

DAIRY PLANNER

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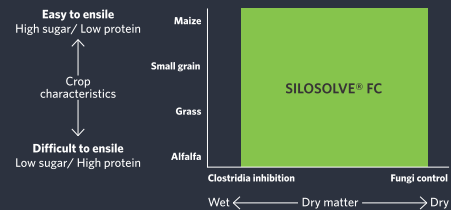
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From the Pen of Chief Editor



Conquering Heat Stress and Taking The Initiative for Curbing It

The latest union budget has encouraged production and consumption on a larger scale in the dairy industry. The increasing trend for dairy products and mass utilization in dairy throughout the economy has seen an immediate need for increased production globally.

Though the budget 2022 talks about the increase in milk production, several prevalent issues need deeper and thoughtful consideration. There is a need of reducing mortality amongst dairy animals because of heat stress to have phenomenal growth in the dairy industry.

India lies in the tropical zone and is therefore prone to high humidity. During the summer season, the heat stress index in dairy animals is highly impacted. The degree of heat stress is directly proportional to a humid environment. Heat stress leads to severe milk yielding, milk production, and reproduction issues in dairy animals, and therefore, heat stress needs to be curbed.

Until the situation is not dealt with, the growth in milk production could be at a considerably low pace. Therefore a need for budget allocation for reducing heat stress is necessary. A significant amount of budget money could be allocated towards providing high-energy feeding feeds, which are essential to keep milk production stable. High fibre feed and supplements help maintain a nutritious diet, thus reducing mortality and allowing healthy milk production.

There is an immense need to allocate budget amounts towards animal cooling systems and proper housing systems to maintain the heat level. Therefore they need to be constructed in large numbers. Tech-driven tools and health monitoring systems must incorporate combating heat stress and cattle distress.

Heat stress is a real issue facing the dairy sector, directly impacting the mortality rate. Proper infrastructure and innovative facilities for managing issues can help increase milk production and cater to dairy sector development.

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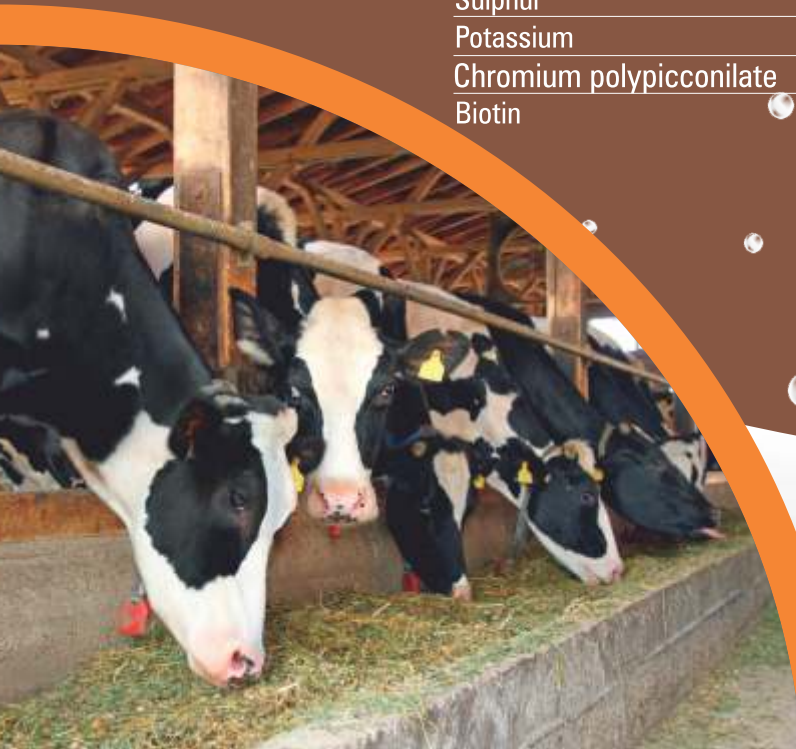
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The Budget 2022 - Simplified

Siddhi Gupta
Co-Editor

The dairy segment and the industries are likely to grow after announcing the union budget presented by honourable Union Finance Minister Smt. Nirmala Sitaraman for the year 2022-23. The increase in demand for the dairy and livestock sector has purveyed an unimaginable scope globally for the dairy industry.

- 44% more for Department of Animal Husbandry & Dairying
- 20 billion allocated for Livestock Health and Disease Control
- Farm Credit Target increased to 18 lakh crore
- Alternative Minimum taxes for cooperative societies reduced to 15%
- Budget allocation for National Program for Dairy Development and Rashtriya Gokul Mission increased by 20%



Significant highlights of budget 2022 in the dairy sector:

- The government has shown the green light for encouraging dairy and livestock production by increasing the budget amount by 44%.
- The budget also highlighted an increase in allocating funds in the dairy and livestock sector amounting to Rs. 6,407.31 crore.
- The reduction in taxes for cooperative societies hopes to help millions of dairy farmers. The Alternative Minimum taxes for cooperative societies have been reduced from 18.5% to 15%.
- Increase in budget allocation for Rashtriya Gokul Mission and National Program for Dairy Development by 20% in 2022-23.
- Revival of economic activities in the

Dairy sector through Rashtriya Gokul Mission and National Program for Dairy Development will also increase employment opportunities in rural and Semi-urban areas.

How can the dairy industry benefit from the presented budget?

- The budget has been considerably increased for the current dairy segment by 44% and 40% for the livestock segment. The allocated amount to Rashtriya Gokul Mission and National Programme for Dairy Development has been increased by 20% in 2022-23.
- The increase in the budget can give cattle rearing infrastructural development and lead to mass production.
- The increased budget amount can increase the productivity of the





indigenous bovine population and the quality of milk production.

- The alternate minimum tax (AMT) has been reduced by 3.5%. The current AMT for cooperative society amounts to 15%, which helps the dairy industries retain a higher profit, thereby increasing dairy infrastructural needs.
- Other subsidies such as the NABARD Dairy farming subsidy scheme, Dairy Entrepreneurship development scheme, and National programme for Dairy Development can be provided under government programs for enhancing and encouraging milk production in the current year.

Mechanisms that can be used for acceleration of dairy produce

The budget has given plenty of opportunities for the dairy industry to invest in technology and intelligent techniques for increasing dairy produce. Industry experts have corroborated on how the current budget can mould Dairy industries. Being a developing country, India is yet to uphold the pillar of complete revamp of technology in dairy farming and still relies on the traditional ways of farming. Many Agri-tech start-ups have come forward and introduced new mechanisms to promote products in the dairy sector.

Artificial insemination (AI) can help monitor cattle and milk-producing breed's abnormalities. Group calving, Farm mechanization, and management tools can prevent significant dairy issues.

Cross-breeding farming and scientific breeding techniques can also lead to a strong foundation for Dairy farms. Robotic milking can also save physical labour and can reduce time-consuming physical activities.

Infrastructural development for an increase in dairy production and distribution through installation of bulk milk coolers, Milk processing plants, and Milk powder plants can work wonders in upgrading and enhancing the production.

Areas wherein the dairy industry can grow due to potential budget.

- India ranks 6th in the world for dairy production, and the capacity can be increased further by providing a proper production, storing, and distribution facility.
- The demand for milk powder has been increased, and the manufacturing unit of milk powder can still show improvement by assimilating proper infrastructure and marketing.
- The cold storage facilities can be

developed for cold compressed milk and other compressed milk products.

- Transportation and handling support services could be improved through natural preservatives so that milk and milk products can be stored for a more extended period; this can also help increase exports.

Market access to Dairy Sector

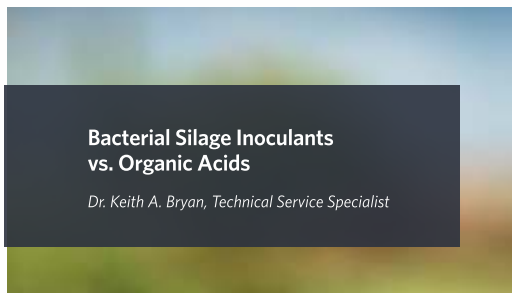
The market access of the dairy sector has compounded to an important issue due to the lack of infrastructural development and connectivity in rural areas. The government looked at the loophole and constituted Infrastructure Development under Vibrant Villages Programme which will help large milk and dairy industries to connect with the remote areas. This will help generate higher productivity due to the exchange of prominent essential equipment.

The increase in productivity of dairy will ensure growth in the economy and on a global level. The cost of production can also reduce with a higher profit value to primary sectors.



CHR HANSEN

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“ A commonly asked question about silage management is, "What are the differences between using a bacterial silage inoculant versus a direct acidification product such as organic acids, like propionic acid?" This question is most easily addressed once we establish a foundational understanding of the similarities and differences between the two types of products.

”

Bacterial silage inoculants have been investigated since the early 1900's. The very first silage inoculants were often not viable due to limitations in the microbial technology at the time. The theory behind the use of silage inoculants was that by adding live, viable bacteria we could drive fermentation toward a desirable endpoint. The original theory still holds true today.

This is accomplished by using specifically-selected bacteria that outcompete the epiphytic bacteria in terms of replication and production of fermentation acids. This efficiency provides for a rapid fermentation which helps reduce energy losses associated with fermentation and dry matter loss.

Lactobacillus plantarum was the dominant silage inoculant species until about 40 years ago when the use of additional species of bacteria was introduced. The different species provided unique characteristics such as production of large amounts of lactic acid early in the fermentation process, or the ability to continue producing lactic

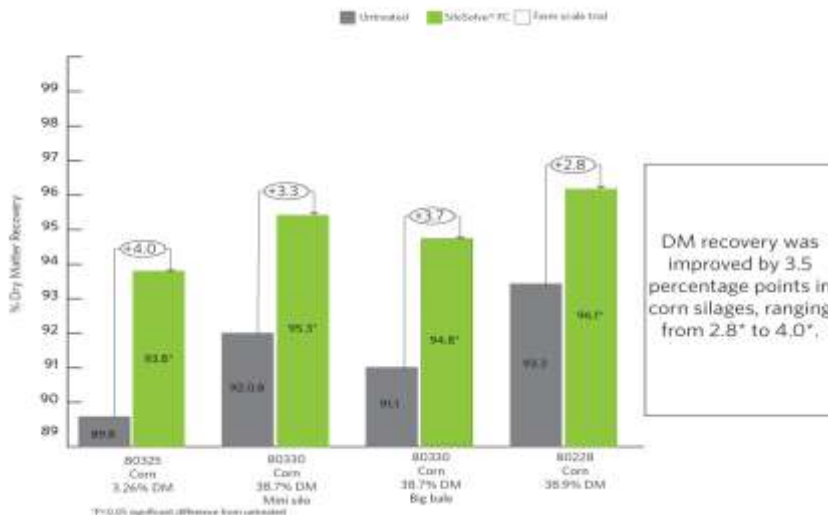
acid at lower pH levels. In the mid-1990's research began on *Lactobacillus buchneri*, which is heterofermentative, meaning it can produce more than one product during fermentation.

Simply stated, in addition to producing lactic acid, it produces acetic acid which helps limit yeast and mold growth and thereby enhances aerobic stability of the silage.

Fairly recently *Lactococcus lactis* O-224 has been included in **SILOSOLVE® FC** to replace some of the more-established strains. This strain has some very unique properties as it is a superior oxygen scavenger that has enabled early opening of silos in as few as 7 days. Without question, bacterial silage inoculants are generally regarded as safe (GRAS), easy to handle and non-corrosive to equipment.

