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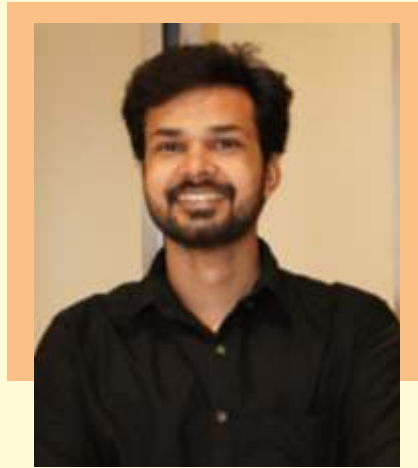
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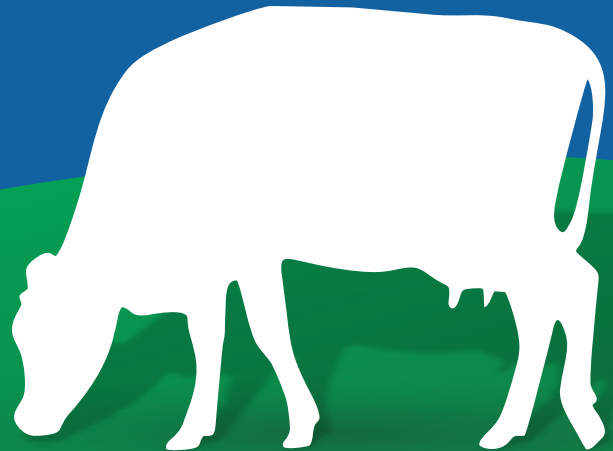
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# From the Pen of Chief Editor



## Winter Stress in Cattle

The combination of cold temperatures, wind, and diminished access to food and water is a common cause of winter stress in cattle. If not properly managed, this can result in decreased feed efficiency, weight loss, and even death.

Additionally, farmers should observe their livestock for signs of stress, such as lethargy, decreased appetite, and weight loss. If animals are determined to be unhealthy, they should be separated from the herd and given additional care.

A well-maintained barn can provide shelter from the elements, as well as a comfortable and secure environment for the animals.

The barn must have sufficient ventilation to prevent the accumulation of moisture and ammonia, which can cause respiratory problems in cattle. In order to prevent the spread of disease, the barn must be kept clean and free of debris.

The barn should provide sufficient space for the cattle to comfortably move around and lie down. To prevent injuries, the flooring of the barn should be made of a nonslip material, such as concrete or rubber.

To allow farmers to monitor the health and behavior of their cattle, the barn should be adequately illuminated.

Additionally, the barn should have a system for removing manure and bedding, which can be a source of bacteria, viruses, and parasites.

In addition, farmers should consider the insulation and heating system of the barn to maintain a warm and comfortable environment for the cattle during the winter.

It is also important to note that during extremely cold weather, cattle have greater nutritional needs. Consequently, farmers should be prepared to increase the quantity of feed given to cattle during the winter months.

It is essential to provide cattle with a balanced diet that includes forages, grains, and protein supplements. Forages may consist of hay or silage, grains are predominantly corn or barley, and protein supplements may include soybean meal and cottonseed meal.

It is also essential to note that feed quality is equally as important as quantity. Moldy or spoiled feed can cause health problems in livestock.

Farmers should also consider feeding the cattle a high-energy diet, such as corn or barley, as an additional source of energy during the winter.

Regardless of the weather conditions, cattle require a constant supply of water. In cold weather, cattle may consume less water, leading to dehydration and decreased feed efficiency. It is essential to ensure that the cattle can easily access the water source and that it has not frozen over.

Overall, providing cattle with adequate water and feed during the winter months is essential for maintaining their health and well-being.

In conclusion, preventing and mitigating winter stress in cattle requires a combination of adequate shelter, feed, and water, animal health monitoring, and appropriate management practices. To ensure the well-being of their cattle during the winter months, farmers must take a proactive approach.

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# Flooring System in Livestock



**Deepandita Barman**

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FOR increased production, it is necessary to give animal proper comfort, their environment must be considered. There should be a proper place for rest of cows where minimum harm is inflicted to them. Providing them with a properly designed stalls with comfortable bedding is one of the aspect which must be considered.

Providing them with inadequate hard bedding in resting place resulted in lameness, decreased performance risk of injuries.

## Different types of flooring

### 1. CEMENT CONCRETE:

- Common material used
- Cheap and durable if properly constructed
- Provides the required cool conditions for the animal
- Groove and rough surface must be provided to make non slippery and to prevent them from accident.

### 2. BRICKS:

- Provides non-conducting warmth floor which is necessary in houses.
- Hard impervious bricks with grooves on the surface.
- Joints are coated with cement mortar.
- Ideal flooring for animals because of durability and damp proof condition.

### 3. STONE SLAB FORMING:

- Stones are made into blocks.
- Durable and strong

- Granite stones are used where they are easily available

### 4. GRAVEL:

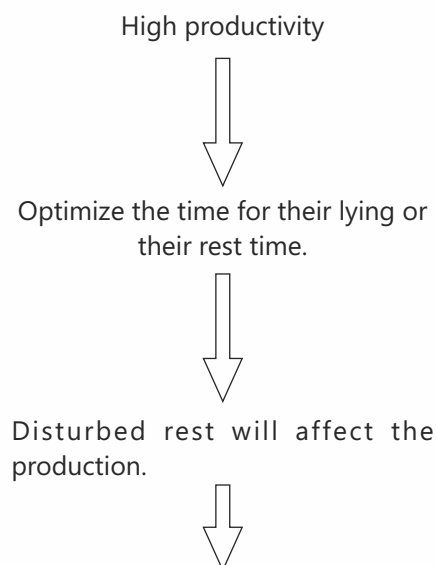
- It absorbs water and worn out quickly.
- Continuous repair and maintainance is required.
- During disease outbreak disinfection is not possible with this type of flooring.

### 5. RUBBER FLOOR:

- Rubber is used as block set on cement block or as a thin mat with grooves and ridges on the surface.
- It is costly and fixing is difficult.
- In western countries this rubber flooring is used in dairy and calving boxes to provide clean, soft and comfortable surface.

## Effect of flooring in dairy livestock and production

COWS prefer softer bedding materials for lying and spend longer time on it rather than hard bedding.



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Decreased secretion of growth hormone and decreased lying time is related to hoof health and lameness.

Cows need 1-4 hours of rest a day which enables better flow of blood to their teats and increased salivation in mouth. This will reduce the chances of ruminal acidosis.

3L of blood per min flows through teats of standing cow, whereas 5L of

blood per min flows through teats of resting cow.

So proper rest will also help in maintaining good udder health and functions which will increase milk production. That all depends on stall design specially flooring material and time of day.

In bedding materials, presence of large number of different types of bacteria results in mastitis and increase in somatic cell count. Mastitis directly affects quantity and quality of milk.

Physical and nutritional conditions of bedding materials also affect the growth of microorganism.

### Conclusion

Various flooring systems have been developed to support animal comfort, health and production and providing animal management indoors.

Clean, dry, comfortable and non-slippery bedding areas should be there for ease of their rising.

## Benefits of A2 Milk

A2 milk is a type of cow's milk that exclusively contains the A2 protein, in contrast to regular milk, which contains both the A1 and A2 proteins. Some people believe that consuming A2 milk can cut the risk of developing digestive issues as well as chronic diseases. Regular milk's A1 protein causes bloating, gas, and stomach discomfort. People who are sensitive to the A1 protein found in regular milk may benefit more from drinking A2 milk. A2 milk is not widely available, which contributes to its high price.

**Nutritional content:** A2 milk contains the same basic nutritional content as regular milk, including protein, carbohydrates, and fat. The difference lies in just the protein.

**Taste:** Some people claim that A2 milk has a milder, creamier taste than regular milk, while others report that there is no noticeable difference in taste.

**Allergies:** A2 milk is not suitable for people who are allergic to cow's milk. Additionally, if you are allergic to A1 protein, you may still be allergic to A2 milk.

**Research:** There is currently limited scientific research on the health benefits of A2 milk, so it is difficult to say for certain whether or not it is truly beneficial. More research is needed to confirm the potential health benefits of A2 milk.



# Lumpy Skin Diseases - Symptoms, Therapeutic and Controlling Measures

Lumpy skin disease (LSD) is economic important notifiable disease of cattle, buffalo and sometimes in wild animals. It causes substantial economic losses to the nation. Disease impacts heavily on cattle production, milk yields, and animal body condition. It causes damage to hides, abortion, and infertility.

First reporting of the disease is Zambia in 1929; LSD has spread extensively throughout Africa, the Middle East, Southeastern Europe, Central Asia, and more recently expended to South Asia and China. In India LSD was first suspected and noticed in cattle in the month of August 2019 in Odisha LSD has since then spread across Eastern, Southern, Central, Western, Northern and North Eastern region of India.

## Epidemiology

Causative agent of LSD is lumpy skin disease virus (LSDV) along with sheeppox virus (SPPV) and goatpox virus (GTPV) are belongs to the genus Capripoxvirus (CaPV) in the family Poxviridae. LSDV has double standard DNA and enveloped virus.

It is a vector-borne pox disease. The principal vector is likely to vary between geographical regions and ecosystems. The common stable fly *Stomoxys* spp., mosquito *Aedes* spp, and some tick like *Rhipicephalus* and *Amblyomma* spp. have ability to spread the LSDV.

There have been incidence of Lumpy Skin Disease (LSD) in cattle in many state namely Goa, Gujarat, Haryana, Rajasthan, Maharashtra, Madhya

Pradesh, Uttarpradcsch, Uttarakhand, Hirnachal Pradesh, Puniab, Andaman & Nicobar Islands and Jammu & Kashmir. Most recently it also confirmed in Chhattisgarh.

## Symptoms & sign

The clinical disease is characterized by malaise, anorexia, fever (up to 41°C), enlarged superficial lymph nodes, watery/purulent nasal and ocular discharge and characteristic generalized skin nodules all over the body within 48 hrs of infection from 0.5 to 5 cm in diameter that develop over 3 to 4 days from macules to papules to nodules They are hard in consistency and affect the full thickness of skin and move easily with the skin when grasped between fingers and thumb and in lactating animals, a rapid drop in milk production. Brisket edema and superficial lymphadenopathy are also reported. After 1 to 2 weeks, the skin nodules become necrotic and center eventually sloughs off.



The disease severity may vary from subclinical infection to death



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depending upon the LSD virus strain, vector prevalence, age and immune status of the host. The morbidity rate can be from 5 to almost 100% and mortality rate most often between 1-3% but may reach up to 45%. Secondary infections of the skin result in further debility and concurrent purulent mastitis. In cattle's occasional abortion, reduced sperm motility and increase in semen discard rate are also observed.

