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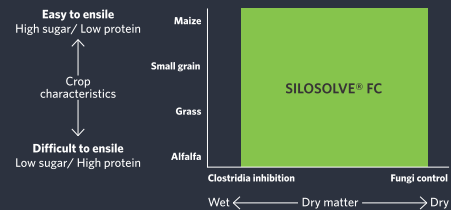
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From the Pen of Chief Editor



Ruminant nutrition – The Heat Buster

Summer is stress time for dairy as the dynamic characteristics of digestion processes are altered with heat stress impacting nutrition and the decreased nutrient intake is the primary cause of decreased milk synthesis.

Rising average temperatures and humidity cause severe heat stress in dairy animals resulting in decreased milk production and health issues.

Reduced feed intake, reduced milk supply and milk fat, reduced activity but higher respiration rate, elevated body temperature, and impaired reproductive performance are some of the most common indications of heat stress in cows.

Feed intake drops significantly during heat stress, and a common strategy is to increase the energy and nutrient densities of the diet. Changes in the physical environment, genetic improvement, and nutritional interventions should be used to combat heat stress in animals.

Increasing water availability, energy and nutrient density, and specific supplementation such as trace minerals, vitamins, niacin, chromium, selenium, antioxidants, electrolytes, and rumen fermentation modifiers have all been shown to alleviate heat stress in dairy animals.

Nutrition is the most basic welfare need for all animals because it provides the necessary elements for nearly all of the body's metabolic processes. Feeding high-quality forages increases the energy content of the diet and maintains adequate rumination while decreasing the heat of fermentation associated with feeding lower-quality forages. Increase the amount of fat in your diet to increase energy density and efficiency.

Dairy producers, veterinarians, and nutritionists should consider a combination of well-established tactics for better cow performance, as field judgments are based on realistic conditions.

It is critical to take care of and manage the animals properly during the summer months in order to reduce the incidence of heat stress, which in turn reduces productivity, reproductive loss, and, ultimately, economic loss to farmers.

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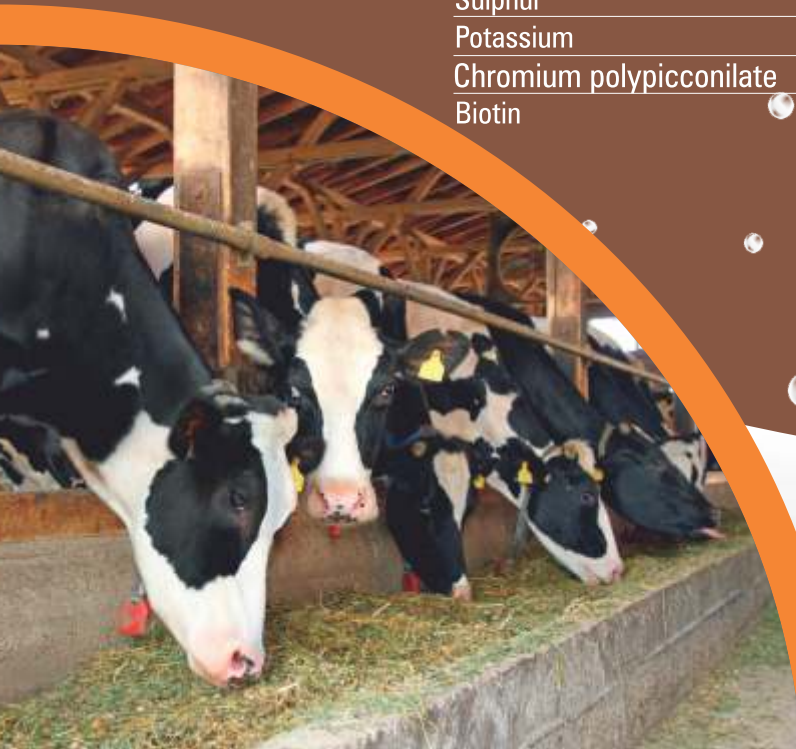
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Strategies for Managing Heat Stress in Dairy Animals



India is first in milk production in the world production, with 20 crore tons of milk from 20 cr. cows 10Cr. Buffaloes during the period of 2020-2021. This was possible only due to large scale crossbreeding of local breeds and non-descript breeds of cattle. Livestock plays an important role in the global economy. Among the environmental variables affecting animals, heat stress is one of the factors making animal production challenging in many parts of the world. Climate change effects are not only limited to crop production, but also affect livestock production, for example reduced milk yields and milk quality and reduced fertility.