When reviewing some of the classical data from Bolsen et al. (1992), we see improved DM recovery by 1.3 percentage points, 1.8% more efficient gains and 3.6 lbs. more gain per ton of crop ensiled when a single strain silage

Figure 1 SiloSolve® FC improves DM recover 3.5% in corn silage





THE NEW STANDARD

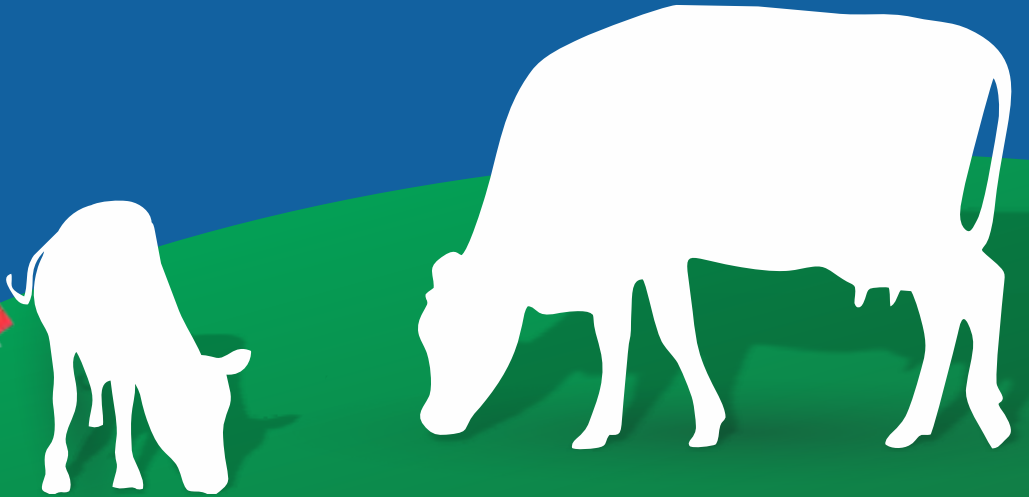
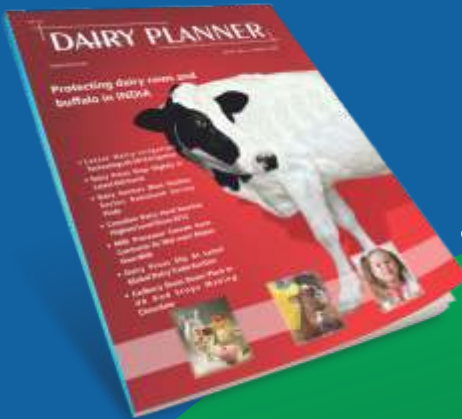
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Table 1

	Bacterial Inoculants	Organic Acids
Extensive Research	+++	-
Enhances natural fermentation	++	-
Designed to aid all stages of fermentation	++	-
Consistent application across wide range of crops and moistures	+	-
Improved aerobic stability	+	+
Safe for equipment	++	--
Safe to handle	+	-
Effective at reducing yeast and mold	+	++
Decreased pH compared to non-additive fermentation	+	+
High levels can inhibit fermentation	-	+
Approximate cost per treated ton, \$	0.75-2.50	2.00-6.00

inoculant was compared to an untreated control. More recent research has shown improvements of more than 3.5% in DM recovery (Figure 1). A few studies have reported improved efficiency of energy-corrected milk production through the use of science-based, research-proven bacterial inoculants.

The research that has been conducted on bacterial silage inoculants by Chr. Hansen and others overwhelmingly has shown the value of using bacterial silage inoculants. By comparison, research is somewhat lacking for organic acid products. Silage review articles give little thought to the use of this technology. While it can work if used correctly based on moisture, crop type and stage of maturity, it is more cumbersome than inoculants which are proven effective and can be applied at the same rate for all crops.

Organic acid products such as propionic

acid are direct acidifiers as they decrease the pH of the silage mass directly. This is simply due to adding an acid to the silage mass. Historically, larger amounts were used that resulted in a restricted fermentation. The addition of organic acids can inhibit yeast and mold through antimycotic activity. This simply means that yeast and molds typically do not survive in the presence of organic acids; thereby increasing aerobic stability.

The application rate of acids tends to be variable and is dependent on the moisture of the crop ensiled. Likewise, crops with higher buffering capacity, such as alfalfa, require higher rates of application. If propionic acid is applied in its base form it can be very corrosive to equipment. As salts of acids have become more readily available, this has become less of a concern. Research using these products is fairly limited and is only applicable to similar crops at similar moistures.

A comparison of the favorable and unfavorable attributes of bacterial silage inoculants compared to organic acids is shown in Table 1.

Silage technology has progressed significantly in the last 40 years, evolving from single species (not strain) bacterial inoculants to modern multi-strain inoculants where each strain is selected for a specific purpose. These modern products outcompete the native microflora and facilitate the achievement of ideal fermentation endpoints.

While organic acids have had a significant value to silage making in the past, this technology is not able to progress as it is based on acidifying the silage mass, not fermentation. Bacterial inoculants have been proven to improve DM recovery, and enhance aerobic stability, both of which are financially important to operations feeding ensiled feeds.

Inoculants are extensively studied both during development and after a product is introduced. This continued research furthers the understanding of the silage making process and helps determine what future improvements can be made. This is important for both producers and the livestock they feed as further improvements in silage fermentation can have an impact on animal performance, feed quantity and quality, and the bottom line of the operation. A science-based, research-proven bacterial silage inoculant provides all of the features and benefits of organic acids along with several additional advantages.

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Management of Heat Stress In Indian Dairy Cattle and Buffalo



**Dr. Sakshi Vaishnav,
Dr. B.L Saini,
Dr. Tapendra Saini**

Introduction

India with 192.49 million cattle and 109.85 million buffalo population ranks first in milk production (20th livestock census). This is attributable to the large scale crossbreeding programme where exotic breeds were imported and crossed with the low producing indigenous breeds. Though the production performance of the crossbreds is higher but their adaptive characters are far below the indigenous breeds making them susceptible to heat stress. Additionally, the temperature in the country goes beyond 45°C in summers which is above the upper critical temperature of dairy bovines. This rise in temperature along with humidity contributes to heat stress. Heat stress in tropical country poses great threat to the farmers and livestock owners as it causes huge economic loss. Therefore knowledge regarding management of heat stress is critical in terms of good health as well as wealth.

Heat stress –causes and signs

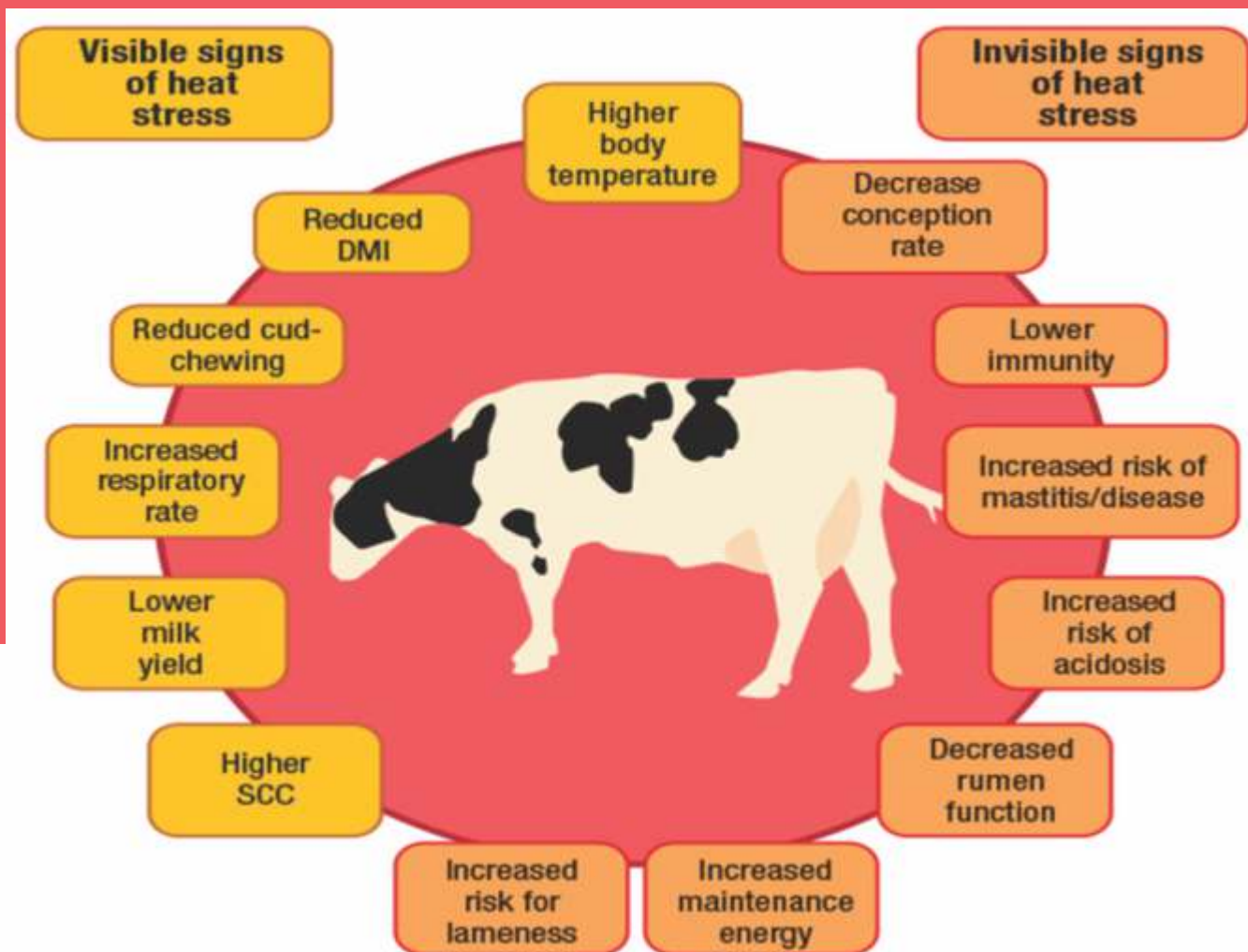
Heat stress is thermoregulatory change which is the result of imbalance between metabolic heat production and heat dissipation by the animal. There are various factors that cause heat stress in animals. These include:

- Environmental temperature
- Relative humidity
- Air movement

- Breed
- Body Colour
- Production performance
- Stage of gestation and lactation
- Amount of feed consumed
- Management practices

All these factors affect the amount of heat produced and dissipated by the animal. This in turn changes the behavioural, reproductive and productive performance of the animal.





Behavioural changes serve as symptoms of heat stressed animal and include:

- Reduced feed intake
- Increase in water intake
- Increase in body temperature
- Prefers standing rather than lying
- Open mouth panting
- Excessive saliva production
- Animal moves to shade
- Rapid shallow breathing
- Unconsciousness

Impact of heat stress on productive and reproductive performance

Heat stress has an adverse effect on productive and reproductive performance of dairy cattle and buffaloes.

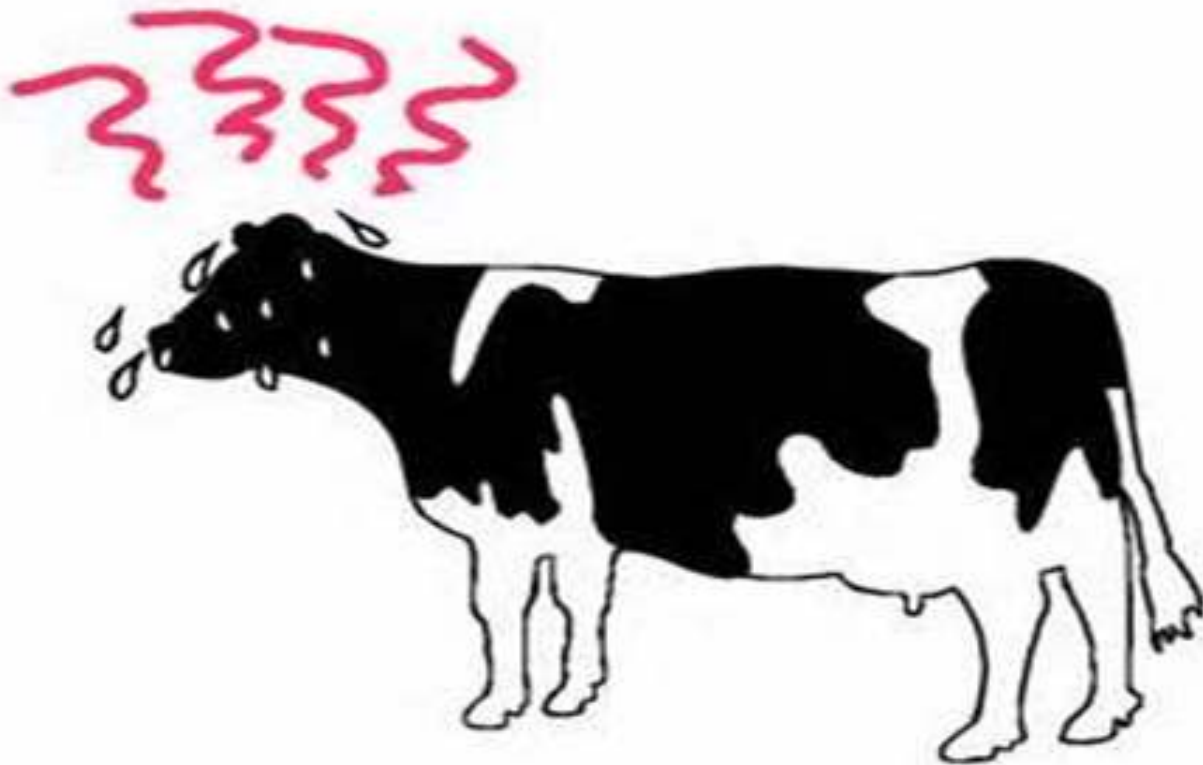
Reproductive performance: Service period is affected by calving season

hence cows and buffaloes calved in summer months are heat stressed and have longer service period. Heat stress also decreases the conception and pregnancy rate in dairy cattle and buffaloes. It was found that the period from October- March is favourable for optimum reproductive performance whereas depression in fertility was witnessed during the months of April-September, May and June being the most critical months. Fertility is reduced owing to the deleterious effect of heat stress on oocyte maturity and early embryo development. Additionally pronounced variations in the signs of estrus, conception rate and calving rate is observed in heat stressed animals. Increased testicular temperature in bulls leads to fertility problems thereby declining the conception and fertility rate per insemination of the whole herd.