### Therapeutic management of lumpy skin diseases (LSD) in cattle

1. Affected animals should be isolated from healthy animals and shall be kept in monitoring under veterinary supervision.
2. Symptomatic treatment is recommended.
  - Use of anthelmintics for deworming e.g. ivermectine
  - Use of anti-inflammatory (NSAID) drugs for inflammation and pain e.g. Meloxicam, Flunixin Meglumine etc
  - Use of anti-histamine preparations / drugs e.g. Chlorpheniramine maleate etc.
  - Use of Paracetamol in case high fever is observed.
  - Use antibiotics in case of secondary bacterial infections like respiratory infections, skin infections eg. Tetracycline, streptopenicillin, enrofloxacin etc.
  - Parental/oral multivitamins may also be given
  - Animal should be given soft, liquid, easily digestible food.
3. Treatment by methylene blue (MB)
 

In adult cow 0.1% solution 300ml at 8 hour interval for 4-5 days orally.

In calf -150ml also used topically (eg. by spray).

4. Wound Healing and Fly Repellents- Herbal spray/cream Preparations like Topicure Advance Spray Natural Remedies as Skin Healer and Fly Repellent, Scavon skin spray, charmil skin spray, Himax cream.
5. Appetite and Digestive Tonics- Restore the appetite, rumen functions Preparations: Like Himalayan Battista, Appetonic and Ruchamax may be used.
6. Immunomodulators and antioxidants- Preparations like Restobal (Ayurvet) Immunity enhancer and Geri forte (Himalaya) may be used.
7. Instant Energy Booster- Preparation likes Gluca-Boost Liquid (Natural Remedies) Energy Booster can also use.

### Control measures

- It is recommended that areas at high risk of LSD introduction implement the following procedure:
  - Identify the sick and affected animals showing the symptoms like lacrimation, ocular-nasal discharge and separate from the healthy animals.
  - Quarantine is the very first step to be undertaken quickly, especially at first detection of the disease in a region.
  - Strict compulsory clinical inspection procedure should be followed in border region of all susceptible imported animals with establish authorized trained units to restrict /control cattle movement as soon as possible.
  - Regular use of pour-on repellents and insecticides for cattle and buffaloes. Regular cleaning, disinfection of farm and other premises where animals are kept.

- Prevent the standing water sources, slurry and manure and improved drainage of excreta are important general measures even in the absence of disease.
- Person who is handling the affected animals should wear PPE kit and follow the standard procedure. After handling or collection of sample properly dispose all the equipments used.
- Vaccination is a best prophylaxis measure for controlling the spread of LSD. Perform a mass vaccination program in range of 5km diameter of affected area. Above 4 month age all susceptible cattle should be vaccinated with goat pox vaccine (Uttarkashi strain) in 3mL dose and S/C route.
- Awareness and training program on clinical disease signs, prevention, control and biosecurity practices among practitioners, government and private veterinarians, border inspectors, farmers, women farmers should be conducted.
- Disposal of the carcass either by burial or burning method should follow for environmental protection.
- Give timely notification to neighbouring countries and relevant international organizations according to international regulations.

### Conclusion-

LSD virus is transboundary disease spreading through country to country. India is the largest milk producer around the world so this disease heavily impact on milk production and reduces the performance of animals. Early detection, immunity boosting, vector control, vaccination is the best way to control the spreading of disease because prevention is the best cure of the disease.

# Agonistic Behaviour in Farm Animals

Agonistic behaviour is commonly observed among farm animals. Agonistic behaviours are those behaviours which cause, threaten to cause or seek to reduce physical damage. Agonistic behaviour is comprised of threats, aggression and submission. While any one of these divisions of agonistic behaviour may be observed alone, they usually are found, in sequence, from the start to the end of an interaction. Farm animals may show interspecific or intraspecific agonistic behaviours, interspecific agonistic behaviour has not been extensively studied but it is agriculturally important because farm workers may become injured or killed by aggressive farm animals. Types of intraspecific agonistic

adjustments associated with fighting, which includes attack, escape, threat, defence and appeasement. The simplest explanation of the concept of agonistic behaviour is that it is composed of the continuum of behaviours from threat to aggression to submission. To minimize aggressive events large individual distances should be maintained.

## Causes

- When a new group formed.
- A new individual enter into a well established group.
- Limited supply of food and bedding space
- Competition among animals for breeding



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behaviour are when animals are brought together, intermale fighting, resource defence, inter-gender fighting and aberrant aggression. Agonistic behaviour defined as the group of behavioural

## ***Fig- Fighting behaviour in cattle***

### **Threat**

Threats refer to those species specific vocalizations, odours, postures, facial or body movements





that signal the intent to display aggression. In stable social systems, the threat causes immediate signs of avoidance or submission. In newly formed or unstable social groups, a threat may cause the recipient to threaten or a threat may precede an outbreak of aggressive behaviour. Threats are usually subtle to the human observer and therefore difficult to measure objectively.

### **Aggression**

Aggression is one segment of agonistic behaviour. Aggressive behaviour is the most formidable to define. For example, workers are aggressive in their jobs and some females and males are sexually aggressive. Neither of these uses of the word aggression applies to this discussion of social behaviour. Aggression is defined as those species-specific behaviours associated with attack. Attack is those behaviours whose objective is physical injury. To put the generally subjective behaviours called threats with the more objective behaviours called aggression weakens this potentially objective measure

### **Submission**

Submissive behaviour is the least studied, least understood and yet very important segment of agonistic behaviour. Submissive behaviour is usually exhibited following either a threat or an aggressive interaction. Therefore, while showing submission, the submitting animal is stressed. Submission includes species-specific behaviours, vocalizations and odours that signal non-aggressiveness and reduce further attack by conspecifics. Most submissive behaviours are learned behaviours associated with flight (from an attack) or appeasement, and that an animal must have been attacked at some time in his life in

order to show submissive behaviour. Submissive behaviour may be objectively measured because these behaviours always follow either aggressive behaviour or a threat and because each species has specific submissive postures.

## **Types of agonistic behaviour in farm animals**

### **1. Interspecific agonistic behaviour**

It is most often a management problem with larger farm animals. Aggressive male animals (particularly bulls, boars and rams) can be dangerous because they can injure or kill farm workers. Farm animals may set up a territory which, when violated by a human, provokes attack (territorial defence). Aggression towards humans from females is less common, but the lactating female may be a threat to workers due to maternal aggression or defence. Another type of interspecific aggression-predatory aggression-is rarer. Only pigs and poultry are considered omnivores and thus may, on occasion, attack and eat a small animal.

### **2. Intraspecific agonistic behaviour**

It must be managed to optimize productivity. The most common management practice that induces aggression and submission is bringing together unfamiliar animals. Intraspecific mixing of unfamiliar cattle, sheep, swine, or poultry incites high, measurable levels of agonistic behaviour. The agonistic behaviour shown after grouping unfamiliar animals follows the continuum from threat to aggression and submission until a period of social stability (level of aggression not statistically different from zero) is reached. During this period of social stability, only an

occasional threat or attack is necessary for an animal to reinforce its dominance. If greater amounts of agonistic behaviour are observed, the group may have an unstable dominance order. Inter-male fighting is observed in normally unaggressive flocks or herds of farm animals during the breeding season. This temporary increase in aggressiveness may be due to motivation to breed more females (a limited resource) or due to seasonal changes in physiology (e.g., high testosterone). Resource defence is the name of a similarly motivated type of aggression. When resources are limited (in any season), aggression increases. For example, limited feeder space causes higher levels of agonistic behaviour. Inter-gender fighting occurs in farm animals during attempted sexual activity. The two common forms are when

- (1) a male attempts to mount a female and the male receives aggression from an anestrus female or
- (2) a male attacks a female in his search for a receptive female. This sex-related fighting is not common and has not been studied in farm animals.

Aberrant aggression (i.e., cannibalism and self-mutilation) is not clearly agonistic behaviour. The intent seems to be to cause physical damage as in tail-biting; however, these behaviours are thought to be aberrant because they have not been reported in wild ancestors of our domestic animals.

### **Sheep**

Domestic sheep are often viewed as non-aggressive, gregarious animals. While sheep may not show the high frequency of agonistic encounters observed in other animals, they do show measurable

levels of agonistic behaviour. The aggressive behaviour called "fighting" and it included shoving with shoulders and running together and butting. Scott observed play-butting in young lambs and more damaging aggression in ewes and rams. Most fighting was during the fall breeding season. Sniffing, mounting, gaffing and chasing have been identified as behaviours occurring during agonistic interaction. Because a complete, quantitative ethogram of agonistic behaviours of sheep is not available, little can be said of the relative importance of these behaviours. Aberrant aggression also has been described for sheep. Some ewes show aggression towards their lambs or alien lambs. A better understanding of these maternal-young interactions may improve fostering and bonding techniques and may consequently enhance lamb survival. Wool-picking (pulling wool with teeth) is more common in confinement-reared sheep. Its causes, treatment and prevention have not been scientifically elucidated.

### **Swine**

Pigs show substantial levels of agonistic interactions when unfamiliar conspecifics are brought together. While pigs have been reported to show threats are subtle and difficult to describe objectively. Head-tilt and retreat (called avoidance or chase by others) and nose-to-nose contact, which may correspond to threats. Often the best method to determine if a threat was made is to observe an avoidance response (as is done in much poultry research). The aggressive components of agonistic behaviour in the pig are composed of mainly bites and pushes. Head-thrusts (also called levering by some researchers) and a type of pushing

where the pig usually pushes its opponent's head up. Head-thrusts, in combination with bites and shoulder pushes, represent the phase of the interaction that seems most intense. Submissive behaviour is shown by the subordinate pig turning its body and either running away or remaining stationary and presenting its rump. Submission may also be signalled by a lowering of the head or a squeal. Abnormal or aberrant agonistic behaviours are found in swine. Sows, on occasion, kill their piglets and growing pigs bite tails and chew ears.

### **Goat**

During feeding, aggressive postures in goats can include side-on locking of horns, butting the flank of another feeding goat, and ear biting. It is not, therefore, surprising that aggressive interactions occur frequently among loose housed goats during feeding. Recent observations in larger groups of horned and hornless goats suggest that distinct differences in social behaviour are more reflected in feeding place occupancy in small groups due to the overall small pen dimensions. Agonistic behaviour in goats are behaviours such as attacking, escape, threatening, and defence. The reason for these behaviours in goats is the instinct to protect both themselves and their food sources. Agonistic behaviour is observed to be 50% higher in males. The most important cause of this is the fact that females have no horns or weak horns. Agonistic behaviour modes in goats are observed mostly in the form of attacking, threatening, and submission.

### **Threatening behaviour**

As the number of living creatures in a population rises, competition for food, living space, and mate increases. Competition leads to

the emergence of social hierarchy among animals which make up the group. The individual which proves its superiority has the chance to meet its vital needs before others. These individuals exhibit symbolic threatening behaviour. Animals which are dominant within the herd try to have their superiority recognized by other animals through certain sounds and motions to express their intent to the other animal.