Heat stress is one of the greatest challenges faced by dairy farmers in many regions of the world. The crossbred animals are more susceptible to heat stress. Heat stress in dairy animals is one of the leading causes of decreased production and fertility during summer months. In India, the summer temperature goes beyond 46°C which is 19°C above the upper critical temperature of dairy cattle.

When the temperature exceeds 27 °C even with low humidity, the temperature is above the comfort zone for the high producing dairy cows. Humidity plays significant role in heat stress.

Common signs 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 (sometimes as high as 106–108°F.)
- Increased production of saliva
- Open-mouth panting
- Dry gums and mucous membranes due to dehydration

As dehydration becomes more severe, animals also may exhibit sunken eyes and an increased pulse rate. The "skin-pinch" test is another method to evaluate dehydration. To perform it, pinch or "tent" a fold of skin at the calf's neck and observe how many seconds it takes to flatten. In normal animals, it will return to its regular position in less than two





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seconds. A flattening time of up to four seconds indicates the animal is up to 8% dehydrated. If it takes longer than that, even more serious, and potentially life-threatening, dehydration has set in.

Effects on milk production

Annual total milk loss due to thermal stress at the all-India level was 0.18 crore tones or approximately 2% of the total milk production of the country amounting to a whopping Rs. 2661.62 crores per year Upadhyay et al. The negative impact of global warming on total milk production in India is also estimated to about 1.5 crore tones by 2050. The decline in milk production due to Heat stress was 14% in early lactation and 35% in mid-lactation. Indeed, up to 10% of the variability in milk production has been attributed to the effect of climatic factors such as temperature.

According to scientists at the National Dairy Research Institute (NDRI), a pioneer institute in the field of dairy research, heat stress and poor maintenance of milch animals in the summer, particularly in May and June, leads to a decline of around 15 per cent to 20 per cent in milk production in crossbred cows and around 10 per cent to 15 per cent in buffaloes. In the humid months of July and August, it falls further to around 20 per cent to 25 per cent in crossbred cows and 20 per cent in buffaloes.

Haryana, Punjab, UP and Rajasthan are major contributors to milk production, but during summer, these states have temperature in excess of 44 degrees Celsius, which leads to reduction of milk yield

Effects on reproductive performance

Heat stress reduces the length and intensity of estrus besides increases incidence of anestrus and silent

heat in farm animals. Heat stress affects the fertility and reproductive livestock performance by compromising the physiology reproductive tract, through hormonal imbalance, decreased oocyte quality and poor semen quality, and decreased embryo development and survival. In general, the percentage of conception rate was found to be reduced by 4.6% for each unit increase in temperature humidity index (THI) above 70, and heat stress during pregnancy further slows down the growth of the foetus and results in lower birth weight.

Some nutritional management tips to manage heat stress are:

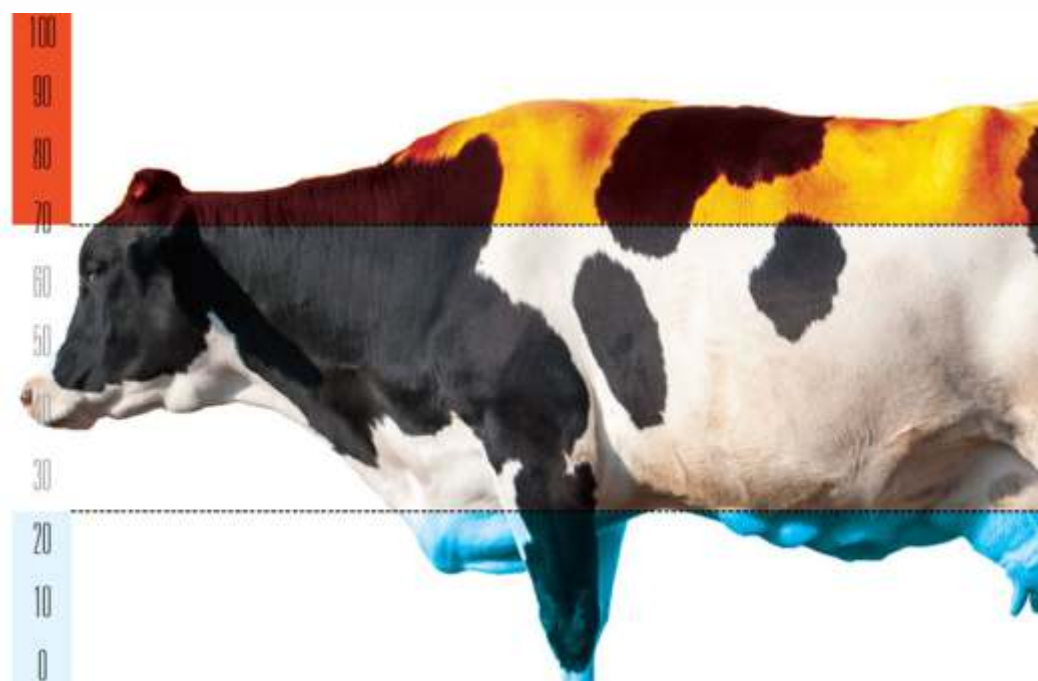
- Provide high quality feeds like total mixed rations
- Increase the frequency of feedings
- Feed during cooler times of the day; feed a greater proportion of feed at night, 60 to 70% of feed
- Keep feed fresh as much as possible
- Provide high-quality forage
- Provide adequate fiber