Productive performance: Heat stress reduces the productive performance of dairy cattle and buffaloes by reducing their dry matter intake and feed efficiency. Reduced milk production is the first visible consequence of heat stress. Heat stress also increases the somatic cell count in milk which is an indicator of infected udder. Also decrease in milk fat, SNF and milk protein is witnessed during peak summer months. Hence not only the production of milk is affected due to thermal stress but the composition of milk also changes which ultimately affects the pricing of milk in the market. Decrease in growth rate and average daily gain is also witnessed in heat stressed animals leading to economic loss for animals raised for the meat industry.

Strategies to reduce heat stress

The following practices are important



in managing heat stress:

Environmental management: The most common approach to reduce heat stress is to modify the cattle and buffaloes' immediate environment. This modification involves-

- Provision of shelter
- Thatching the roof using paddy straw or painting the roof white or providing false ceiling
- Evaporative cooling system in the form of water sprinkler, mist or fog with pump and timer
- Cooling ponds
- Barriers against hot wind using thatched wall or wet bags.
- Tunnel or cross ventilation
- Wallowing in water pond especially for buffaloes.

Nutritional management: It helps animal maintain homeostasis and also prevents nutritional deficiencies that the animal might face due to heat stress.

- Protein rich ration should be provided so that the animal doesn't overeat since more energy is

needed for digestion leading to excess heat production.

- Dietary fat content should also be increased. This enhances efficiency of milk production.
- Provide feed containing low fibre since heat production is linked with the acetate metabolism.
- Supplementation with vitamin A, C and E along with minerals such as zinc.
- Yeast product supplementation can also be done in order to improve the digestibility of nutrients in rumen.
- Greater proportion of feed should be given during night or early morning and increase in water availability.

Genetic selection: Long term strategies involve genetic selection so that the animals become adapted to the climate change. Different breeds and species have different level of thermal tolerance. Therefore genetic tools can be utilized to select thermo-tolerant animals. The preliminary selection involves

selecting animals that can survive and maintain their high production level even in heat stressed condition. Such animals are characterized by shorter hair with greater diameter and lighter hair coat. The genes associated with these phenotype along with heat shock genes that are associated with thermo-tolerance can be identified and used in marker assisted selection and genome wide selection. Such thermo-tolerant animals can be further used in breeding programmes.

Conclusion

Heat stress or summer stress is a major problem in management of dairy cattle and buffaloes in India. During extreme hot and humid climate the thermoregulatory mechanism of the animal is hampered. These changes lead to decrease in production and reproduction capabilities and hence timely and efficient management of heat stress is vital for boosting the economy of dairy industry. However if the animal is found severely affected then immediate veterinary aid should be provided.

Summer Guide for Feed & Water Management For DAIRY ANIMALS

Bhavana Gupta

Editor-in-Chief

Priyanka Patlan

Co-Editor



“Warm breeze, humid weather, and gleaming sunlight are all signs that summer is around the corner. Heat flashes and the humid breeze affect dairy animal's ten-fold times the number of humans. It can be witnessed across every dairy sector that the productivity and efficiency in dairy animals become low during such times. Therefore proper feed and water management needs to be in place.”

Feed management for dairy cattle

During summers, heat stress and dizziness in dairy animals are prompt medical conditions, and this shall be tackled through proper feed management. Feed shall constitute the appropriate mix of proteins and vitamins to tackle health issues in cattle. As per dairy analysis, it's been concluded that milk production decreases in summer due to less amount of fiber-fed to cattle.

Feed management techniques that can be implemented in dairy industries to manage milk production:

- The use of supplements in feeds to meet vitamin needs is essential. Providing supplements such as Vitamin A, E, and D3 can help retain the lack of vitamins in grains.
- Oil cakes shall be fed to dairy cattle at a proper interval as they constitute 40% of proteins, increasing digestibility and milk quality.
- Some alternatives that can be fed to dairy animals include Maize stovers/ soybean chaff, Sugarcane

tops supplemented with limestone powder, leaves of mango, papal, banyan, babul, subabul, mahua, Israilibabool, kabulikikar, vegetable leaves, fruit pulp, tree leaves mixture and Banana stem.

- Electrolyte consumption is also necessary; therefore, adequate salt needs to be a part of the daily feed routine.

Tips for improving feed management:

- Monitor the level of feed intake to manage heat stress.
- Monitoring the changes in feeding patterns and behaviours
- Making feed nutritious and healthy through the use of supplements
- Use of technology for monitoring the feed pattern

Water management for dairy cattle

Water management for dairy cattle has become of utmost importance to curb the low-lying issue of summer heat. Efficient water management techniques can help increase the ability to produce milk in dairy cattle.



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Improve Growth performance of heifers
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The water intake in cattle animals is usually dependent on its milk yield, feed consumption, personal diet, temperature, humidity, and moisture in the atmosphere. It's not only limited to providing water to cattle, but proper water management is also needed for washing shed, cleaning equipment, and catering to dairy animal needs.

Summer humidity increases the heat across the barn and in outside pastures. The need for skilful water management techniques is essential. Some ways that could help and improve water management are as follows:

- A good infrastructure for cattle misting and sprinkling systems can help improve the barn environment, so that heat stress and other humidity-related issues are dealt with. An ideal misting and sprinkling system helps in preventing the wastage of water.
- Improvisation in cattle cooling system uses water as a cooling agent to reduce the cattle body temperature. Water can be recycled and utilized duly for spraying on floors, shelters, and roofs for lowering the temperature during extreme humid hours.
- The need for water consumption in cattle increases during summer. Therefore, it's necessary to provide every animal water intake needs during summer for proper and healthy milk production.

Water quality directly impacts dairy production, and the quality of water and feed quality plays a significant effect on cattle health and milk production. Through technology, proper health and nutrition management can be assessed for meeting the increasing need in times of substantial climate change.

The alleviated heat stress of cattle during summer can only be dealt with through proper feed and water management techniques, and industries now need to focus on this critical aspect for dairy production needs.

WATER MANAGEMENT

Heat Stress- A menace to the dairy industry



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The dairy sector is a business that is dedicated to the collection or processing (or both) of animal milk for human use, typically from cows or buffaloes, but occasionally from goats, sheep, horses, or camels. A dairy is usually found on a dedicated dairy farm or in a sector of a multi-purpose farm (mixed farm) that is dedicated to milk production. India is the world's largest producer of milk. India ranked first in milk production in the world, accounting for 23% of worldwide milk production followed by the United States of America, China, Pakistan and Brazil. From 146.31 mn tonnes in 2014-15 to 209.96 mn tonnes in 2020-21, milk output in the country has expanded at a compound annual growth rate of roughly 6.2 percent. According to CRISIL, despite COVID-19-induced restrictions, the organised sector is expected to grow at a rate of 5-6 percent in 2021-22, generating Rs 1.5 lakh crore in sectoral revenue.

While a variety of environmental conditions can influence a dairy animal's immunological status and productivity of milk, heat stress is the most common cause of animal health problems around the world. Heat stress potential is increasing as global temperatures rise, both in absolute terms and in terms of duration. Heat stress is caused by a number of factors, the most important of which are high ambient temperature and high humidity.

Signs of Heat Stress

Common symptoms of heat-stressed animal include,

- Animal moves to shade
- Water intake enhanced while feed intake reduced
- Prefers standing than lying down
- Increased respiration rate, body temperature
- Increased production of saliva
- Open-mouth panting
- Incidences of silent heat increase during heat stress

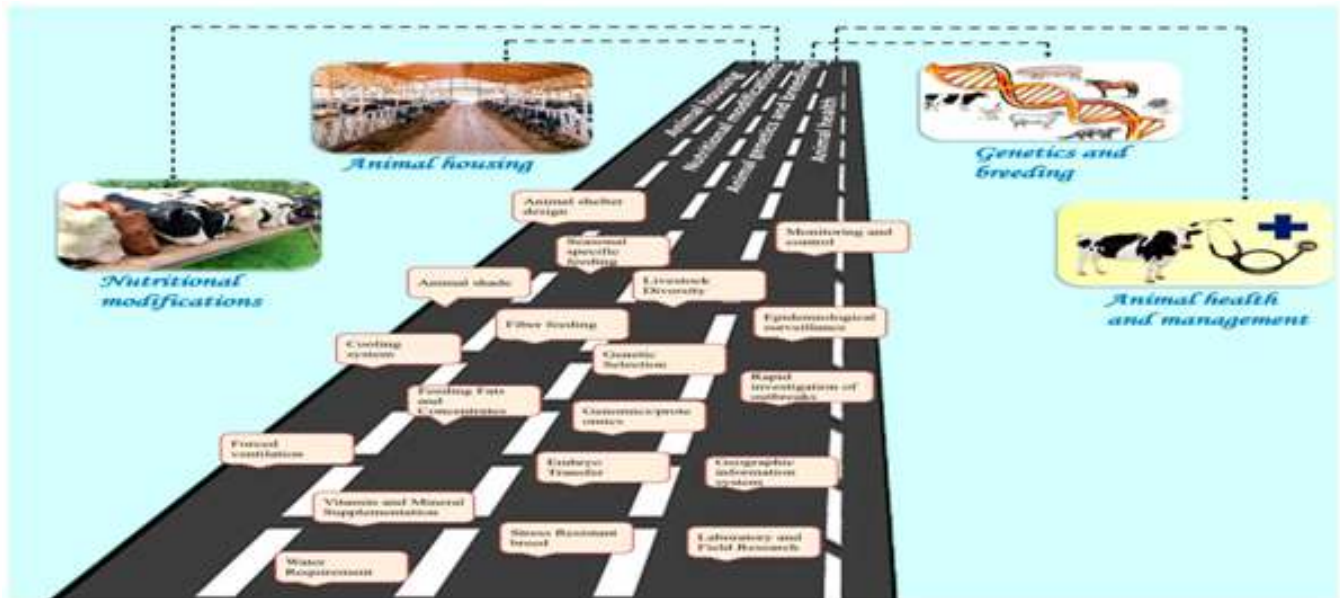
Reproductive and Productive challenges:- Heat stress challenges the production and reproduction performances of dairy animals. Milk composition, such as milk fat percentage and SNF percentage, is also affected. Follicular development and the estrous cycle are both negatively affected by heat stress.

Strategies to combat the negative effects of heat stress:- There are certain mitigation strategies to alleviate the detrimental effects imposed on dairy animals due to high ambient temperature.

Breeding Management

As cows express lesser heat symptoms during heat stress zones as compared to thermal comfort periods, it is necessary to





approve or adopt a good heat detection program to detect cows with marginal heat symptoms. It is always advisable to continue breeding with the help of Artificial Insemination technique instead of using bulls because in natural breeding both bull and cows suffers infertility due to summer stress or heat stress. Genetic selection of heat tolerant animals and inclusion of heat tolerance as a trait in selection programme will be a boon to the dairy farmers.