### **Attacking behaviour**

It is perhaps the most important of agonistic behaviours. Environmental factors have a fairly high influence in the emergence of these behaviours. We could list herd size and physical amenities (shelter, feed, area for water etc.) among these factors. For instance increased herd size can increase attacking behaviour since it will limit food, water, and shelter areas. Attacking behaviour also increase with sexual maturity. These behaviours mostly manifest in the form of head-butting.

### **Conclusion**

Agonistic is a sort of social behaviour that is frequently seen in animals raised for food. Behaviours that create, threaten to cause, or attempt to lessen physical harm are said to as antagonistic. Threats, aggressiveness, and capitulation are all parts of antagonism. Although each one of these categories of agonistic behaviour can be seen on its own, they are often seen from the beginning through the end of an interaction. Food animals may exhibit agonistic behaviours that are either inter- or intra-specific. When animals are brought together, intermale fighting, resource defence, inter-gender fighting, and aberrant aggression are examples of intraspecific agonistic behaviour.

# Combating Cold Stress in Small Ruminants: Practical Tips



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Unlike temperate countries – although significant parts of India do not experience freezing cold – most of the northern states encounter extreme winter with an environmental temperature falling 5°C or below between mid. November to the end of January. Unless small ruminants like sheep and goats are protected against the impending inclement weather of periodic episodes of cold waves and frosty wind, they may suffer from “cold stress” and succumb to death with extreme “hypothermia.”

Following are some of the practical tips to combat cold stress in small ruminants kept under intensive/semi-intensive rearing:

### I. General management/husbandry practices

- Breeding should be planned in such a way that lambing and kidding should not coincide with the extreme cold season, as young ones are more prone to cold stress.
- Shearing of sheep must be completed at least two months before the beginning of winter so that they will have sufficient wool covering to protect against cold.
- Deworming based on faecal

egg count needs to be completed in advance to make sure that the animals actually absorb the digested feed nutrients to maintain desired body condition.

- Keep the floor clean, dry and free from dampness by avoiding washing the floor with water. However, dry lime dusting is encouraged for general disinfection.
- Dry bedding with gunny bags, dried grass, long paddy straw, leaves, wood shavings/saw dust etc. may be included to limit direct contact of animals' body with the cold surface of the floor.
- Faecal pellets need to be lifted on a daily basis to minimise ammonia build-up within the shed, which may otherwise predispose animals to respiratory ailments.
- In the case of open-housing system, cover both the open sides of the shed with a thick plastic sheet, tarpaulin or used bag curtains to act as a windbreak/shield.
- Keep all animals in the covered shed with a roof shelter and do not let loose them in open area, especially during evening and night hours. Animals show





“huddling behaviour”, which in turn decreases heat loss and maintains warmth.

- A winter coat prepared from a clean jute bag or old blanket helps insulate the body of animals against the frosty wind. This is particularly important for weak animals having low energy reserves. An additional layer of plastic covering over the jute bag may be necessary for goats as they have the tendency to chew gunny bags.
- Refrain from giving bath to animals in the cold season, which may otherwise aggravate hypothermia.
- Shift the young, weak animals and nursing ewes/does to a pen receiving maximum sunshine during daytime.
- Electric heaters and/or blowers may be installed at least one per pen.
- Lights within the animal house may be turned on during night hours to minimise mosquito menace to a certain extent.
- Keep monitoring every animal for signs of deteriorating health twice a day, once in the morning and evening. Early signs of disease like shivering, nasal discharge, coughing, anorexia, diarrhoea, hypothermia etc. warrant immediate medical attention.

## II. Nutritional management

- Feed a balanced ration adequate in energy, protein,

fat and micronutrients (minerals and vitamins) as per the requirements.

- Feeding program needs to support optimal body condition to facilitate physiological thermoregulatory mechanisms.
- As animal spends more energy in maintaining body heat, dry matter intake generally increases by over 15%; hence, winter nutritional program must duly consider the necessary ration adjustment through a higher allocation of concentrate mixture.
- Molasses (jaggery) at 5-7% and bypass fat at 1-2% may be included in the concentrate mixture, which increases palatability and energy density, respectively.
- Proportion of grain may be increased by 5-10% whilst that of oilcake be decreased by 2-5% provided sufficient protein forage like berseem, ryegrass, lucerne hay etc. are available.
- To increase the heat of fermentation due to eating and rumination, the proportion of dry forage (straw) may be increased, which generates additional heat increment. However, it should not be done at the expense of energy concentrates.
- More feed may be offered during evening hours than morning so that it provides

additional warmth from fermentative feed digestion until early morning when the temperature dip will be maximum.

- Wherever the feeding program comprises exclusively of ad libitum berseem under stall-fed conditions without additional concentrate allocation, provide at least crushed grains to synchronise energy-protein to maximise rumen microbial protein synthesis.
- Orphan lambs/kids in the farm that are under bottle-feeding must be provided with lukewarm milk twice/thrice a day.
- Feed concentrate (starter) mixture at 100-200 g/d separately for all the post-weaned lambs/kids for harnessing a rapid growth rate.

The general management and modified dietary regimen are necessary precautions to safeguard animals from winter stress. For any strategy applied at on-farm situations to be practically feasible, there must be a clearly justifiable return-on-investment. Nonetheless, when the loss of animals (mortality) is accounted due to no/poor winter management, the minimum investment incurred on nutritional enrichment and other management guaranteeing a successful winter performance itself will be an apparent gain/benefit for small ruminant producers.

# Preventive Measures For Contagious Diseases in A Farm



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## Introduction

Infectious diseases are major threats to farmers depending mainly on agriculture and livestock farms as they cause huge production losses and deaths of animals. Infectious diseases include bacterial, viral and protozoan diseases which can spread from animal to animal through direct contact, feed, water or air. The risk of spreading can be minimized by following biosecurity and biocontainment planning system in a farm.

### 1. Biosecurity:

Biosecurity is the management practices that reduce the risk of introducing the infectious agents into the farm.

**a. Purchase of new animals:** Before introducing a new animal to farm it should be evaluated for its complete health status, and vaccination records have to be checked properly. Farmer should take a notice of prevalence of diseases in their area and if any endemic disease exists then test should be done before buying the animal.

Particularly before lactation animal was brought to a dairy farm, the milk samples should be tested by microbial culture to avoid any contagious intramammary disease.

The cattle or any other animals that have been purchased or from any other premises should be kept in quarantine for at least 10 days (preferably 3 weeks) in different area (Figure 1). If any symptoms of infectious disease appear, that animal should be culled immediately. For better surveillance record should be maintained containing the

identification for each animal, place of origin, details of seller, vaccination history, tests performed, date of entry to the isolation area, and date released to the general farm.

It is recommended to purchase the animals from a known source and to avoid from market or dealer. Prohibit the practice of hiring bull for short period of time for breeding purpose. It is better to follow artificial insemination.

**b. Feed and drinking water:** The source of contamination of feed is the manure that has been used as fertilizers, contaminated water used in irrigation, fecal material and urine from rodents, wildlife, and birds. The manure used in the fields should be monitored for containing any contagious agents and it should be recorded that from which farm animals it has been used. It is necessary to observe any mold growth in feed stuffs and if possible it is better to test the feed samples for mycotoxins (Figure 2). Drinking water used in farms also can be a point of infection, so it should be filtered and chemically sterilized before providing to animals.

**c. Workers and Vehicles:** People like dairy workers, laboratory workers, veterinarians, visitors, vehicles bringing feed and fodder, other inanimate objects any others who enter into different farms can be source of spreading infections. Therefore precautions should be taken like restrict the access the area of farms where animals are housed. Area loading and unloading of culled and dead animals on vehicles should be very



far from animal house. Feed or any goods receiving area should be located at entrance which can restrict the entry of vehicles. Workers who come into contact of animals should have separate clothes, foot wear and hand gloves. Disinfectant baths for foot wear and vehicles should be provided for workers at entrance (Figure 3). A best way to reduce contamination is educating and training the workers about the preventive measures and diseases awareness.

## 2. Biocontainment

Bioconatinment is the management practices that decreases the spread of diseases within farm between animals

- a. **Vaccination:** Vaccination is the proper method for preventing spread of diseases. Herd immunity is necessary in a farm to avoid animal losses, though it does not provide absolute protection from disease (Figure 4).
- b. **Housing facility of animals:** Animals can be divided into different groups (new born, young one, lactating cows, non-lactating cows, sick cows) and housed

separately to avoid spread of infectious agents to susceptible ones. Farm should contain enough space for movement of animals, and it should not be over crowded. In a farm indirect contact can be avoided by using separate equipment, working people and feeding and drinking facility should be separate.

- c. **Cleanliness measures:** Clean environment is most priority in preventing spread of pathogens among animals. Disinfect the animal farm periodically (Figure 5). The floors have to be cleaned, dry scrubbed to remove organic matter and then wetdown with detergent and water. Equipments, feed and water containers should be washed daily. In case of outbreak of disease, farm should be fumigated. All these should be done by having gloves on hands.
- d. **Culling of disease animals:** The animals with poor production, sterility, infected by contagious disease, milk production decreased due to mastitis should be removed from farm to control economic losses and pathogenic agents.

- e. **Disposal of dead animals:** Dead animals should be disposed properly taking precautionary measures as they are source of infection to animals as well as humans. They should be handled by wearing personal protective equipment. Whole animal is taken far away from farm and they are disposed by burial or burning or incineration method. In case of dead fetus of infected animal should be disposed immediately along with the secretions and placenta expelled from cow. Dead animals can be utilized for composting which can be used as fertilizers (Figure 6).

## Summary

In a farm biosecurity and biocontainment measures should be followed in order to reduce the risk of spreading infectious diseases between animals, human to animals and animals to human. These measures help to prohibit economic loss due to outbreak of any contagious disease as they form a barrier in passing infectious agents in a rapid pace between animals.



Figure 1: Quarantine of animals



Figure 2: Feeding the animals



Figure 3: Disinfecting the vehicles



Figure 4: Vaccination of cattle



Figure 5: Disinfecting the farm



Figure 6: Composting the dead animal



# Climate Management of Buffalo in Winter Season



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Macroclimate comprises the normal component of weather to which animals are exposed rainfall, temperature, solar radiation and wind. Microclimate that occur in small space within a few milli meter of plant on animal surface i.e biological climate and terrestrial climate .Exposure of very cold temperature leads to hypothermia wind, rainfall increase the loss of heat from the body occur cold stress animal reducing efficiency of digestion leading to enteritis. During winter season the milk production is increased but SNF% is decreased due to climatic fluctuation.All animal performs better at thermoneutral zone. Hypothermia occurs when the body temperature drops well below normal. In buffalo mild hypothermia occurs with a body temperature of 30°C–32°C, (86°F–89°F), moderate hypothermia at 22°F–29°C, (71°F–85°F) and severe hypothermia below 20°C (68°F).As rectal temperature drops below 28°C (82°F), cows are not able to return to normal temperature without assistance through warming and the administration of warm fluids. When temperatures move outside of the TNZ, the animal has to start expending extra energy to either cool down (heat stress) or warm up (cold stress). Environmental temperature range in which no

apparent demands are made upon physiological and thermo-regulatory mechanisms.