- Heat stress can also be managed by spraying/ sprinkling water directly on the body of animals for a period of 1 to 5 minutes at an interval of 10- 30 minutes.
- Water intake increases by up to 50% as the THI approaches 80
- Use of electrolytes to replenish electrolytes losses

Intake of sufficient cool water is probably the most important strategy for animals to undertake during heat stress.

Conclusion

The body temperature and feed intake of dairy cows are affected by rising ambient temperature and humidity, which in turn affect milk production and reproduction. Mineral losses via sweating (primarily K) and changes in blood acid-base chemistry resulting from hyperventilation reduce blood bicarbonate and blood buffering capacity and increase urinary excretion of electrolytes. If animals are severely dehydrated due to heat stress, then animal should rehydrate with oral electrolytes.





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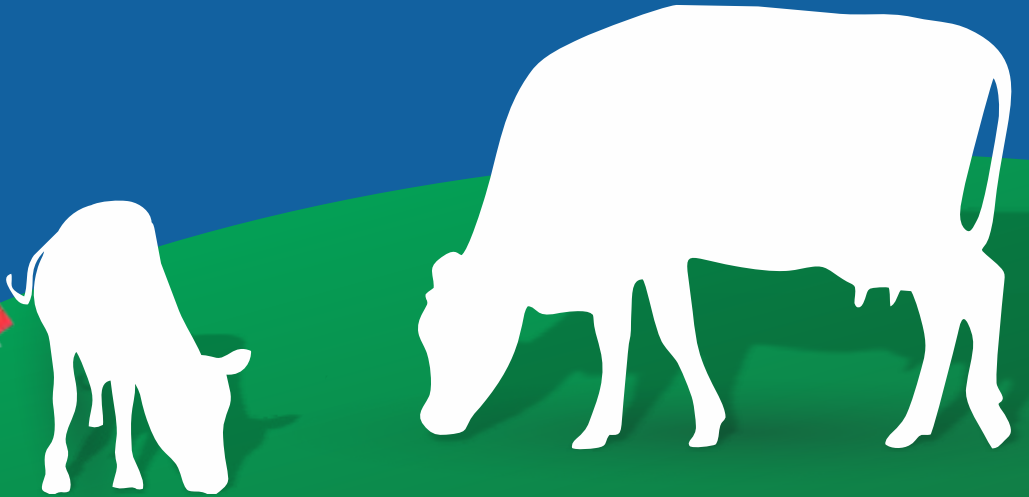
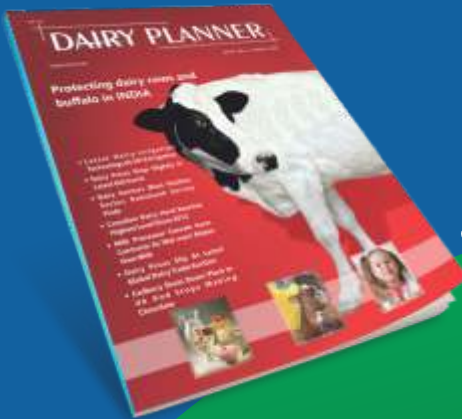
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Feeding of Livestock For Efficient Growth Rate