Animal Housing Management

There must be a cooling system in farms/animal houses to combat heat stress. The greatest cooling solution is to use fans in combination with a water sprinkling or water fogging system. This must be exercised in case of buffalo farming as they are more prone to heat stress in comparison to other dairy animals. Excessive sprinkling should never be done because it can result in moist bedding, which can lead to mastitis and other problems in the animals. The farm should be adequately ventilated. The long axis of animal houses must be in east-west direction for provision of a cooler environment inside the shed. The color of roof and outside walls should be painted with white color that cause a reflection of sunlight upto 75 %. Houses should be made up of a thick isolating material that does not give access to the sunlight inside animal houses.

Nutritional Management

Heat-stressed animals are more likely to perform faultily in terms of reproduction and productivity. In heat stress, feed intake decreases. Hence, the demand of energy and nutrient densities increases. High-quality forages and balanced meals will alleviate some of the impacts of heat stress

and improve animal performance. The following are some nutritional management suggestions for dealing with heat stress:

- Provide high quality feeds like total mixed rations
- Increase the frequency of feedings
- Feed during cooler times of the day and graze the animals in night time
- Keep feed fresh as much as possible
- Provide high-quality forage
- Decrease fibre content of the diet
- More fat and concentrates should be given to make feed more dense in energy
- Use of by-pass proteins can enhance the milkyield and protein content.
- Animals should be given more minerals (zinc, chromium and selenium) and vitamins A, C, E along with the diets to reduce oxidative stress and enhance their immunity.
- Rumen fermentation modifiers such as monensin and live yeast culture should also be incorporated in animal diets to improve glucose status, nutrient utilization and increase feed intake.
- Intake of sufficient cool water is probably

the most important strategy for animals to undertake during heat stress. At least 10% of the herd should be capable of drinking simultaneously from, preferably, large open water troughs that are easily accessible.

Providing natural or artificial surface area

Plantation surrounding the farm will help to reduce the animals' heat load. However, it is not always feasible in today's commercial dairy business. As a result, providing artificial shade in the form of a shade cloth or a naturally ventilated structure with open sidewalls can keep the animals away from exposure of direct sunlight up to 30%.

Selection of heat tolerant animals

Genetic Selection of animals based on specific molecular genetic markers (HSP and ATP1B2 gene) for heat tolerance will definitely be a boon to alleviate heat stress in cattle and buffaloes by identifying the heat tolerant animals. It has been proven that animals with shorter hairs, greater diameter and lighter coat are more heat tolerant in comparison to animals with longer hairs and darker color coat. Therefore, selection of such animals will also be fruitful to dairy farmers.



Legume Forages – As A Nutritional Feed Resource For Dairy Animals



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Leguminous crop plays an important role in improving soil fertility in agriculture. They are cheap producers of fodder, rich in protein and nitrogenous compounds used to feed with livestock. All green plants produce carbohydrates by utilization of Co₂, water and sunlight by the process of photosynthesis. But in cultivation of leguminous crops, they only have the additional capacity of directly drawing huge amount of atmospheric nitrogen and stored in its specially structure called root nodules. They are converted or transformed into highly valuable crude protein, are as necessary as livestock feed. When the plant roots, stubbles and leaves are left in soil, the release nitrogen and utilized by the succeeding crops called legume effect.

Production of leguminous forage crops and their uses on improving soil fertility will become one of the best agricultural practices. Legume species are important supplements for livestock and at times completely replace purchased feeds if used properly. There are many legumes species commonly used for fodder purposes. Balanced nutrition has to be one of the most important factors limiting ruminant production in the traditional smallholder. The potential way for increasing the quality and availability of fodder for smallholder ruminant animals may be through the use of legumes. Leguminous fodder can be added into livestock feed for increase the milk production and SNF content. It can be mixed with regular green fodder at 1:7 as cattle feed.

Nutritional status of fodder Legumes

Protein content in legume fodder contains of both soluble and insoluble components can be used as an important source of nitrogen for increased rumen microbial activity and by-pass protein for supplying amino

acids to the lower gut of the livestock. In addition to that, legume fodder is an important source of minerals such as sulphur, calcium, copper. The other advantage of using fodder legumes as a source of feed for ruminant animals is that supplementation of forages up to about 35 percentage.

1. Fodder Cowpea (*Vigna unguiculata*): (Duration: 60-70 days)

It is a short duration fodder, indeterminate plant with luxurious growth, suitable for intercropping system and widely spaced planting crops. It can be intercropped with deep rooted cotton, red gram and castor, because initial growth rate of this crop is slow. It is also suitable for intercropping with red sorghum and maize. It can be harvested for green fodder at 55 DAS. Green fodder is highly palatable which contains 20% of protein, 2-3% fat, 1.5% calcium, and 1.4% phosphorus. It has high leaf stem ratio.

Co(FC) 8 is an improved variety has high green fodder yield of 8-9 tonnes per acre, can be cultivated throughout the year under irrigated condition. Under rainfed condition it produces 5-6 tonnes of green fodder per acre. Potential yield of 9.2 tonnes of green fodder per acre was produced under cotton+ fodder cowpea intercropping system of 1:3 ratio.



Vegetative growth of COFC-8 at 45 DAS before flowering

2. Moth bean (*Vigna conitifolia*): (Duration: 65-70 days)

It is important leguminous crop of arid



and semi arid regions of Tamil Nadu. It is drought resistant, multi-uses pulse crop. It is a rabi crop (Nov-Dec), high fodder yield with high protein content suitable for dry fodder under mixed cropping system with red sorghum. Pure crop yields 1.3 tonnes of dry fodder per acre.

TMV(mb)-1 is variety released from Tindivanam Research Station, TNAU, Tamil Nadu. It produced high fodder yield and high protein content of 24.8%. It is early maturing moderately resistant to pod borer and YMV disease. It is suitable for mixed and intercropping system. Normally, moth bean has mixed cropped with red sorghum, harvested along with sorghum straw and stored as dry fodder to feed to livestock during summer. Green fodder contains 6-10% crude protein, 6-8% crude fiber, 1-2% fat, and 1160 kcal/kg of energy.



Flourish growth of COFC-8 at 45DAS under 1:3 ratio of cotton+ fodder cowpea intercropping system

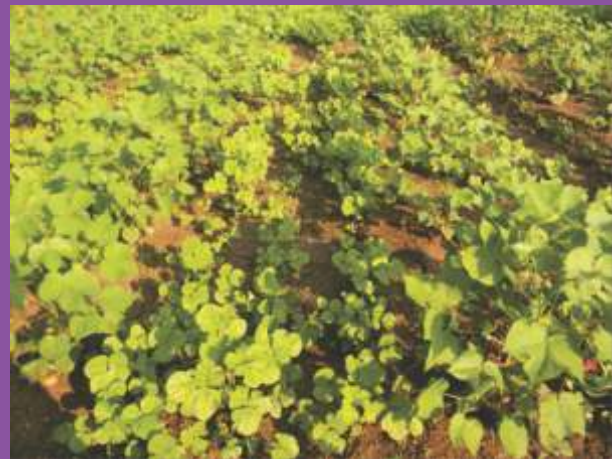
3. Pillipesara (*Vignatrilobata*): (Duration 70 days)

It is a leguminous crop extensively cultivated in Andhra Pradesh and suitable to cultivate all types of soils. It is drought resistant, short duration, dual purpose crop. Grain is palatable, very small and dark green in colour, used for culinary purposes. Fodder yield is less compared to fodder cowpea and moth bean.

Initially slow growing, it will take 6-8 days to germinate. Capable of producing root nodules and fix atmospheric nitrogen. Numbers of root nodules are lesser than fodder cowpea. 1.2 ton of green fodder yield can be obtained from one acre when raised as a sole crop. Nutritive value of green fodder is 4-8% of crude protein, 3-6% of crude fibre, 0.5-1.5% of fat and 710 kcal/kg of energy.

4. Horse gram (*Macrotyloma uniflorum*): (Duration: 100-105 days)

Paiyur 2- It is a high yielding variety than other horse gram varieties. It is a valuable green fodder crop and yield can obtain around one ton per hectare when harvested at 60-65 DAS. It can be used as a dry fodder along with other forages. Farmers can cultivate as groundnut-horsegram, gingelly-horsegram cropping sequences under rainfed condition. It contains 4-5% crude protein, 6% crude fiber, 0.87% of fat and 819 kcal/kg of energy.



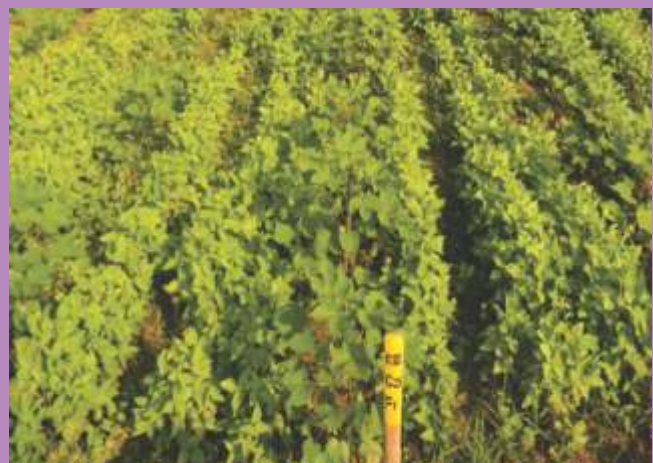
Cotton+ pillipesara intercropping system

5. Alfalfa or Lucerne (*Medicago sativa*): (Duration: First cut -55-60 DAS)

It is drought resistant and moderately salt resistant legume fodder crop. It is a multi-cut crop and its deep root system fixes atmospheric nitrogen which improves the soil fertility. It has crude protein ranges from 20-24%. Sowing starts at the second week of November, and the first green forage harvest will be 55-60 DAS. Subsequent cuts will be at a 45-day interval. It can make possible up to 5-6 harvests per year. Apart from protein, it is rich in calcium, phosphorus and minerals. It contains low fiber and high digestibility.

Benefits of feeding leguminous fodder:

- High in energy, calcium and other minerals such as sulphur, copper, leads to increase conception rate.
- Excellent source of amino acids and protein.
- Contains important vitamins B, C, D, E and K.
- Highly digestible and palatable.
- Increased livestock longevity.



Cotton+ Horse gram intercropping system

A Guide On Heat Stress In DAIRY CATTLE

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“Heat stress is a common phenomenon in dairy cattle. The heat and humidity directly impact cattle, leading to a decrease in milk production and diverse health issues. When exposed to the sun, cattle absorb solar heat. The cow undergoes heat stress when it generates and absorbs more heat than its body can easily remove through respiration, sweat, and airflow.”

How to know if heat stress is affecting your cattle?

There are specific symptoms in cattle that can be analysed to understand that cattle are going through heat stress. The early analysis and detection can help in preventing severe heat stress-related issues.

- Respiration problems and body temperature changes are the primary symptoms if the cattle are going through heat stress. If a cow is experiencing a respiratory rate exceeding 100 breathes per minute, it calls for immediate attention and a state of emergency.
- Lower milk production or declination in the rate of milk production is also a relatively common symptom and needs to be adhered to quickly.
- In cases of severe heat stress, cows usually breathe and pant out of an open mouth and extend their necks. On the other hand, some heat-stressed cows may not show any clinical signs.
- Extreme lethargy and fatigue in cows can also signify heat stress.
- Elevated open mouth breathing and unusual drooling, increased saliva production, as well as restless

behaviour can be a sign of heat stress.

- Enhanced water intake and lower feed intake can also signify heat stress.

Steps to be taken to prevent heat stress

Drastic measures can be taken to prevent heat stress. Preventive measures not only ensure cattle health but also reduce the mortality rate.

1. Proper shade

Dairy owners and industries can provide adequate shade facilities for cows. Heat stress usually occurs in summers due to humid weather, and a duly ventilated barn needs to be structured for heat and stress management in cattle.

2. Sprinkler system

Sprinkler systems need to be incorporated while grazing cattle, and a proper sprinkler cycle for a relaxed environment and cattle health shall be in place.

3. Ventilation

A healthy ventilation system in barns can help as a cooling mechanism that throws excess humid air and relaxes the barn environment.





4. Water facilities

Good drinking water shall be in place for cattle hydration and regulating cattle's body temperature. Excess dehydration due to heat stress can also be tackled with proper water intake at appropriate drinking intervals.