## Effect of climate in Winter season in buffalo

Animal becomes lethargic and depressed. Animal loses weight as both feed energy and stored fat are diverted to maintain body temperature and vital functions. Temperature of skin, feet and ears, is reduced and feel cold to the touch. Pregnant animals become weaken and lose weight. Mortality rate increases in calves. Decreases digestive efficiency in animals and causing diarrhoea Reduce physical condition due to the low availability of energy and milk production is reduced. Slows respiration and heart rate. In extreme winter animal loses consciousness and may dies. Winter exposure directly limit the synthetic capacity of mammary gland by reducing mammary gland temperature or the blood supply. With change in endocrine balance induced by winter exposure alter the metabolism of mammary gland and affect milk production Metabolic rate increases: thereby increases feed intake Energy is required to help support metabolic increase and if this requirement is not met, fat is pulled from body reserves. Less efficient digestion, since buffalo is consuming more feed frequently.



Reduced body fat result in weight loss and ultimately reduced body condition. Reduced body condition leads to increase chances of lameness and poor reproduction. Difficulty in parturition due to reduced body temperature, respiration and pulse rate. Due to increase heat production by maintaining the thermoneutral zone.

### **Strategy for climate management in buffalo**

A shelter should be comfortable and can protect the animals from inclement weather conditions i.e cold, rain, snow and strong wind and protection of predators, isolation, comfort welfare. It may be constructed with simple and locally available materials with a roof and walls. There should be a feeding area inside the shelter in case of several days with bad weather. Dry and clean bedding is important in cold weather to

maintain animal health as hay, straw, wood shavings ,sand sawdust In housing bedding for an animal must be comfortable, clean moisture absorption capacity, and absorbent i.e Comfort Cleanliness Bedding should not sustain bacterial growth. Water, possibly lukewarm, should be clean and available in free access conditions. 10 to 12 liters of water is required for one liter of milk.20 to 25 liters of water required in case of adult buffalo in 24hours .Clean and fresh water should be provided to animals. Give Vitamin antioxidant diet (for example vitamins A, E and C) and mineral salts (iron, zinc, copper and manganese) it should help in maintaining the natural cycle of oestrus Protect animals from frost wind. Because the temperature of the atmosphere effectively reduces air frost in animals and increases the likelihood of cold stress. The concentrate should be given at night because the metabolic rate is

increased at night and easily digested. In winter season, increase the amount of grain in the diet that could protect the animal from cold stress. Dry-bed i.e Puwal protect animals from cold stress which plays an important role. The animal must feed more hay and grain .it help to reduce cold stress. Keep buffalo clean and dry because wet skin, which reduces the insulation properties in animals increases the potential for winter. Clay and buffalo dung on the skin reduces the skin insulation properties.

### **Conclusion**

Temperature affects most of the critical factors for livestock production, such as water availability, animal production, reproduction and health. Adaptation can protect animals from harsh weather. Key to control climate for the animals is management.





# The Concept of Dietary Cationic and Anionic Balance (DCAB/DCAD) and its Role in Proper Management of Transition Period in Dairy Cattle.

“ The effect of diet on acid-base balance is more important in controlling milk fever than calcium intake

”



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## Transition period in dairy cattle:

The term "transition" refers to the process of a cow moving from not producing milk (dry cow), to calving, and then to producing milk. The transition period was traditionally the three weeks before calving and the three weeks following calving. As we learned more about cow physiology, this period expanded from 60 days pre-calving to 30 days post-calving. This 90 day makes a transition period for dairy cattle. The transition period is characterized by the increased risk of diseases due to changes in calcium, phosphorus homeostasis and energy balances. Metabolic changes take place during the transition period due to changes in its physiology. Metabolic disorders occur when dairy cows cannot successfully adapt to all the physiological changes. These disease complexes are interrelated. The occurrence of one can increase the risk of another and also predisposes the cow to infectious diseases. Nearly 50% of dairy cows suffer from metabolic disorders and mastitis during this period. This period has an immense effect on the production of cattle as well as reproductive performances. This is a very important period economically for livestock owners.

## Common transition period disorders related especially to calcium and phosphorus homeostasis:

Subclinical hypocalcaemia and milk fever: 60-70% of dairy cows suffer from subclinical hypocalcaemia of which 5-7% go into milk fever. This condition leads to a loss in milk production, a 3-fold increased risk of dystocia, retention of the placenta (ROP), metritis, prolapse and abomasal displacement; 9-fold increased risk of ketosis and mastitis. Milk fever if left untreated results in the death of dairy cows.

## DCAB/DCAD

The effect of diet on acid-base balance is more important in controlling milk fever than calcium intake. Diets fed before parturition that evoke an acidic response in the animal reduce milk fever risk, whereas diets that evoke an alkaline response increase it.

The potential of a diet to cause either alkalosis or acidosis can be estimated by calculating the dietary cation-anion difference (DCAD). The Dietary Cation-Anion Difference or Balance (DCAD or DCAB) of feedstuffs is determined by calculating the balance between the positively charged ions (cations) and the negatively charged ions (anions). Inorganic ions that are highly dissociated in aqueous solutions and absorbed across the intestine into the blood influence acid-base status. The principal dietary cations are sodium (Na), potassium (K), calcium (Ca) and magnesium (Mg); the major dietary anions include chlorine (Cl), sulphur (S) and phosphorus (P). By knowing the levels of these minerals in a product, the DCAB of any feed ingredient, forage or total ration can be calculated.

## The DCAB is calculated as follows

$$\text{DCAB (mEq/kg DM)} = \{ \text{Na (mg/kg DM)} / 23.0 \} + \{ \text{K (mg/kg DM)} / 39.1 \} - \{ \text{Cl (mg/kg DM)} / 35.5 \} - \{ (\text{SO}_4 \text{ (mg/kg DM)} \times 2) / 32.1 \}$$

The basic unit of measure is the equivalent (Eq) or milliequivalent (mEq). An Eq is simply the atomic weight adjusted for the ionic charge. A mEq is one-thousandth of an Eq. This is necessary because we are concerned with an electrical charge, not mass. Therefore, it is essential to convert per cent dietary concentration to mEq.

DCAB is also called the following: Dietary Cation Anion Difference (DCAD), Dietary







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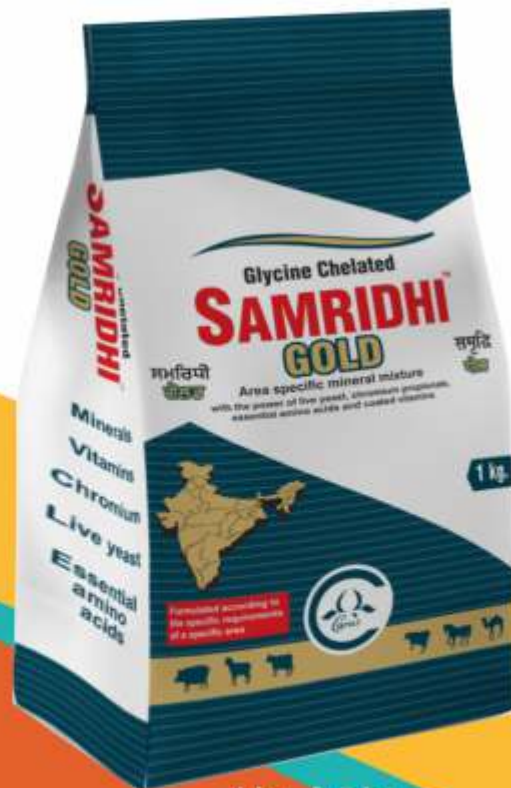
### Usage:

Cow, Buffalo & Horse : 50 gm. per day

Calf, Sheep, Goat & Pig : 25-30 gm. per day

Camel : 100 gm. per day

Or mix 1-2 kg. in 100 kg. feed or as advised by the nutritionist



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Nutrition Division

Electrolyte Balance (DEB), Anion Cation Balance (ACB), Strong Ion Balance (SIB), and Fixed Ion Balance (FIB). These terms are generally used interchangeably.

### The Importance of DCAB/DCAD

The reason to calculate the DCAB is that Na, K, Cl and SO<sub>4</sub> are involved in the acid-base status of the animal; In this case, we don't speak about the rumen acids and bases, but the systemic (blood) acids and bases. The role of systemic acid-base status mediated by the relative difference between strong dietary cations (Na, K) and anions (Cl, S) in Ca homeostasis and as a mechanism for milk fever prevention has been well studied. Response to cation-anion manipulation of the diet can be easily monitored by measuring urinary pH. Urinary pH is sensitive to acid load and is highly correlated (R<sup>2</sup> = 0.77) with change in the blood pH. The desired range in urinary pH to achieve sufficient metabolic acidosis to prevent milk fever is 6.0 to 7.0. Urinary pH below 6 suggests excessive acidification and it is not advisable to add anions.

Although all macrominerals potentially mediate Ca homeostasis, practical experience with urinary pH measurements and rationalization of mineral requirements relative to their contribution to acid-base status has simplified the application of DCAD to milk fever prevention. Dietary Mg should be increased to 0.35% to 0.4% DM to counter antagonism from higher dietary K content and to ensure adequate Mg to support the Ca homeostatic system. Because of the inhibitory effects of high blood P concentration on vitamin D activation and inherently low acidifying effects, there is no need to increase dietary P beyond current NRC recommendations (0.3–0.35% DM). Dietary sulphur (S) should be supplemented between 0.22% and 0.4% DM. In view of the questionable acidifying effect

of sulphate ions and the potential toxicity of S (e.g., polioencephalomalacia), supplementing to greater than this level is not recommended. Na requirement can be met with a diet containing 0.12% Na. Forages typically are low in Na (<0.1%), and minimal salt could be added to the diet to meet requirements.

### The below mentioned mechanism correlates Ca homeostasis and DCAD concept.

1. The Negative DCAD with major anions like Cl and S have an acidic function in the body; their metabolism leads to decrease the pH of the blood and Urine. Ca is a cation and to neutralise the pH of the blood, the body reacts by increasing the calcium resorption from the bone and calcium absorption from the intestinal tract.
2. It is well-studied that the marginal difference in the systemic pH influences the interaction between PTH (parathyroid Hormone) and its target organ (bone, kidney) receptor. Metabolic acidosis induced by an excess of absorbable anions (negative DCAD) enhances the PTH activity which augments Ca mobilization from labile bone, additionally, PTH also stimulate the renal Vitamin D which is resulting in greater efficiency of intestinal Ca absorption.