5. Diet management

High-quality Feed intake shall provide adequate nutrients that will help maintain a balanced diet and energy requirements.

Technology aspect for industries to manage heat stress

It is prudent for the dairy industries to involve themselves in dairy-tech solutions to maximize production and minimize heat stress and health issues in cattle. The mechanical and technology solutions offered through the Internet of things and high-tech innovations can prove to be a stroke of luck for dairy industries.

The newly-equipped IoT tags in the animal grazing and dairy sector can send and receive signals to estimate body temperature changes and track data. Digital intervention in cattle can reduce the mortality rate due to early diagnosis of heat stress and health-related severe issues.

The technology in the dairy sector can help in monitoring and tracking the moments of cattle, tracking heat cycle and body temperature at regular intervals, and security alerts in case of severe heat stress conditions.

In a nutshell,

Heat stress can severely affect cattle, and therefore measures need to be taken to minimize heat stress issues and ensure adequate health in the cattle herd. The management in dairy needs to be updated with proper available technology for cattle welfare and performance. Like humans, cattle care shall also be a top priority in the coming age.

Monensin – A Tool For Methane Emission & Rumen Related Disorder

INTRODUCTION

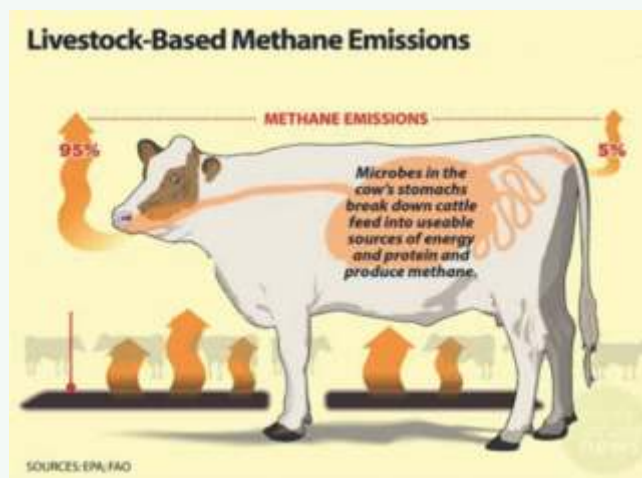
- Microbial digestion by ruminant microflora yields metabolites able to be used for synthesis of milk constituents, as well as carbon dioxide and methane.
- The types of metabolites arising from fermentation (including acetic, propionic and butyric acids) are affected by diet composition and the microflora, especially bacterial species and the protozoa.
- India hosts 18% of the global dairy cattle population. More over urbanization in India has increased rapidly and the share of urban population has doubled in the past 60 years.
- Greenhouse gas emissions from livestock farming and in particular enteric methane (CH₄) from ruminants are criticized for being one of the main contributors to climate change.

WHY METHANE?

- Methane is an especially potent trace gas due to its global warming potential, 25 times that of carbon dioxide.
- It is the second largest anthropogenic greenhouse gas, behind carbon dioxide.
- Also, methane is able to increase ozone in the tropospheric region of the atmosphere where the greenhouse effect occurs.
- Globally, 50–60% of methane emissions are from the agricultural sector, specifically from livestock production operations; the principal source of methane is from ruminant animals.

HOW METHANE IS PRODUCED BY RUMINANTS

- Ruminant livestock – cattle, sheep, buffalo, goats, have a fore-stomach (or rumen) containing microbes called methanogens which are capable of digesting

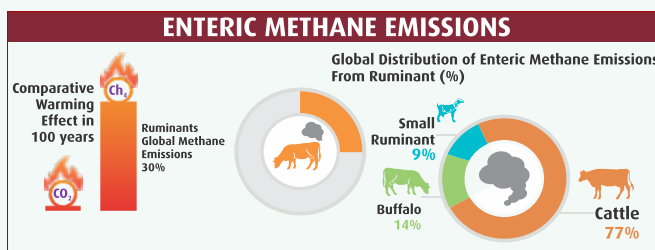


- coarse plant material and which produce methane as a by-product of digestion (enteric fermentation).
- This microbial fermentation is referred to as enteric fermentation, produce methane as a by-product, which can be exhaled or eructed by the animal.
- The amount of methane produced and excreted by an individual animal depends primarily on the animal's digestive system and the type of feed it consumes.

- Rumen archaea are strictly anaerobic and are the only known microorganisms present in the rumen capable of producing methane. Such archaea are referred to as methanogens.

WHAT IS METHANOGENS

- Methanogens belong to the domain Archaea and the phylum Euryarchaeota Unlike Bacteria, methanogens lack peptidoglycan in the cell wall.
- Archaea are found in the rumen in the range of 10 to 10¹⁰ cells per ml, accounting for less than 4% of the microbial community. Methanogens are among the strictest anaerobes.



- Most methanogens remove hydrogen gas by reducing CO with hydrogen gas to form methane. Producing methane keeps hydrogen concentrations in the rumen low, allowing methanogens to promote the growth of other species, and enabling a more efficient fermentation.
- Methanogenesis is the only mechanism of ATP synthesis available to methanogenic archaea.
- However, methane produced in the rumen is eructated, leading to atmospheric pollution. It should also be noted that methane production by archaea represents an energy loss of about 2 – 12% of gross energy intake, meaning this energy is no longer available for animal growth, lactation, maintenance or pregnancy.
- Manipulating the diet of ruminants to reduce the number of methanogens would therefore both help reduce the negative impact on the environment, and also improve the efficiency of livestock production.

DIETARY COMPOSITION

- The components of the diet fed especially type of carbohydrate, are important for methane production as they are able to influence the ruminal pH and subsequently alter the microbiota.
- The digestibility of cellulose and hemicellulose are strongly related to methane production.
- Grinding forage feed before it is ingested by the cows also seems to decrease the production of methane.
- Increasing the rate of digestion and flow through the gastrointestinal tract limit the time available for methane to be produced within the rumen.
- It is important to note that increasing the amount of rapidly fermentable carbohydrates in a diet can increase the rate of passage from the rumen, as well as lower the ruminal pH.

WHAT ARE IONOPHORS

Ionophore antibiotics are molecules diverse in chemical structure having several oxygen atoms spaced throughout the molecule. Ionophore have polar and nonpolar regions that enhance cation entrapment and interaction with membranes. Carboxylic acid, polyether ionophore were initially developed to improve the performance of cattle by altering the pattern of rumen fermentation.

CONTROL OF METHANE EMISSION BY DIETARY SUPPLEMENTATION OF MONENSIN

- Monensin is a carboxylic polyether ionophore compound fed to ruminants to modify rumen fermentation dynamics by selectively inhibiting growth of gram-positive bacteria, which produce most of the acetate, lactate, and hydrogen in the rumen.
- Anaerobic fermentation in the rumen derives energy from substrate oxidation by the transfer of electrons (and hydrogen) to acceptors other than oxygen. The reduced compounds formed are mainly VFA and methane. Fermentation balance requires that an increase in propionate production must be accompanied by a decrease in methane production.
- Up to 12% of the gross energy of feed can be lost as eructated methane.
- Interest has been renewed in monensin as a mitigation strategy for methane production, as it is known to inhibit gram-positive microorganisms responsible for supplying methanogens with substrate for methanogenesis.
- Ionophores inhibit methanogenesis by lowering the availability of hydrogen and formate, the primary substrates for methanogens. Bacteria that produce these substrates are sensitive to ionophores, whereas methanogens are more resistant.
- This favors growth of gram-negative bacteria and production of propionate in the rumen. Increased production of propionate in the rumen increases hepatic gluconeogenic flux which improves the overall energy status of ruminants.
- It is hypothesized that monensin does not affect methane production by inhibiting methanogens, but instead inhibits the growth of the bacteria, and protozoa, providing a substrate for methanogenesis.
- The reductions in methanogenesis following ionophore supplementation vary from minor to 25%.
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MONENSIN HELPS TO CONTROL RUMEN RELATED DIGESTIVE DISORDERS

Certain rumen related digestive conditions, e.g., bloat, acidosis, and ketosis are related to disturbances in ruminal fermentation. These conditions are reduced when Monensin are fed because of a specific effect on a particular bacterial species or changes in end products of fermentation.

BLOAT

Bloat results from the excess production of stable foam in rumen. Gas becomes entrapped within the reticulo-rumen and failure of eructation mechanism caused the abdominal distension. The acute nature of the disorder often leads to death within hours after the ingestion of bloat provocative meal. Feeding an ionophore can also reduce the potential for bloat. Monensin inhibits rumen protozoa that normally produced gas & foam stabilizing substances thus leading to a reduction in bloat potential.

ACIDOSIS

Current levels of milk production and the relative cost of grain to forage have resulted in an increased proportion of rapidly fermentable carbohydrate in the diet of dairy cows. Consumption of rapidly fermentable diets places the dairy cow at risk for acidosis. Acidosis is generally linked to lactic acid production. In many cases, digestive disorders are associated with or secondary to other health problems such as mastitis, retained placenta, or metritis associated with calving. Ionophores have the potential to ameliorate the disease of acidosis. Ionophore effects on lactic acid producing strains of bacteria such as *Streptococcus bovis*. Monensin inhibit many of the major strains of rumen bacteria that produce lactic acid.

KETOSIS

The sudden onset of lactation places significant metabolic demands on the cow. Glucose precursors, primarily propionate and amino acids, become essential for a successful lactation. Glucose synthesis must increase to meet the needs of lactose synthesis.

- High producing dairy cows meet the increased energy requirement by mobilizing body fat. Adipose tissue releases NEFA into the blood. The NEFA may be oxidized, reesterified, or metabolized to ketone bodies.
- The liver of the dairy cow has a higher rate of triglyceride synthesis than secretion. This imbalance contributes to fat deposition in the liver (fatty liver).
- Ketogenesis by the liver leads to elevated blood concentrations of BHBA, acetoacetate (ACAC), and acetone.
- Excessive ketogenesis, resulting in most cases from reduced feed intake, often leads to the metabolic disease of ketosis.
- Cows fed monensin had lower concentrations of BHBA in blood during the first 3 wk of postpartum & other studies have reported reduced blood concentrations of NEFA and BHBA when monensin was fed postpartum.
- This pattern of energy metabolites in blood is indicative of an improved energy status for cows fed monensin especially during early lactation.

To know more, please contact Huvepharma technical team



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Repeat Breeding Syndrome: Causes and its Management

Introduction

Animal Reproduction is the main key element in the dairy herds. Good reproduction and production rate are the main important points to grow a dairy enterprise. The productive life of any animal starts with parturition. After that cow needs regular conception and calving to begin lactation which is important point of her production life. Therefore any reproduction related problems lead to economic loss. For this, the animal should be in proper reproductive state i.e. it is able to produce one calf crop per year. There are several factors which affect normal reproductive process in an animal which are repeat breeding syndrome, anestrus, polycystic ovarian disease etc. Out of these repeat breeding is the important issue nowadays as it will cause direct effect on the loss of the normal reproductive process along with economic loss of the individual. A repeat breeder animal is animal, which fails to conceive after at least two successive conceptions, which is having no clinical abnormalities and cycling process.

• Genetic causes of repeat breeding:

Chromosomal or genetic abnormalities of parents which can be transmitted to the offsprings that may lead to cause this syndrome. In breeding may provoke incidence of repeat breeding.

• Age of the animal:

Effect of age on fertility is commonly reported as negative. Higher incidences of repeat breeding have been seen in old cows.

• Uterine infections and estrus cycle:

Uterine environment is important for embryo implantation and growth. Thus any disease related with uterus may lead to cause early embryonic death and thus repeat breeding syndrome. Uterine infections negatively influence the uterine and cervical postpartum involution, follicular development, causes embryo mortality and repeat estrus rates.

• Anatomical defects of the genital tract:

Anatomically perfect reproductive tract can offer good environment for reproductive function. Thus any change in this anatomical structure may lead to cause this problems.

- **Improper ovarian function:**

Ovarian cyst like problem is the serious reason of reproduction failure. Delayed ovulation and anestrus conditions are also linked with this.

- **Nutritional status of animal:**

The importance of nutrition in all vital processes is indisputable, and the qualitative and quantitative differences in the ration in dairy cattle may cause

rule i.e. if a cow comes in heat in morning, she should be inseminated in the same day evening and if came to heat on evening she should be inseminated on next day morning.

Diagnosis of repeat breeding syndrome:

- **External inspection and vaginal examination:**

By external inspection we can know the

ovulation or some diseases) or clear and clean mucus (associated with heat).

- **Rectal palpation:**

It is widely used techniques as it is easy to palpate genital organs and less expensive than other techniques. Plastic gloves are lubricated and then feces are withdrawn. Air should not be present into the rectum to get a more relaxed mucosa and easily manipulate the structures beneath. The cervix is presented as a solid structure, tubular, fibrous, with 3-4 folds projected inside and localized on pelvis floor in normal non-pregnant cows. It is cylindrical, with a length of 5-10 cm and a diameter of 1,5-7,0 cm. Cranially the uterus can be palpated. At heat, uterus is turgid, erect and coiled. However, it is soft and flaccid during luteal phase and palpation is a bit more difficult; it is a consequence of the progesterone action, released from CL

- **Hormonal level tests:**

Sex hormones and other substances are important in sexual cycle of cows and buffaloes. Progesterone assay is an objective and accurate test to evaluate the ovarian function and to diagnose certain diseases that otherwise could



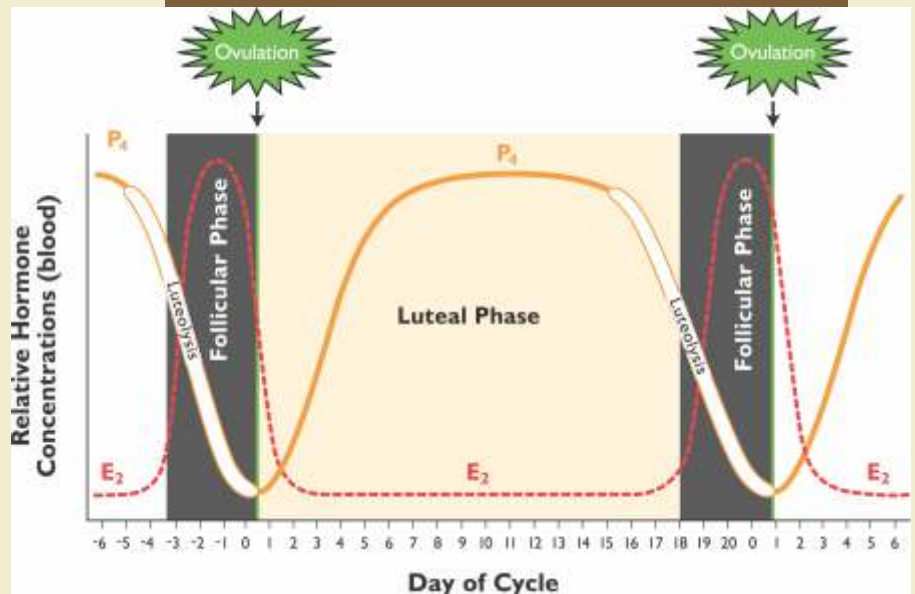
reproductive dysfunctions . Weight of breeding indigenous and jersey heifer should be 240-275 kgs and for HF cross heifer 260-290 kgs. Underweight animals show poor reproduction function i. e. poor conception rate. Balanced feeding is the effective solution for this. Some trace elements like copper, cobalt, iron etc are important for steroidogenesis. Supplementing trace minerals and Vitamins A, D3 and E, can assist in treating the problem of anoestrus/ repeat breeding dairy animals.

- **Artificial insemination:**

Any disorder at any action like bull preparation, artificial vagina preparation, semen collection, semen processing, storage, thawing, post-thaw handling of semen, incorrect insemination in relation to stage of oestrus may result into repeat breeding. Insemination time is also important. We should inseminate the indigenous cows according to AM.-P.M.

congenital or acquired defects like pneumovagina, vulvar defects, tumours or injuries. The vaginal contents should be inspected to detect urine (if urovagina), pus (if endometritis, vaginitis), blood (post-

not be correctly determined, such as delayed ovulation, persistent luteal activity, ovarian cysts or suprabasal progesterone levels . Radioimmunoassay and enzyme immunoassay can also be done.





- **Oviductal potential**
- **Endometrial cytology**
- **Uterine infection/ uterine bacterial culture test:**

It is important to know the microbiological and pathological condition of the uterus. If any infection is there then it should be cured otherwise it may lead to infertility or any other issues regarding conception failure.

Management of repeat breeding:

- Maintain breeding record properly
- Avoid overcrowding of animals at the time of AI
- Mineral mixture supplement should be provided to the animals @ 2% of ration
- Provide clean water to drink
- Provide as much as cool climate during summer
- Animals with congenital effects with ovary, uterus or fallopian tube should not be inseminated.
- Underweight, malnourished, anaemic animals should never be inseminated.
- Do not feed mould infested grains and green fodder.
- Cows showing turbid or discoloured mucus discharge should not be inseminated and should be checked any uterine infection.

- Avoid putting the straw back into the liquid nitrogen cylinder once it has been taken out. Once the straw is taken out, it should be used immediately.
- To avoid contamination the AI gun should never be pulled out of the vagina and reinserted into it.
- Only efficient trained person should allow to do AI
- Never use bulls with known vaginal infections for AI.
- Avoid inbreeding.
- Use hormonal treatment if necessary.

Clinical approach to repeat breeding syndrome:

- **Nutritional supplements therapy:**
Diets containing higher concentration of inorganic iodine from 8-12 days before estrus improve the stimulation of the pituitary gland, reducing at the same time the RBC rate. Herds with problems of repeated estrus were supplemented with copper and magnesium, minimizing fertility problems
- **Assisted reproductive techniques:**
Abnormal implantation and transport of gametes are associated with endometrial defects, resulting in RBC syndrome. Certain assisted reproduction techniques, as in vitro

production of embryos or intraperitoneal insemination, have been proposed to solve this syndrome. Intraperitoneal insemination could be an alternative procedure to the normal deposition of semen in the genital tract of the cow. In vitro fertilization and embryo transfer techniques are also important to reduce repeat breeding syndrome.

• **Intrauterine therapy:**

Prophylactic practices have been used, as the uterine administration of antiseptic solutions (lugol) 24 h. after mating/AI, although fertility results are poor.

• **Other medicinal treatment:**

Moxibustion has been used to reduce reproductive failure in RBCs. We also find references in the literature about the positive effect of aquapuncture therapy.

• **Hormonal therapy:**

Hormonal treatment should be given if any hormonal cause found. Progesterone is useful in implantation and maintenance of pregnancy. GnRH hormones at the time of insemination is useful to accelerate ovulation in animals. If luteal deficiency is suspected as reproductive failure in cows, GnRH (100 µg) could be used on day 5 post-AI. A comprehensive study carried out in RBCs indicates that the administration of GnRH at the AI time may be beneficial for improving fertility in these cows.

• **Discussion:**

Repeat breeding is the important problem in nowadays in farm animals as it directly affects farm profitability. It not only affects reproductive ability but also affects production ability of the individual. Causes can be different of this condition according to that we have treat the animal. By proper management we can avoid this syndrome. As given above these managemental practices improve the health condition of the animal and help to avoid repeat breeding condition.

Powerful prevention with Intra Hoof-fit Spray



“ An international European research institute, which experienced a sudden increase of hoof problems, started with Intra Hoof-fit Spray and succeeded a significant reduction within a timeframe of 2 months and is already for 12 months on only 2% hoof problems. ”

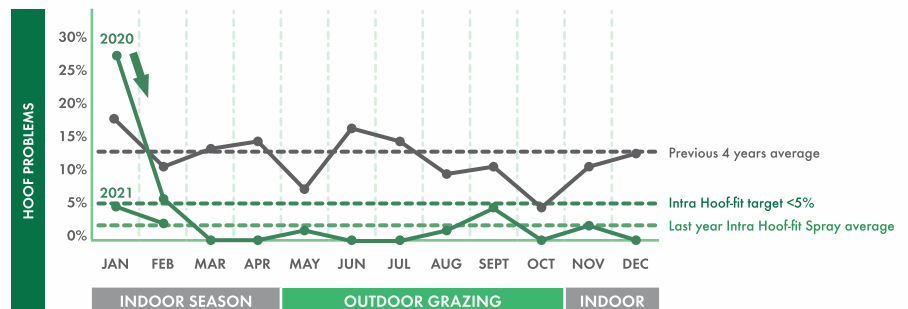
This research institute with lactating dairy cows is performing hoof checks and individual treatment of hoof problems with a monthly interval. At the start of the indoor winter season 2019/2020, an experimental hoof bathing protocol was used, which unexpectedly resulted in a sudden increase to 27% hoof problems (January 2020). This was an alarming quick increase!

In order to reverse these problems, they started a herd protocol by weekly spraying the hind legs of all animals with Intra Hoof-fit Spray (green line). Within 2 months, the incidence dropped to 0% (March 2020) and they already are for 12 months (March 2020 - February 2021)

stable around 2% (last year Intra Hoof-fit Spray average line), which is nicely below our Intra Hoof-fit target line of <5% and far below the 13% average of the previous four years (grey line)

These results demonstrate:

- One time a week preventive application of Intra Hoof-fit Spray is able to reduce a significant level of hoof problems within two months
- During the twelve month follow-up, hoof problems remained around 2%, which is far below previous four years average of 13%
- The great reduction in hoof problems results in lower costs and improvement of animal health



Intra Hoof-fit Spray is a ready-to-use hoof spray innovation, based on the Hoof-fit technology of chelated minerals with a proven long-lasting adhesion on the hoof, which prevents product wastage in the manure pit. The farmer can apply fresh product on the right spot on every single hoof using a low-pressure or automatic sprayer. An additional advantage is that also the young stock and dry cows can be included into this group prevention protocol.



The Newborn Foal

Paramveer Singh Sangha

PhD Scholar, Department of Veterinary Gynaecology and Obstetrics, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India

Introduction

Ultimately the aim of breeding is to produce an adult horse of good genetic characteristics. Even before a live foal is born the nutrition of the mare through pregnancy, the management of the foal from day one, through weaning and continuing through the first years of life is vital to ensure survivability and build up its endurance. The breeding, and "nurturing", both have a role in producing the best adult specimen.

The Umbilical Cord

Normally, the umbilical cord breaks when the mare or foal gets up and moves around. If not, do not cut it. As approximately 25 percent of the foal's normal blood volume may still be circulating through the placenta at the time of delivery, the cord should be left intact long enough to allow the passage of this blood into the foal. Cutting the cord causes it to bleed more. Septicaemia, a common foal disease, is caused by bacterial invasion through the navel stump. The stump should be treated with chlorhexidine mixed one part with four parts water. The foal should be dried thoroughly. A tetanus antitoxin injection should be given to foal if the mare was not immunized before foaling. The foal must start nursing within two to three hours after birth to obtain adequate colostrum. The large immunoglobulin molecules in colostrum, which provide antibody protection, can only be absorbed in the first 12 hours after birth.

Colostrum

Colostrum, or "first milk," has many properties which are very beneficial to newborn foal. It is high in nutrient content, has laxative properties and most importantly, is very high in antibodies and other factors important for developing the foal's immunity. The foal is born deficient in antibodies and lacks adequate immunity. Therefore, the newborn foal is relatively incapable of fighting off disease before it obtains colostrum. The foal which has received and absorbed adequate amounts of colostrum is more capable of fighting off

disease because of this colostral "passive immunity." It protects the foal until it is able to produce its own "active immunity," or the production of antibodies within its own body.

The First Day

Wheat straw is the preferred bedding for foaling. It does not stick to the foal or the placenta. Normally, the placenta is shed within three hours after birth. Do not pull on the un-expelled placenta.

Ammonia in Stalls

Before the age of one year, about 15% of all foals have a severe respiratory illness. High levels of ammonia have been linked to respiratory issues in foals. Protein is broken down into urea, which is expelled in the urine and released into the environment as ammonia. Reducing ammonia levels in stalls is one approach to prevent respiratory irritants to foals. This problem is exacerbated by the infrequent removal and replacement of filthy bedding. Ammonia odour is common in confined, hot barns. A lot of the ammonia in a stall comes from the floor, which is where newborn foals spend a lot of their time. Because young foals' respiratory systems are undeveloped, they are more vulnerable. Sprinkling 1-2 pounds of hydrated lime after cleaning and before re-bedding, on the stall floor lower the ammonia levels. Broodmares should not be fed an excessive amount of protein. It should be sufficient to provide 14-16 percent grain with grass hay and 12 percent grain with alfalfa hay.