The reduced urinary pH also increases the Ca excretion via urine which in turn lowers the blood calcium level and work as a negative feedback signal for the Parathyroid gland to secrete the PTH to maintain the blood calcium level by mobilization calcium from bone.

### The role of DCAD in optimisation of the Immune system.

A negative prepartum DCAD is also believed to improve postpartum health and production primarily through increasing the postpartum Ca status of dairy cows. Calcium is a divalent cation that is used by all cells of the body to control cell functions in addition to being a major mineral in bone. The availability of Ca is necessary for the proper function of all immune cells. The concentrations of Ca in the cytoplasm of cells are normally very low, but the influx of calcium from intracellular stores and extracellular Ca

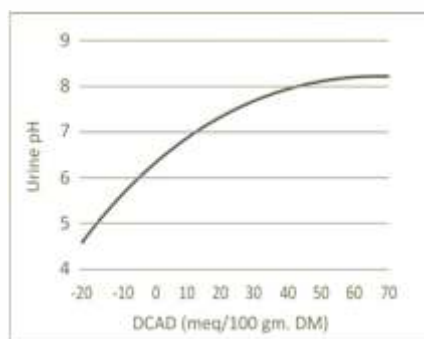
results in the activation of Ca-dependent proteins in the cell. Thus, the transient hypocalcaemia that occurs in dairy cows at the onset of lactation disrupts the ability of immune cells to appropriately respond to pathogens. For example, neutrophil phagocytosis and oxidative burst are impaired by hypocalcaemia in cows. Accordingly, clinical and subclinical hypocalcaemia that occurs at the onset of lactation are associated with a greater incidence of postpartum diseases in dairy cows. Feeding a prepartum ration with low or negative DCAD increases postpartum Ca status, improves neutrophil function, and lowers the incidence of postpartum disease in cows.

### Relevance of DCAD and transition period:

Most often, the DCAB is adjusted in diets of dry cows, close to calving. Just before calving the calcium requirement of dairy cows suddenly increases. When calcium is not mobilised quickly from the bones or absorbed from the intestinal tract, the risk of (subclinical) milk fever increases. To manage this, the DCAB in rations for dry cows can be adjusted by reducing it, often to a negative value (-50 to 0 mEq/kg DM). This will lead to a lower blood and urine pH. In order to neutralise the blood and urine pH, the animal will react by increasing the calcium resorption from the bones and calcium absorption from the intestinal tract. This activation of the calcium metabolism can decrease the risk of milk fever and hypocalcaemia along with the additional benefits of increased milk production and improved reproductive performance. Actually, it is an investment in the animal for the next lactation.

### Conclusion

The DCAD concept is mainly utilised to optimise the function of the parathyroid gland and PTH hormone and to sensitise the endocrine system and keep it ready for the time of parturition. During the transition period when the cow moves from the dry to the milking stage, there is a sudden and vast increase in the requirement of Ca and P and most of the Ca which is secreted in the milk is mobilised from the bone. So optimal functioning of the PTH system is more important than the external feeding of Ca for better management and to prevent metabolic problems related to Calcium.



## January 2023

- Dairy Forum 2023 (IDFA)**  
**Dates:** January 22 - 25, 2023  
**City:** Orlando  
**Country:** Florida  
**Website:** [www.idfa.org/events](http://www.idfa.org/events)
- DairyTech**  
**Dates:** January 25 - 27, 2023  
**Venue:** Crocus Expo International  
**City:** Moscow  
**Country:** Russia  
**Website:** [www.dairytech-expo.ru](http://www.dairytech-expo.ru)
- IDEX 2023**  
**Dates:** January 28 - 29, 2023  
**Venue:** Expo Center  
**City:** Lahore  
**Country:** Pakistan  
**Website:** [www.internationaldairyexpo.com](http://www.internationaldairyexpo.com)

## February 2023

- Agroexpo**  
**Dates:** February 1 - 5, 2023  
**City:** Izmir  
**Country:** Turkey  
**Website:** [en.agroexpo.com.tr](http://en.agroexpo.com.tr)
- Dairy and Poultry Expo**  
**Dates:** February 2 - 4, 2023  
**Venue:** International Convention City Bashundhara  
**City:** Dhaka  
**Country:** Bangladesh  
**Website:** [www.limraexpo.com](http://www.limraexpo.com)
- GulFood**  
**Dates:** February 20 - 24, 2023  
**Venue:** Dubai World Trade Centre  
**Country:** Dubai  
**Website:** [www.gulfood.com](http://www.gulfood.com)

## April 2023

- Canadian Dairy EXPO 2023**  
**Animal husbandry**  
**Dates:** April 5-6, 2023  
**Venue:** Stratford, Canada  
**City:** Stratford  
**Website:** <https://ifw-expo.de/en/exhib/canadian-dairy-xpo>

## June 2023

- DLP EXPO Africa Dairy LiveStock and Poultry Expo**  
**Dates:** June 15-17, 2023  
**Venue:** KICC, Nairobi, Kenya East Africa  
**City:** Nairobi  
**Website:** [www.dlpexpo.com](http://www.dlpexpo.com)

## August 2023

- The Dairy Expo @ The Livestock Expo**  
**Dates:** August 3-5, 2023  
**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)

## October 2023

- World Dairy Expo**  
**Dates:** October 1 - 6, 2023  
**Venue:** Madison  
**City:** Wisconsin  
**Country:** USA  
**Website:** [www.worlddairyexpo.com](http://www.worlddairyexpo.com)



# Synergistic effect of Cefixime and Cloxacillin in combination with Lactobacillus against common bacterial infections in Dairy Animals:



An Ethical Vision to Serve Animal World



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B.V.Sc, M.V.Sc& PGDM

**Dr. Uttam Bajpai**

B.V.Sc. & M.V.Sc.

**Dr. Mohit Rathore**

B.V.Sc. & A.H.

The dairy industry in India is the largest globally, accounting for 23% of global milk production. The industry contributes 5% to the national economy and directly supports more than 8 crore farmers. India's dairy industry has grown significantly over the past 10 years, supported by various initiatives taken by the government.

For about 25 years, India has been the largest milk-producing nation in the world. It has produced twice as much milk in the last 20 years. The dairy industry has greatly aided the expansion of India's rural economy. The National Dairy Plan as well as general empowerment programmes, such as the Jan Dhan Yojana and the Start-up India initiative, were among the government's measures that helped infrastructure for dairy farming. Under Prime Minister Modi's Atmanirbhar Bharat agenda, the animal husbandry and dairying sectors have seen significant growth over the last eight years, and their progress is an impressive illustration of independence.

But the bacterial infections in dairy animals lead to decreased milk production & milk quality & majorly **Staphylococcus aureus, Streptococcus agalactiae, Streptococcus dysgalactiae, Streptococcus uberis and Escherichia coli** kind of bacteria are responsible for the bacterial infections in dairy animals that causes Mastitis & other bacterial infections.

In Modern Era, Different types of bactericidal or bacteriostatic antibiotics i.e Cephalosporins (like Ceftriaxone & Ceftiofur sodium) or Penicillin (like Ampicillin, Cloxacillin & Amoxicillin) or Tetracyclines are being used individually in order to treat various types of bacterial infections in Dairy animals.

But now adays, Bacteria is developing resistance against different individual antibiotics. To treat the infections caused

by resistant bacteria a Broad Spectrum Bactericidal Antibiotic is needed for complete & better treatment.

Commonly used third-generation cephalosporins include Cefotaxime, Ceftazidime, Cefdinir, Ceftriaxone, Cefpodoxime, Cefoperazone, and Cefixime. This generation has extended gram-negative bacteria coverage often used to treat gram-negative infections resistant to the first and second generation or other beta-lactam antimicrobials.

But the inadvertent use of antibiotics may cause microbial resistance now a days. A combination of antibiotics including CEFIXIME, CLOXACILLIN & LACTOBACILLUS (Probiotic) is quite effective against various bacterial infections.

## Introduction

CEFIXIME, CLOXACILLIN & LACTOBACILLUS belongs to a group of drugs known as 'antibiotics' (Cephalosporins, Penicillin & Lactobacillus Probiotic) that is used to treat a variety of bacterial infections. It effectively treats infections of the respiratory tract (Pneumonia), urinary tract, ear, nose, and throat. Additionally, it is also prescribed to treat Mastitis. Infectious or harmful bacteria can make animal sick and reproduce quickly in animal body. These harmful bacteria produce chemicals known as bacterial toxins, which can damage tissues and make animal sick.

**CEFIXIME**- Cefixime belongs to the third-generation cephalosporin antibiotics that exert their bactericidal effect by attaching to penicillin-binding proteins and inhibiting peptidoglycan synthesis, thus causing damage to the bacterial cell wall. The third-generation Cephalosporins are used all over the world because of their broad spectrum



activity against all Gram-negative and positive pathogens and atypical organisms, e.g. Mycoplasma and Chlamydia.

**CLOXACILLIN**- Belongs to the class of Penicillin. Effective against bacterial infections and treatment of Staphylococcal Mastitis. Cloxacillin has a bactericidal mode of action (inhibits bacterial wall mucopeptide synthesis). Cloxacillin loses potency when used with Erythromycin, gentamycin & Kanamycin so these combinations need to be avoided.

These medications (Cefixime & Cloxacillin) can treat the below provided problems:

- Bacterial Infections
- Mastitis
- Respiratory Tract Infection
- Skin And Structure Infection
- Bone And Joint Infections
- Infections Of Urinary Tract

**LACTOBACILLUS**- Lactobacillus being the most commonly used probiotic agent improves growth performance, feed conversion efficiency, nutrient utilization, intestinal microbiota, gut health and regulates immune system. Lactobacilli stimulate rapid growth of beneficial microbiota in the GIT which become abundant and induce competitive exclusion of pathogenic bacteria either by occupying binding sites on intestinal mucosa or competing for nutrients and absorption sites with pathogenic bacteria. Antibiotics, often supplemented in feed, used as a growth promoter, may cause their residual effect in animal produce and also trigger antibiotic resistance in bacteria, which is of serious concern among swine farming entrepreneurs. As an alternative, supplementing probiotics gained interest in recent years.

### Conclusion

A study was done earlier where the MIC of Cloxacillin and Cefixime was determined by the agar dilution method, according to clinical laboratory standards institute.