Handling Foals

Before they have to be handled, foals should be acclimated to being handled. Some foals will be injured, and they will need to be handled carefully so that they can be vaccinated and dewormed. When foals are young, owners should handle them and halter train them. It will be less distressing if they are accustomed to being handled, haltered, and led from an early age. Early foal training can be advantageous. Place the mother and foal in a box stall when the foal is young. When the foal's tail is slightly curved over



its croup, it normally stands peacefully.

Disease Control

To safeguard the foal as it matures, it will require a series of vaccinations. Because colostral antibodies may interfere with the foal's ability to build long-lasting immunity, vaccines are normally given when antibodies derived from colostrum have reduced. At three months of age, foals should begin their vaccination routine. One month later, booster shots are required to provide enough immunity. Tetanus, Eastern and Western encephalomyelitis (EEE, WEE), equine influenza, and rhinopneumonitis should all be routinely vaccinated in foals. Under some circumstances, vaccination against strangles, Potomac Horse Fever, rabies, and other diseases may be necessary.

The following is a vaccination schedule for foals:

Birth

If the mare was vaccinated one month prior to foaling and the foal received adequate colostrum, no vaccination is required. If not, tetanus antitoxin should be given at birth.

Third Month

Tetanus, EEE and WEE, Influenza and Rhinopneumonitis

Fourth Month

Tetanus, EEE and WEE, Influenza and Rhinopneumonitis. Yearly boosters for all of the above vaccines are required. However, horses receiving the influenza and rhinopneumonitis (respiratory form) vaccine should be revaccinated every 60-90 days. Immunity to these diseases is short and revaccination is necessary.

Internal Parasite Control

In addition to prevention and control measures, routine deworming is a vital aspect of a foal's health programme. Medications for controlling worms and disrupting their life cycles can be given directly into the stomach via a stomach tube, eaten in conjunction with rations, or applied as a paste inside the mouth. Paste dewormers are a good alternative for controlling worms in horses due to their availability and cost efficiency. Furthermore, putting a paste dewormer in a foal's mouth rather than introducing a stomach tube is often safer and less distressing. Deworming of the foals should be done on a monthly basis until they reach the age of one year.

Nutritional Management

Creep feeding is a crucial part of early foal management. As foals get older, they become more reliant on solid food,

while milk consumption decreases. The mare's milk only provides about half of the protein and calories needed by the 3-month-old foal. For optimal foal growth, creep feed must be provided to match the foal's nutrient requirements. Creep feed can be given to foals as early as two weeks of age. However, there will be virtually little consumption at this period. Foals will initially nibble and play with the creep feed before increasing their consumption to one to three pounds per day, depending on their age. Fresh creep feed should be put into the feeder daily. Creep feed left in the feeder can be fed to mares or other horses if it has not become sour or mouldy. The major considerations of a good creep feed include high quality protein, moderately high energy levels and adequate calcium and phosphorus amounts in the proper ratios.

Conclusion

To deal with existence surrounded by possible predators, the equine species has developed to develop swiftly during this early age and to show few apparent signs of sickness. This necessitates close observation of foals for the first 24 hours of their lives, as well as prompts veterinarian intervention if there are any concerns.





DSM Receives Landmark EU Market Approval For Its Methane-reducing Feed Additive Bovaer®

Royal DSM, a global purpose-led science-based company, announces that European Union (EU) member states approved the marketing of the methane-reducing feed additive for dairy cows, Bovaer®, in the EU. After inclusion in the EU registry, expected in the coming weeks, it is the first time a feed additive authorised in the EU for environmental benefits can be marketed. This marks a significant milestone for DSM, paving the way for Bovaer® to revolutionize the dairy market.

Methane has a global warming potential 28 times greater than carbon dioxide, which is why reducing methane emissions was identified at COP26 as one of the most significant short-term means of tackling climate change. More than 100 governments pledged to cut methane emissions by 30% by 2030, as part of the Global Methane Pledge, launched by the EU and the US.

Bovaer® will contribute to the greening of the EU's agriculture, and to the objectives of the Farm to Fork Strategy. As stated in the European Commission's confirmation of approval, the innovative feed additive is safe for use without impacting the quality of dairy products and is the first of its kind to be available within the EU which can reduce methane emissions.





ANIMALL: CATTLE TRADE START-UP



The start-up era in the Agri tech industry has witnessed phenomenal growth. New technology emergence through mobile applications has worked wonders. Animall, a recent e-commerce start-up for buying and selling cattle and empowering dairy farmers by revolutionizing the digital mechanism in cattle trade, has indeed brought the world a bit closer.

Co-founded by KirtiJangra, NeetuYadav, Anurag, and Libin V Babu, Animall is all set to enable India's next digital white revolution. KirtiJangra, COO, and NeetuYadav, CEO, were roommates at IIT Delhi and saw this immense need to develop an online platform for animal trade. This unique idea then led to the formation of Animall in 2019, an app specifically designed for buying, selling, and trading cows, goats, and buffalos.

The team has an optimum combination of IIT and IIM graduates having experience in market maker companies such as Pratilipi, Cisco, Nomura, and Penguin India. The team has believed in delivering the best solution for taking the agri-tech industry a step forward through digitalization.

The online app developed by the team allows the listing of dairy animals by animal owners on their platform as per their location. It will enable people to buy and sell animals directly without third-party involvement. The listing usually includes specifications as to dairy animals' health and a picture of the animal, along with details of buyers. The app is available in Hindi for better convenience to the dairy farming community.

Apart from the main features of trade, the platform also has an inbuilt animal doctor's consultation forum where questions and queries can be asked immediately by dairy farmers. Also, it includes a forum for dairy farmers to talk openly and discuss strategies and get ideas for improving and boosting the production of milk. The app consists of "Doodhparchi," meaning Receipt of milk to calculate and keep track of milk sold, rate calculator, and fair market value of milk.

The concept of Animall received pre-seed funding of Rs 50 lakh from Anupam Mittal. Three months later, famous institutional investors such as



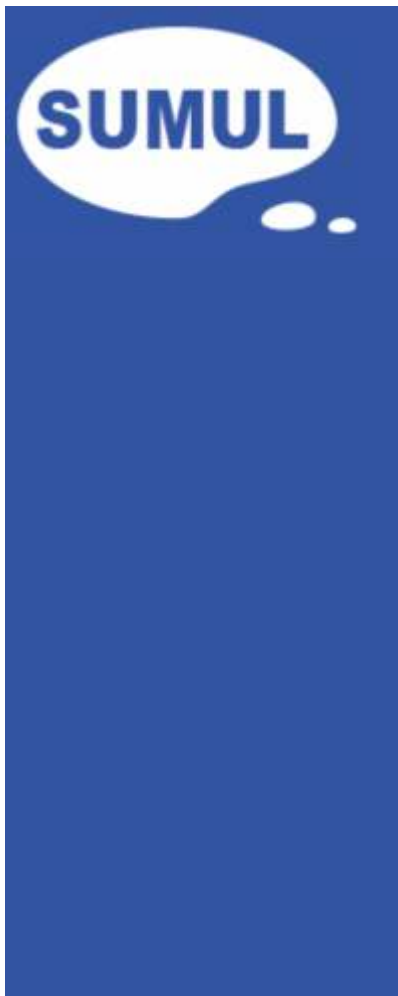
Singapore-based BeeNext and Mumbai-headquartered WEH Ventures came with a seed funding of Rs 5.75 crore. Sequoia and Omnivore also came together to provide funding in this unorganized sector. On today's date, Animall has 21 investors and has raised a total of \$36.3 million through 6 funding rounds, and the valuation is said to be more than Rs. 500 cr.

The passion of co-founders and ability to derive income out in a niche market while solving problems of million farmers has accelerated the growth of Animall. Therefore investors are taking an interest in such venture capital.

The business model will help farmers and dairy industries exercise smooth management and add an increase to the economic development of the country as well. The Bangalore-based start-up also believes that technology can change farmers' lives and simultaneously build a large, profitable, and sustainable business in the long term. NeetuYadav previously has stated the noble cause behind the app, saying that their dream is to improve the lives of farmers by making farming significantly more productive and profitable.

The B2B app, a utility-driven app, has traded over 5 lakh dairy animals and aims to become a one-stop shop for dairy farmers in India. The app is available on the play store under the name "Gaaybhainswalapashumela- Animall app" and has over 1 million downloads and a rating of 4.8 after 6,000 reviews and is widely spreading across a large number of people. The ratio of downloads is highest in Haryana, Uttar Pradesh, and Rajasthan after the launch of the app in November 2019.





Sumul Dairy Striving to Help Farmers Through CSR Activities

Sumul, a Gujarat-based milk brand providing and procuring milk economically, has also diverted its attention towards giving back to the community through its corporate social responsibility activities.

Under its CSR activity, it aims at sustainable and progressive change in the dairy sector. They have collaborated with government organizations through development programs, encouraging animal breeding and health, tree plantation programs, and using artificial intelligence and technology to improve productivity and empower women.

Collaboration for encouraging productivity, Sumul has devised development schemes to establish Dairy Farm encouraging self-employment through Animal Rearing Business. Their objective towards maximizing awareness in the farming sector has helped farmers and animal rearers greatly. The benefits provided under development scheme help farmers construct cattle shade,

purchase milching animals, availability of loan facilities, and insurance provision under subsidized rates to promote dairy. The activity revolves around the villages of Surat and Tapi.

They actively initiated various campaigns such as the Mass Deworming campaign under Animal Health & Breeding programme. Mass Deworming campaign was introduced to prevent animal diseases decreasing milk production and infertility-related problems. Therefore, deworming tablets/bolus were distributed under this scheme. Various Animal Health & Breeding Activities such as providing Veterinary visits, Animal treatment camps, Artificial insemination centers, and vaccination were also their focus areas.

This inspiration towards a noble initiative for helping farmers and the world through CSR activities and taking responsibility for embracing the dairy industry at a larger scale should be applauded and appreciated.

Kemin Animal Nutrition & Health – South Asia Launches MICROFAT™ BOOSTER



On February 22, Kemin Animal Nutrition and Health – South Asia launched MICROFAT™ BOOSTER, a solution to improve fat digestion and absorption in ruminants.

As an energy dense nutrient, fat is vital for milk production, milk fat yield and body growth. Over the years, bypass fats have gained prominence as a ready source to include in ruminant diets. In response, Kemin developed an innovative bypass fat, ENERFAT™ and ENERFAT™ PLUS, 10 years ago, gaining widespread use and popularity over the decade.

With rising prices and the sub-optimal quality of fat-rich brans, oilcakes and bypass fats, Kemin South Asia used its global expertise in fat nutrition to formulate MICROFAT BOOSTER. The advanced solution improves utilization of dietary and bypass fats with the benefit of better income over feed cost. MICROFAT™ BOOSTER contains biologically engineered and researched Quaternary Polar Lipids, which effectively break down fat molecules while improving the rate of absorption in the intestine, ultimately leading to higher milk yield, milk fat levels and body conditions in cattle.

For more details connect with us at mail.india@kemin.com



Meatable Appoints New Management Team to Support Expansion and Product Launch



Delft, a Netherland-based company, named Meatable, defining the new natural product through artificial cultivating of beef and pork, has announced the latest members to join their leadership team. The newly appointed professionals are industry leaders and professionals, which will help the company achieve great growth and drastic support for business expansion.

The company's new appointment includes former Fonterra Europe & Africa president Hans Huistra as Meatable's

new Chief Operating Officer (COO), having over 30 years of experience in FMCG and the food industry within Europe Asia, the Middle East, Africa, and the U.S.

Jef Pinxteren will also work VP development in the list of new appointments. Pinxteren having 25 years of experience as a biochemist across academia and industry, will help develop the company's portfolio.

The former president and CEO of Chr. Hansen, Cees de Jong has been

appointed as chairperson on the board and will be handling the major responsibility in the company's development and product expansion. Previously, Cees de Jong worked as COO of Crucell and shares experience as a senior executive in global food and pharma organizations.

Meatable was founded in 2018, and its main aim includes delivering at scale the new natural, cultivated meat that looks like, tastes like, and has the nutritional profile of traditional meat.