In that study, Combination of Cloxacillin and Cefixime were tested against each microorganism by the checkerboard method, with the MICs ranging from 1/32µg/ml to 4µg/ml and the result

shows the synergistic effect when both the drugs, Cefixime&Cloxacillin used in combination which demonstrates that the action of Cefixime&Cloxacillin in combination is quite effective that means MIC level of both the drugs was reduced significantly when used in

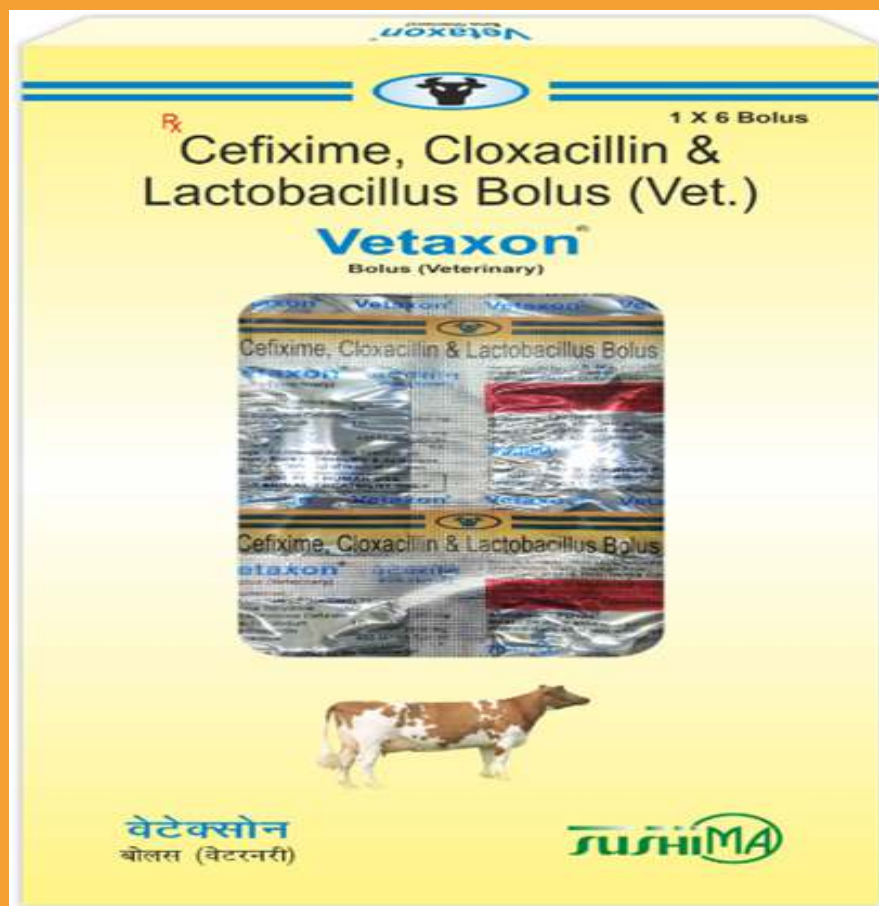
combination in comparison to when used alone (as in table below) . This shows that less concentration of drug in combination is required for inhibiting the growth of the bacteria (drugs with lower MIC scores are more effective antimicrobial agents).

Strains	MIC when single drug was used		MIC when combination was used	
	Cloxacillin	Cefixime	Cloxacillin	Cloxacillin
S. pneumoniae	2 µg/ml	1 µg/ml	0.0625 µg/ml	0.25 µg/ml
H. influenzae	1 µg/ml	0.25 µg/ml	0.25 µg/ml	0.0312 µg/ml
S. aureus	1 µg/ml	32 µg/ml	0.5 µg/ml	8 µg/ml
P. aeruginosa	256 µg/ml	32 µg/ml	256 µg/ml	16 µg/ml
E. coli	128 µg/ml	0.5 µg/ml	4 µg/ml	0.5 µg/ml
K. pneumoniae	256 µg/ml	0.5 µg/ml	128 µg/ml	0.25 µg/ml

Reference: Astha Agarwal, N. Jain, A. Jain (2007) 'Indian Journal of pharmacology', 39, pp. 242-243

A synergistic antibacterial effect may result when either two penicillins or a penicillin and a cephalosporin are used in combination against certain gram-negative bacilli. Here, the synergistic effect of cloxacillin and cefixime against the common bacterial pathogens has been studied. The synergistic effect of cloxacillin and cefixime used in combination against S. pneumoniae and H. influenza.

**Now, Sushima Pharmaceuticals company having a relevant product VETAXON Bolus which contains Cefixime trihydrate eq. to Cefixime – 1000mg, Cloxacillin sodium eq. to Cloxacillin – 2500mg & Lactobacillus – 450 million spores which helps in treatment of Mastitis, Respiratory tract infections (eg. Haemorrhagic septicaemia), Gastrointestinal tract infections, Urinary tract infections, Chronic wounds & abscess & for prevention of pre & post operative infections.**







# Social Welfare Initiative of Ayurved



Ayurved Limited is the pioneer of manufacturing 100% natural & safe herbal animal health care products since 1992. It provides herbal and ayurvedic solution for animal health issues by offering veterinary medicines and feed supplements to wide range of animals. The company has also committed itself to welfare of society wherein the endeavour is to catalyse sustainable and inclusive growth.

Under its School Support Program, the company has **constructed additional classrooms** in more than five Govt. Schools, provided other

amenities like **safe drinking water**, constructed **shed for Mid-Day Meal**, provided teaching aids, set-up **science lab and library** in school. These initiatives have positive impact on overall learning environment in Govt. Schools.

Health Care is another domain in which the company have improved the access to basic health care in remote villages by organising **mobile health camps**. To combat the fight against Covid pandemic the company has **installed Medical Oxygen Plant** in ESIC Hospital and





provided **100 hospital beds** and mattresses in two Govt. Hospitals. It also cares for the health care needs of the elderly people sheltered in Old Age Home, for this the company has **set up a diagnostic centre at one Old Age Home.**

For Environmental Sustainability, the company is working towards conservation of natural resources

and promoting renewable energy. In this domain the company has installed more than **150 solar street lights** in villages, installed on-grid and off-grid **solar power plants** in two schools and also installed **modular rainwater harvesting** unit in two Govt. Schools. Moreover, company has also constructed **Biogas Plant** in two Gaushalas.

**Plantation activity** is regular initiative at Ayurvet to increase the green cover.

Ayurvet has also supported infrastructure development by construction of **individual toilets for BPL families** in rural parts, construction of **community toilets** and construction of **sports centre for rural youth.**



# E-Feed Secures \$ 1M Seed Funding



**Kumar Ranjan**  
Co-founder & CEO



**Ravi Chauhan**  
Co-Founder & COO



**Ankit Patel**  
Co-Founder & CBO



eFeed recently secured \$ 1M seed funding with participation from Omnivore, Better, AngelList, LetsVenture and Huddle. The funds will be used to strengthen the research, development operations, expand the farmer network, and get more animal nutrition experts onboard.

eFeed is a 'direct to farmer' company established in June 2021 by Kumar Ranjan, Ravi Chauhan and Ankit Patel.

Having lived in a rural area of Uttar Pradesh, Kumar Ranjan was well exposed to agriculture and the hardships faced by farmers. A serial entrepreneur and business consultant, Kumar always wanted to work with farmers, teamed up with his friend Ravi Chauhan to start E-feed, a company that is solving challenges related to animal feed.

It claims to be the largest digital animal nutrition platform for farmers

in the country. E-feed focuses on the holistic progress of the society, integrating sustainable animal culture with the food security value chain.

They use AI to provide efficient solutions to farmers, dairies and consumers. They leverage predictive insights in generating feed recommendations through machine learning and data science tools to maximize the milk output in cattle.

It helps farmers to plan, create, and optimize animal feeds & ration.

Focusing on animal nutrition, helps cut carbon footprint and greenhouse gas emissions, including methane, thus laying a positive impact on the environment.

Thus, providing better inputs to farmers and making it safer for human consumption while supporting socio-economic growth is the basic motto of E-feed.

E-feed first connects with these







farmers either through social media platforms such as WhatsApp or physically through its stores.

The AI tools help farmers solve the problems based on their farm activities. The next process is the nutritional advisory.

With two simple steps, farmers can choose their animal species and find the right nutrition for their animal culture to enhance productivity. Upon paying a fee, farmers get advice from the experts on the E-feed board based on

animal species, geography etc. E-feed imparts training to farmers about the dietary requirements of different species of animals, organic feed processing and about how to prepare feed with available resources at home.

E-feed started with just 15 farmers. In a span of one year, the team claims to have impacted the lives of over 1.2 lakh farmers. E-feed's aim is to target at least 10 million farmers in one year out of a total 80 million cattle farmer, 10 million aqua farmers and 30 million poultry farmers.







## MOU Signed for Commercial Production of Indigenously Developed Vaccine "Lumpi-ProVac"

An MoU for production of Goat Pox vaccine and "Lumpi-ProVac" vaccine was signed in Nagpur on 29th December, 2022 in the presence of Shri Parshottam Rupala, Union Minister of Fisheries, Animal Husbandry and Dairying, the Chief Minister and Deputy CM of Maharashtra. Shri Rupala praised the commendable effort put forth by ICAR in developing indigenous vaccine Lumpi-ProVac for LSD. He further

said that this MoU will also ensure large-scale production of Goat Pox vaccine for future needs of India's livestock sector. At present Goat Pox vaccine is used for controlling Lumpy Skin Disease in animals and this has been proven effective against Lumpy.

He further highlighted the relevance of the technology and requested the IVBP, Pune to start manufacturing the vaccine at large scale without any delay so as



to make the vaccine available for the use by the department for the help of the farmers by overcoming the disease.

National Centre for Veterinary Type Culture, ICAR-National Research Centre on Equines (ICAR-NRCE), Hisar (Haryana), in collaboration with ICAR-Indian Veterinary Research Institute (IVRI), Izatnagar (UP) developed a homologous live-attenuated LSD vaccine, named Lumpi-ProVacInd. Agrinnovate India Limited (AgIn), the commercial arm of DARE, Ministry of Agriculture and Farmers' Welfare, Govt. of India granted "Non-Exclusive Rights" for Commercial production of "Lumpi-ProVac", to Institute of Veterinary Biological Products (IVBP), Pune today.

Lumpi-ProVacind is safe in animals and induces LSDV-specific antibody-and cell-mediated immune response, besides providing complete protection against lethal LSDV challenge. Lumpi-ProVacind is used for the prophylactic immunization of animals against Lumpy Skin Disease, which illicit protection for about one year. A single dose of the vaccine contains 103.5 TCID50 of live-attenuated LSDV (Ranchi strain). The vaccine is stored at 4°C. The

vaccine must be shipped on ice and must be used within a few hours after reconstitution. The patent has been filed by the ICAR for the technology.

The event was graced by Shri Parshottam Rupala, Union Minister of Fisheries, Animal Husbandry and Dairying, Govt. of India, Shri Eknath Shinde, Chief-Minister, Govt. of Maharashtra, Shri Devendra Fadnavis, Deputy Chief-Minister, Govt. of Maharashtra, Shri Radhakrishna Vikhe Patil, Minister of Animal Husbandry, Govt. of Maharashtra, Dr. B.N. Tripathi, DDG (Animal Science), ICAR, Dr. Triveni Dutt, Director, ICAR-IVRI, Dr. T K Bhattacharya, Director, ICAR-NRCE, Mr. Sachindra Pratap Singh, Commissioner (AH), Govt. of Maharashtra and Dr. Praveen Malik, CEO, AgIn, other officials from ICAR and AgIn. Agrinnovate, granted a non-exclusive license to IVBP, Pune for ten years.

The dignitaries congratulated the IVBP, Pune, ICAR-NRCE, ICAR-IVRI and AgIn for the successful transfer of the technology. It is expected that the vaccine technology will definitely meet out the standard of the market and significantly provide a defence mechanism to control the devastating lumpy skin disease.





## Huvepharma®, Inc. Partners with Champion Animal Health on Fly Control



Huvepharma®, a global leader in animal health, has partnered with Brazilian firm Champion Animal Health to become the sole distributor of JustiFLY® Feedthrough products in the United States. JustiFLY® products contain diflubenzuron, an insect growth regulator that stops fly reproduction at the larval stage.

“The impact of flies creates a dramatic economic loss to the livestock industry each year. Forming this strategic relationship with Champion Animal Health, Huvepharma’s portfolio has gained another solution that addresses this prolific production challenge facing the industry,” Glen Wilkinson, President and CEO of Huvepharma® said of the recent partnership.

When consumed through feed or mineral supplements, diflubenzuron passes through the digestive tract of the animal and into feces resulting in the disruption of the fly larvae, thereby breaking the life cycle. JustiFLY® is

approved to control horn, face, stable, and house flies in pasture cattle, confined cattle, dairy cattle, and veal calves. It can be used in an integrated pest management fly control program and is non-toxic.

Product Manager for Huvepharma, Cameron Tate, is enthusiastic about the agreement and the opportunities it presents for producers saying, “we are excited to announce the extended partnership between Huvepharma and Champion Animal Health and to continue our mission of bringing additional choices to the livestock industry.”

Huvepharma is pleased to offer the full range of JustiFLY® products and several different applications of diflubenzuron. JustiFLY® Feedthrough will be available as a Premix (0.67% or 3% diflubenzuron concentration), Liquid Feed, 360-gram Add Packs, and Salt Blocks. Fly control is a vital management tool for the cattle and dairy industries. By broadening the

Huvepharma portfolio of animal health products with JustiFLY®, we broaden the options available to our customers.

“The alliance between Huvepharma and Champion Animal Health is very exciting for the livestock industry. Champion, a leading innovator from Brazil backed by 70 years of experience in one of the largest livestock producing countries in the world, recently established operations in North America to offer the American livestock markets expanded diflubenzuron options as well as our technical expertise in the field of fly control. Aligning with a globally established company like Huvepharma, with a complete portfolio of high-quality products and solutions, provides the livestock industry with the confidence to equip their livestock operations.” said Andre Rocha, Champion’s President, “We are honored to be part of this alliance and certain that it will bring new advantages to North American livestock industry.”



## PAU develops a system of integrated farming for small, marginal farmers.



December 23, Ludhiana

After extensive testing for more than ten years, Punjab Agricultural University (PAU) has created an Integrated Farming System (IFS) specifically for small and marginal farmers. It is a suitable combination of crops, livestock, aquaculture, agro-forestry, and agri-horticulture that ensures sustainability, profitability, balanced food availability, and the creation of jobs. It is an economically viable option.

Vice-Chancellor Dr Satbir Singh Gosal urged small and marginal farmers to adopt the PAU-developed IFS, saying it would help them increase their income and provide balanced nutrition.

Dr. Gosal stated that Punjab has 1,092,713 holdings, with 14.13% being small (less than 1 hectare), 18.98% being marginal (1-2 hectare), and 33.67% being semi-medium (2-4 hectare) farmers. He elaborated on Punjab's crop income, revealing that it is 90.5 percent, with non-farm sources accounting for 9.5% of farmers' income.

Dr. Ajmer Singh Dhatt, Director of Research, revealed that the IFS model, which was launched at the School of Organic Farming, PAU, as part of an All India coordinated research project, generates income all year in addition to meeting domestic needs (cereals, vegetables,

oilseeds, pulses, fruits, milk, etc). Depending on the location, a combination of crop cultivation, dairy farming, kitchen gardening, and other secondary components can be used. He added that specific agri-based enterprises could be included after proper training.

Dr. Sohan Singh Walia, Director of the School of Organic Farming, stated that the experiment, which began in Kharif 2010, covered an area of 1.0 hectare (2.5 acres) and included field crops, horticulture, aquaculture, dairy, agro-forestry, and goatry components. Paddy, maize, and turmeric were grown on 6,400 square metres during the Kharif season, and potato, berseem, wheat, gobhi, sarson, onion, pearl millet, and spring maize were grown during the rabi and summer seasons. Guava and citrus plantation was done on around 1600 square metre area as horticulture component; vegetable crops in inter-row spacing were raised in 1,500 square metre; and dairy, aquaculture, and agro-forestry components were used on

200, 1,000, and 300 square metre, respectively.

## National Cooperative Society to have a share capital of Rs 500 crore



NDDDB, Amul, and NAFED will be among the five promoters of the newly announced cooperative society for organic food goods at the national level.

National Dairy Development Board (NDDDB), Amul, and NAFED will be among the five promoters of the recently announced national-level cooperative society for organic food products, which would aim to increase farmers' income by boosting production, certification, and marketing system.

The Cabinet Committee on Economic Affairs (CCEA) approved a proposal to form three new multi-state cooperative organisations at the national level to promote organic products, seeds, and exports last week.

Under the 2002 Multi-State Cooperative Societies (MSCS) Act, a national-level cooperative organic society, cooperative seed society, and cooperative export society will be registered.

According to sources, the Anand, Gujarat-based National Cooperative Organic Society would be established with an authorised share capital of Rs 500 crore. According to sources, its first paid-up share capital would be Rs 100 crore.

NDDDB, co-operative NAFED, Gujarat Co-operative Milk Marketing Federation (GCMMF), which markets milk products under the Amul brand, National Cooperative Development Corporation (NCDC), and National Cooperative Consumers' Federation of India Ltd (NCCF) will each contribute Rs 20 crore for initial paid-up share capital, according to sources.

The NDDDB will be the primary promoter, and these items will be sold under the Amul brand. In addition, a new brand will be introduced for the global marketing of the products.

Initially, the focus of this national-level organisation would be on enhancing the marketing system so that organic food producers receive a higher revenue. Additionally, the certification system and testing laboratories will be reinforced over time.

This national society for organic products accepts as members cooperative societies, including primary societies, district, state, and national level federations, multi-state cooperative societies, and Farmers' Producer Organisations (FPOs).

Due to its diversified agro-climatic conditions, India has the ability to create a wide range of organic products. In certain regions of the United States, the inherited legacy of organic farming offers a distinct advantage, particularly in the North Eastern Region, where Sikkim was certified a fully organic state in 2016.

## Accuvance announces commissioning of India's first integrated bovine genetics facility



Accuvance announced commissioning of its Second and India's first integrated bovine genetics facility - AGRC (Accuvance Genetics & Research Centre) in the NCR at Patauda, near Gurugram on the happy occasion of Makar Sankranti.

It has India's most advanced bull housing with the state-of-the-art biotech lab for semen processing and dairy IVF for creating Top dairy genetics and sexed IVF pregnancies for the Indian dairy farmers, helping them make more profits through genetic progress of their herd.

Accuvance is engaged in providing innovative bioscience solutions and the most advanced assisted reproductive technology to dairy clients and farmers across India from its state of the art biotech and bovine genomics, embryo genotyping and in vitro fertilisation (IVF) lab in the



national capital region and highly skilled and professional Accuvance Consulting services. Accuvance provides faster genetic gain and advancement and helps dairy farmers to take advantage of its most advanced reproductive and bioscience technologies.

## Amul MD RS Sodhi to resign

Jayen Mehta, Chief Operating Officer, has been assigned the charge of MD.

The Board of Directors of Amul marketer Gujarat Cooperative Milk Marketing Federation (GCMMF) instructed existing Managing Director Rupinder Singh Sodhi (RS Sodhi) to quit with immediate effect and hand over the authority to Chief Operating Officer Jayen Mehta.

It was learned that the Board of Directors of the Federation, which consists of the chairmen of 18 dairy unions in Gujarat, called an impromptu meeting on Monday and decided to terminate Sodhi's services as the Federation's managing director with immediate effect. The Board provided no explanation for its decision.

Sodhi, who has been at the helm of Amul's operations since 2010, has served two five-year terms as the company's managing director and will begin his second extension in December 2020. Due to the Covid predicament, the Board then decided to keep Sodhi in charge until the next decision. Under Sodhi's direction, Amul's revenue increased



sevenfold from 8,005 crore in 2009-2010 to 61,000 crore in 2021-22. After BM Vyas resigned on June 11, 2010, Sodhi, the then-chief general manager of the Federation, assumed the role of managing director. Sodhi served as Managing Director for a full five years until 2015, following which he was granted an extension until December 2020. Due to the Covid crisis, the Board subsequently agreed to extend Sodhi's tenure without specifying a date.

## Adari Tulasi Rao, chairman of Sri Vijaya Visakha Milk Producers Company Limited (Visakha Dairy) passes away



Wednesday marked the passing of Adari Tulasi Rao, chairman of Sri Vijaya Visakha Milk Producers Company Limited (Visakha Dairy), at a private hospital in Hyderabad.

His son Adari Anand, YSR Congress Party coordinator for the Visakhapatnam West Assembly constituency, stated that his father, Tulasi Rao, 84, had been hospitalised for an ailment for some time (YSRCP).

On the morning of January 5, his remains will be taken to Yelamanchili in the district of Anakapalli. The body will be on display inside Mr. Anand's party headquarters on Old Cinema Road in the city.

Adari Rao is survived by his wife, Jayalakshmi, and three children: Anand, Santosh, and P. Rama Kumari, the mayor of Yelamanchili.

Tulasi Rao was born to Venkata Ramaiah and Sitayamma on February 1, 1939. He attended school through the tenth grade and devoted himself to agriculture and animal husbandry. Tulasi Rao participated actively in a number of political parties, including Swatantra, the Janata Party, and the Telugu Desam Party (TDP).

In 1962, at the age of 23, he was chosen for the first time as director of a cooperative urban bank. He

was afterwards chosen as the sarpanch of Yelamanchili. He was sarpanch for about twenty-five years. In 1985-86, he ran for the 1977-founded Visakha Dairy's board of directors. It had a capacity of 50,000 litres per day at Akkireddypalem, Visakhapatnam, at the time. Under his direction, daily milk production reached 10 million litres.

On August 29, 1986, he assumed the role of chairman of the dairy company.