NEOGEN Adds Synergize Ready-to-Use Disinfectant to Biosecurity Portfolio

NEOGEN Corporation announced that it has added a ready-to-use formulation of their Synergize® disinfectant to their biosecurity portfolio.

Synergize RTU is a new formulation of the company's Synergize disinfectant that has been trusted by producers for over 20 years. The disinfectant and deodorizer requires no mixing, eliminating several steps that were required to use the concentrated product, saving users both time and money spent on the personal protective equipment items required to handle the concentrate.

"At NEOGEN, we always want to offer solutions that make the process of enhancing animal safety as easy and cost-effective as possible," said John Adent, NEOGEN's President and CEO. "As producers in the animal agriculture markets face high turnover and increasingly complex requirements for ensuring employee safety, this ready-to-use Synergize formulation will assist in keeping costs down and processes quick and efficient."

Synergize RTU is a non-corrosive, combination quaternary ammonium and glutaraldehyde multi-purpose disinfectant that kills both Gram-negative and Gram-positive bacteria, fungi, and viruses, including the viruses that cause avian influenza and COVID-19. It can be applied with a cloth, sponge, mop, or mechanical coarse spray device.*



About NEOGEN:

NEOGEN Corporation develops and markets comprehensive solutions dedicated to food and animal safety. The company's Food Safety segment markets dehydrated culture media and diagnostic test kits to detect food borne bacteria, natural toxins, food allergens, drug residues, plant diseases, and sanitation concerns. NEOGEN's Animal Safety segment is a leader in the development of genomic solutions along with the manufacturing and distribution of a variety of animal healthcare products, including diagnostics, pharmaceuticals, veterinary instruments, wound care, and disinfectants, as well as rodent and insect control solutions.



New Funding For U.K-based Company- Better Dairy

Better dairy, a U.K based food Tech Company founded by JevanNagarajah, is all set to get aged and hard cheeses into the testing phase after securing \$22 million in Series A funding. The company was founded in 2019 and is still developing a proper R&D for developing animal-free cheeses using precision fermentation.

Happiness capital invested d £1.6 million in a seed funding round. The capital secured from other market players includes Capital, Manta Ray, Acequia Capital, and Stray Dog Capital, which would help the company expand its workforce from eight people to 35 and acquire a new 6,000-square-foot laboratory and office space in East London.

Better dairy uses precision fermentation procedures to produce molecularly identical products to traditional dairy. Better dairy's primary focus is processing and making hard cheeses more sustainably.

Nagarajah stated that they need the right space and equipment to upgrade their science. He further said, "It is not just about being animal-free and sustainable, but also delicious. If it tastes

a better then it becomes a no-brainer and a benchmark for success. There is a benefit for doing it the right way because if not, the time it takes to unwind it all could take years."

Dairytech startup Stellapps secures funding from IDH FarmFit

Stellapps is a Bangalore-based startup working towards digitizing the dairy supply chain and providing end-to-end dairy technology solutions in the dairy segment. IDH Farmfit saw an emerging potential to elope the future invested in Stellapps. The equity investment ratio is not yet disclosed, but it is believed that IDH FarmFit's first equity investment in India is all set to deliver profit in the

coming years.

The increasing demand for milk and the potential of milk production can be aligned further for the company's growth. The dairy tech startups aim to revolutionize milk production through improved productivity, enhanced milk quality, and emerging government facilities for helping smallholder farmers.

The dairy tech startup is committed to providing female leadership for a noble cause throughout the country. It also believes that digitalization in the traditional dairy sector can open highways for Agri-business and India's milk production index globally.

Varishna Tewarie, IDH Farmfit Fund's investment manager for Asia, stated, "We are delighted to support Stellapps with this new investment, which will improve farmer income and positively



impact their lives. We shall witness the transformation of one of India's most crucial agricultural sectors. The company supports smallholder Indian farmers by increasing transparency, improving farming practices, and enabling financial inclusion."

Meghalaya's new initiative to upscale the dairy sector



The Chief Minister of Meghalaya, Conrad K. Sangma, has taken a major initiative in the dairy sector to upscale dairy production and distribution. On 11th February 2022, the CM stated that the government is bringing new and innovative actions for skyrocketing the dairy sector through the state's Dairy Mission program.

The CM stated the government has been building up a functional and efficient Dairy complex at Ganol in West Garo Hills District to boost dairy production. The Dairy complex would have all the required chilling, processing and packaging, and distribution units.

The CM informed, "Government of Meghalaya is working with different Dairy Cooperative Societies to encourage milk production across the State." He also added that since Meghalaya is largely dependent on farming, the dairy mission will provide phenomenal growth.

The build-up cost of the Dairy complex is estimated to be Rs 10.52 crore, out of which Rs. 9.15 crore is provided by the National Programme for Dairy

Development (NPDD), while the Milk Producers Union of West Garo Hills has also contributed Rs.86.27 lakhs.

The CM also brought forward and informed about the Piggery Mission being implemented in Meghalaya amounting to Rs.209 Crore.

This dairy mission aims to provide job opportunities in the dairy sector, thereby improving production and distribution, impacting more than 300 households, thus benefiting society at large.

Ahmedabad-based Prompt Equipments, receives patent calibration liquid for ultrasonic milk analyzers

Prompt Equipments, a leading provider of equipment and software solutions across the dairy supply chain and headquartered in Ahmedabad, has unveiled a unique and distinctive method of checking the calibration status of Ultrasonic Milk Analyzers without taking milk samples.

The innovative MilkOcheck solution from Prompt consists of a patented liquid mimicking raw milk and a secure mobile application that allows any brand of Ultrasonic Milk Analyzer assessed on-premise in real-time for calibration status. MilkOcheck is designed to enable the dairy owners to check the calibration status of Milk Analyzers installed at the various village location

On February 07, 2022, the Patent Office awarded Prompt Equipment the patent for the "Composition of calibration liquid and process for preparation" of Milk Analyzers.

On receipt of the patent, Shridhar Mehta, director, Prompt Equipment, said, "MilkOcheck is India's first digital, tamper-proof, single-use solution to check the calibration of Ultrasonic Milk Analyzer. It enables on-site calibration of Milk Analyzer, ensures right payment to farmers, enables transparency and trust between farmers and Milk Collection Centers and saves costs for Dairy. It helps in eliminating the practical problems in using raw milk samples for calibration."

This new technology in the dairy industry will allow better management and time-saving aspects, eliminating human error chances. The patented liquid having a good shelf life of 30 days is added advantage to the farmers and villagers.



Editorial Calendar 2022

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

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Front Title Inside	12000	Back Title Inside	12000
Front Title Opening	10000	Back Title Opening	10000

March 2022

1. EuroTier Middle East

Dates: March 21- 23, 2022
Venue: Abu Dhabi, National Exhibition Centre (ADNEC),
 Vereinigte Arabische Emirate
City: Abu Dhabi
Country: United Arab Emirates
Email: s.karaoglan@dlg.org
Website: www.eurotiermiddleeast.com

April 2022

1. Anuga Food Tec

Dates: April 26 -29, 2022
Venue: Cologne Trade Fair Center
City: Cologne
Country: Germany
Website: www.anugafoodtec.com

August 2022

1. ILDEX Vietnam 2022

Dates: August 3-5, 2022
Venue: SECC, HCM
City: Ho Chi Minh City
Country: Vietnam
Email: panadda@vnusiapacific.com
Website: www.ildexvietnam.com

2. Livestock Malaysia

Dates: August 10 - 12, 2022
Venue: MITC Complex
City: Melaka
Country: Malaysia
Email: livestockmalaysiamy@informa.com
Website: www.livestockmalaysia.com

3. Livestock Phillipines 2022

Dates: August 24 - 26, 2022
Venue: World Trade Center
City: Pasay city
Country: Phillipines
Email: rita.lau@informa.com
Website: www.livestockphilippines.com

September 2022

1. Victam Asia 2022

Dates: September 7 - 9, 2022
Venue: IMPACT Exhibition Center
City: Bangkok
Country: Thailand
Website: www.victamasiasia.com

October 2022

1. World Dairy Expo

Dates: October 2 – 7, 2022
Venue: Alliant Energy Center
City: Madison, Wisconsin
Country: United States
Website: www.worlddairyexpo.com

2. Sommet-elevage, France

Dates: October 4 - 7, 2022
Venue: Grande Halle Showgrounds
City: Ferrand
Country: France
Website: www.sommet-elevage.fr

3. VIETSTOCK 2022

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

November 2022

1. EuroTier

Dates: November 15 - 18, 2022
Venue: Deutsche Messe AG
City: Hannover
Country: Germany
Website: www.eurotier.com

December 2022

1. Agri Livestock 2022

Dates: December 2 - 4, 2022
Venue: Myanmar Expo Hall
City: Yangon
Country: Myanmar
Website: www.agrilivestock.net

Almizol-WS[®]

wound spray

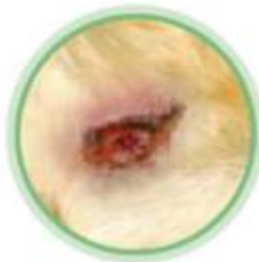
Powerful Maggoticidal and Wound healer



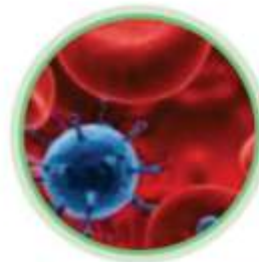
Maggotidal



Fly Repellent



Wound Healer



Antimicrobial

Uniformly & Deeply
penetrated in Wound

Composition

- ▶ Cypermethrin.....0.0125% m/v
- ▶ Dichlorophen.....0.015% m/v
- ▶ Chlorocresol.....0.5% m/v
- ▶ Gentian Violet.....0.15% m/v

Cypermethrin: Neurotoxic to Insects Non-toxic to animal
Gentian Violet: Antifungal, Antibacterial, Antiviral, Antiparasitic



100ml and 250ml

Indications

All types of open wound like Maggoted wound, Surgical and Septic wound

Fungal Infections of skin - Dermatomycosis & Ringworm

Direction of Use:

Clean the affected area, spray Almizol-WS adequately twice a day till complete cure of affected area

Alembic pharmaceutical Limited

3 rd floor prime corporate park, Sahar road Andheri East Mumbai 400099

Ph. 02266953607



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JUBIMETH[®]-RP

Rumen Protected Methionine

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Uniqueness

- Highest neutralizing Capacity
- TACC is high (up to 200 lit)
- Long lasting effect & impact
- More Favourable Bacteria
- Low methane & High acetate

Benefits

- Instant relief from acidosis
- Maintains rumen pH for long duration
- More milk and fat percentage
- Optimum digestion
- More concentrate can added in diet



Dosage:

25-30 gm/head/day

750 gm- 1 kg per ton of Feed

Available in 25 kg (5 X 5 Kg)



IntraRepiderma

ANTIBIOTIC FREE



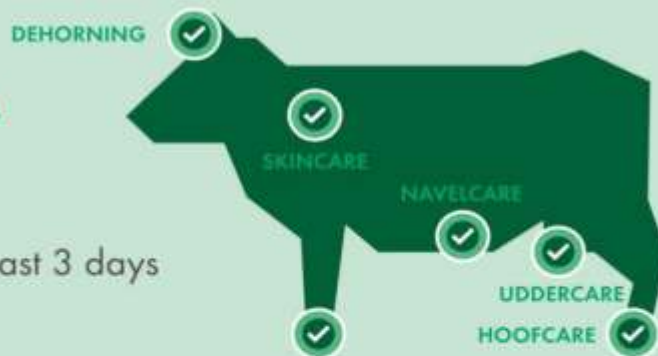
The trusted spray for farmers around the world



FOR HOOF, UDDER CLEFT, DEHORNING, NAVEL AND SKIN TREATMENT

REASONS TO CHOOSE INTRA REPIDERMA

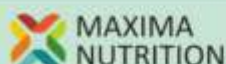
- ✓ Micronised powdered organic minerals
- ✓ Patented antibiotic free product
- ✓ Protective layer with strong adhesion, for at least 3 days
- ✓ Sprays at every angle, even upside down



INTRA REPIDERMA SIGNIFICANTLY IMPROVES ANIMAL WELFARE



LEARN MORE



Maxima Nutrition, "Fateh Towers", Plot No. 1442, Off Shamgarh- Taraori Link Road, V.P.O. Shamgarh,
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Would you like to know more? www.irace.nl

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