When he assumed leadership, the revenue was merely 11 crore. According to the dairy management, the current revenue exceeds 1,400,000,000. It later expanded its marketing efforts to neighbouring Odisha, West Bengal, and Madhya Pradesh.

Visakha Dairy, the first co-op to become a producer business, was turned into a Milk Producers Company in 2006.

In 2010, Tulasi Rao was the first in India to introduce ultra-pasteurized milk with a shelf life of up to 14 days, using the most recent technology from Elecster of Finland.

Tulasi Rao introduced two solar power plants with a capacity of 1.15 MW in Visakhapatnam and 1.65 MW at Vizianagaram to alleviate the electricity shortage. The facilities were activated in record time.

In 1998, N. Chandrababu Naidu inaugurated the dairy's multispecialty hospital, Krushi Hospital, which was Tulasi Rao's lifelong ambition. He was always of the opinion that the health of the dairy depended on the health and happiness of the farmers. His concept included the hospital and the establishment of an English-medium school for the children of milk farmers.



## New low-cost bolus for smarter farming



A new bolus device, as part of smart farming solutions, assists dairy farmers in increasing production performance with only minor investments. A group of scientists from Russia's Institute of Microdevices and Control Systems created the bolus, which is inexpensive at 25,000 roubles (\$400) per unit.

During a series of trials, the intelligent farming system, which was primarily focused on monitoring gut health and feeding efficiency, demonstrated an increase in milk gains of 2-3 litres per cow on average. The bolus developed by Russian scientists, like similar devices currently on the market, monitors pH levels, temperature, and hydration, among other things.

Monitoring drinking is only a small part of smart farm functionality and, of course, cannot provide a complete picture [of a cow's health]. However, this section clearly demonstrates the bolus's utility on a farm. For example, the system can detect when a cow drinks and generate an alert if it has only happened twice in the day, despite the fact that the normal level of drinking for a cow is 5 to 6 times per day. By the evening, the cow will be dehydrated, reducing the morning milk yield. The system indicates when the animal does not drink enough, indicating that it should be checked.

The capsule measures 140 mm in length, 40 mm in diameter, and weighs only 250 grammes. It is easily swallowed by cows and remains in their gut for their entire lives. The tool could be reduced in size to make it more versatile and cost-effective.

## China's milk producers are feeling the pinch as a supply glut drives down prices

China's unpasteurized milk producers are struggling as an excess of dairy cows and a lack of demand flood the market, causing prices to fall to unprofitable levels, while the cost of fodder continues to rise and there appears to be no end in sight to the misery.

The raw milk sector is currently experiencing a cyclical period of oversupply, and prices, which have been falling since the middle of last year, are expected to fall further in 2023; things will only improve once demand improves.

The market continues to cool, even in the run up to the week-long Lunar New Year holiday at the end of the month when many dairy product makers usually stock up on their milk supplies.

According to the Ministry of Agriculture and Rural Affairs, the price of unpasteurized milk in ten major milk-producing regions, including the Inner Mongolia Autonomous Region, fell 4.2 percent year on year in the last week of December to CNY4.12 (USD0.59) per kilogramme.

As if that wasn't bad enough, the price of animal feed, such as soybean meal, corn, and alfalfa, has risen significantly in the last year, eroding milk producers' profit margins.

Fodder accounts for roughly 70% of milk production costs.

The current imbalance between supply and demand also has to do with the size of dairy herds increasing too much in the past three years. According to estimates, the number of dairy cows increased by 37% last year from 2019 to 6.3 million.

The unpasteurized milk market has become engulfed in a vicious cycle of 'milk scarcity' - price increase - cattle breeding - oversupply - cattle culling - milk shortage'.

If the market does not recover during the Spring Festival holiday, the raw milk sector will be put under even more strain.

## Nutreco's U.S.-based feed additive company Micronutrients to rebrand as Selko

Micronutrients, Nutreco's U.S.-based feed additive company, will rebrand as Selko in January 2023. The change unifies the portfolio of specialty feed additives, including IntelliBond trace minerals, under a single global brand.

Selko is investing to become the market leader in phytogenics, building on a legacy of research and development, and has established an innovation discovery group focused on specialty feed additives.

While Selko will become the single brand serving customers worldwide, the people, product names, processes, and services offered to customers will not change.

As the Selko brand expands into the United States, it becomes Nutreco's sole feed additives brand, serving customers worldwide. The rebrand will not affect customer-facing staff, product names, or services.

## Edge Dairy establishes legislative priorities for 2023

The third largest dairy cooperative in the United States will prioritise climate and environmental regulation, farm bill reform in 2023, and other initiatives.

Edge Dairy Farmer Cooperative, the country's third largest dairy co-op, will prioritise climate and environmental regulation, 2023 farm bill reform, dairy product labelling, milk pricing reform, expanded trade opportunities, and a dependable workforce as top priorities in the next congressional session.

Climate and environmental regulations, 2023 farm bill reforms, accurate dairy product labelling, milk pricing reform, expanded trade opportunities, and the need for agricultural workforce reform are among the six key focus areas released by the Midwest-based co-op.

## Animal Health International launches OptiCalc

Animal Health International (AHI), a Patterson Companies Inc. subsidiary, recently announced the addition of OptiCalc to the Aspen Vet product portfolio.

OptiCalc is an oral calcium and vitamin D supplement designed to provide cows with a rapid and sustained calcium release. This product contains more calcium than competing calcium boluses and outperforms competitors in calcium chloride and calcium sulphate.

In addition to providing a high-quality product, OptiCalc is

competitively priced in the market and is packaged economically in 12-count boxes rather than 48-count boxes as other leading manufacturers.

## World Dairy Expo Announces Associate Judges for 2023



The World Dairy Expo® is pleased to announce the eight individuals who have been chosen to serve as associate judges for the Expo's 2023 Dairy Cattle Show. These individuals, nominated by the official judge and approved by a committee of Expo exhibitors, bring a global perspective to this world-renowned event. The World Dairy Expo will return to Madison, Wisconsin, from October 1 to 6, with the Dairy Cattle Show taking place in the Coliseum from October 2 to 6.

The following are the complete list of individuals who will serve as judges at World Dairy Expo 2023, as well as the dates of the respective show:

### **International Ayrshire Show: Tuesday, October 3**

**Official:** Kurt Wolf, Guttenberg, Iowa

**Associate:** Steve Searles, Pine Island, Minn.

### **International Brown Swiss Show: Tuesday, October 3 and Wednesday, October 4**

**Official:** Chris Lahmers, Marysville, Ohio

**Associate:** Richard "RT" Thompson, Darlington, Wis.

### **International Guernsey Show: Monday, October 2**

**Official:** Kevin Hartmann, Mulberry Grove, Ill.

**Associate:** Ted DeMent, Kenney, Ill.

### **International Holstein Show: Thursday, October 5 and Friday, October 6**

**Official:** Lynn Harbaugh, Marion, Wis.

**Associate:** Jason Danhof, Waukon, Iowa

### **International Junior Holstein Show: Monday, October 2**

**Official:** Callum McKinven, Canton de Hatley, Quebec, Canada

**Associate:** Matt Mitchell, Speedwell, Tenn.

### **International Jersey Show: Monday, October 2 and Tuesday, October 3**

**Official:** Mike Duckett, Rudolph, Wis.

**Associate:** Kevin McGriskin, Melancthon, Ontario, Canada

### **International Milking Shorthorn Show: Wednesday, October 4 and Thursday, October 5**

**Official:** Brandon Ferry, Hilbert, Wis.

**Associate:** Mike Gregory, Hebron, Ill.

### **International Red & White Show: Wednesday, October 4 and Thursday, October 5**

**Official:** Phillip Topp, Botkins, Ohio

**Associate:** Tanner Schmalig, Elkhorn, Wis.

World Dairy Expo, the global dairy industry's meeting place, brings together the latest in dairy innovation and the best cattle in North America. The global dairy industry will return to Madison, Wis., on October 1-6, 2023, for the 56th event, which will feature the world's largest dairy-focused trade show, dairy and forage seminars, a world-class dairy cattle show, and more.

# Editorial Calendar 2023

Publishing Month: <b>January</b> Article Deadline : <b>30<sup>th</sup>, Dec. 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, Jan. 2023</b> Focus : <b>Climate Management</b>	Publishing Month: <b>February</b> Article Deadline : <b>30<sup>th</sup>, Jan. 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, Feb. 2023</b> Focus : <b>Nutritional Deficiency Effects</b>	Publishing Month: <b>March</b> Article Deadline : <b>28<sup>th</sup>, Feb. 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, March 2023</b> Focus : <b>Herd / Breed Management - Fertility, Breeding &amp; Reproduction</b>	Publishing Month: <b>April</b> Article Deadline : <b>30<sup>th</sup>, March 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, April 2023</b> Focus : <b>Disease Prevention/ Risk Assessment</b>
Publishing Month: <b>May</b> Article Deadline : <b>30<sup>th</sup>, April 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, May 2023</b> Focus : <b>Small Ruminants Management (Sheep, Goat etc)</b>	Publishing Month: <b>June</b> Article Deadline : <b>30<sup>th</sup>, May 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, June 2023</b> Focus : <b>Calf &amp; Heifer Management</b>	Publishing Month: <b>July</b> Article Deadline : <b>30<sup>th</sup>, June 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, July 2023</b> Focus : <b>Milk Production Management/ Milking Practices</b>	Publishing Month: <b>August</b> Article Deadline : <b>30<sup>th</sup>, July 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, August 2023</b> Focus : <b>Feed &amp; Fodder</b>
Publishing Month: <b>September</b> Article Deadline : <b>30<sup>th</sup>, August 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, September 2023</b> Focus : <b>Vaccination Protocols/ Cattle Herd Immunization</b>	Publishing Month: <b>October</b> Article Deadline : <b>30<sup>th</sup>, September 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, October 2023</b> Focus : <b>Dairy By-products</b>	Publishing Month: <b>November</b> Article Deadline : <b>30<sup>th</sup>, October 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, November 2023</b> Focus : <b>Potential of Dairy Farming</b>	Publishing Month: <b>December</b> Article Deadline : <b>30<sup>th</sup>, November 2023</b> Advertising Deadline : <b>3<sup>rd</sup>, December 2023</b> Focus : <b>Calf Management</b>

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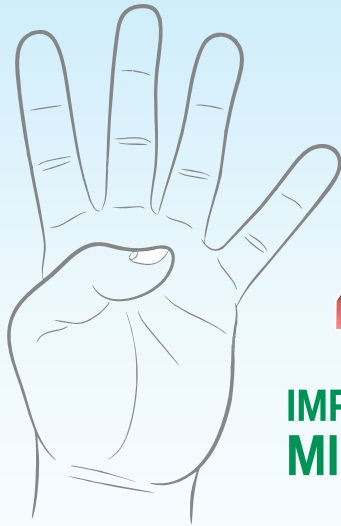
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