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Introduction

Growth in animals is defined as accretion of protein, fat and bone in the body. Although growth typically is measured as change in live weight, nutrient retention is estimated more precisely by measuring empty body weight and its composition. Production economics are judged ideally through carcass weight and carcass quality. Carcass weight gain usually is in a much high percentage during the feedlot phase than during the growing phase of production because dressing percentage increases with maturation and is greater with concentrate rich diets than roughage diets. In a mature body size, body fat percentage seems to be most constant and can be altered genetically and nutritionally. Protein accretion declines to zero when cattle reach their mature body size. Although fat concentration can be reduced by limiting the supply of net energy, rate of fat accretion by

finishing steers given access to ad libitum concentrate diets, reaches a plateau at approximately 550 g daily. The protein: fat ratio of carcass can be increased through increasing mature size, administration of hormones, limiting energy intake during the growing or finishing period or slaughtering cattle at an earlier stage of maturity. Energetically, efficiency of accumulation of fat is approximately 1.7 times that of protein. Lean tissue gain is four times as efficient as accumulation of fat tissue because more water is stored with deposited protein than deposited fat,

Importance of growth

From birth until weaning to dry off stage, calf undergoes tremendous physiological and metabolic changes. During pre ruminant stage, digestion and metabolism are similar to those of non ruminant animals in many respects. Dietary requirements are best achieved



with high-quality liquid diets which are formulated from carbohydrate, protein and fat sources and are digested efficiently. The most critical period is first 2-3 week of life as during this time the calf's digestive system is immature but undergoes rapid development with regard to digestive secretions and enzymatic activity. Calves raised for purposes other than veal production should be encouraged to consume dry feed at an early age, as this will stimulate development of a functional rumen. A developed epithelial tissue of rumen is responsible for absorption of volatile fatty acids and this development depends on presence of VFA with butyrate being most important.

Average daily gains of some beef breeds

Name of beef breed	Average daily gain (lb)	Mature body size (lb)
Orig. Hereford-Angus	2.51	1068
Curr. Hereford-Angus	2.74	1152
Orig. Charolais	2.77	1160
Curr. Charolais	2.89	1219
Chianina	2.63	1124
Gelbvieh	2.66	1129
Limousin	2.49	1080
Maine Anjou	2.72	1147
Salers	2.70	1148
Shorthorn	2.73	1156
Simmental	2.73	1148

Adapted from Cundiff et al., 1993.

Role of energy, protein, vitamins and minerals

Energy requirements of calves, like those of other breeds and classes of cattle can be expressed in multiple ways. Regardless of the standard practised, it is pivotal to understand where the major loss of energy occurs when energy-yielding elements of diet undergo digestion and metabolism. If the conversion efficiencies of gross energy to digestible energy/ metabolizable energy and conversion of

metabolizable energy to net energy are known, nutritionists can choose the system which best determines their needs. Energy requirements of calves are derived on basis of metabolizable energy; however the requirements and feed composition can be given in net energy and digestible energy units also. Data on energy requirements are formulated for replacement calves fed only milk or milk replacer, calves fed milk and starter feed or milk replacer and starter feed. The amount of liquid feed offered to replacement calves is restricted to encourage intake of dry feed, but calves reared for veal are fed milk or milk replacer at near ad libitum intakes to have faster weight gains. Energy is considered first in diet formulation. Energy intake can determine the calf's

ability to utilize other nutrients to a much large extent. Energy requirements are affected by mature body size, physical activity and environmental temperatures.

Little information is available on the protein requirements of young calves weighing less than 100 kg. The requirement is partitioned into 2 components: maintenance and gain. Maintenance constitutes obligate nitrogen losses in the urine and faeces, whereas gain restricts to N stored in tissues. Microbial protein supplies around 50% of protein and amino acid

needs. Protein deficiency is most commonly seen in calves grazing mature forages or low-quality hays, or straw. Less than 7% CP is not enough to provide sufficient ruminal nitrogen for microbes, resulting in reduced intake and digestion of forages.

In case of growing animals, calcium and phosphorus play a pivotal role in the diet. If not consuming adequate amounts, various deficiency disorders can develop, e.g., rickets & osteomalacia in young animals and adults respectively. Cobalt is needed by microbes to synthesize vitamin B12. Where iodine is low in the soil, use of iodized salt would be the most convenient way to provide I2. Forages are relatively high in many minerals (e.g., Cu, Fe, Mg, Mn, etc.), but grains are usually very low in many minerals. Adding mineral mixture as an important component of diet will serve to prevent occurrence of any disorders.

Vitamins-sun-cured forages contain large amounts of vitamin D, vitamin E, and β -carotene. Vitamin A can be stored enough for 2 to 4 months, but would be depleted quickly without regular supply of dietary Vitamin A. Once calf is weaned to dry feed, there is no need to supplement water soluble vitamins in the diet, as the micro organisms in the digestive tract can synthesize ample amounts to meet the needs of calf.

Conclusions

Although growth rate depends on genetic makeup of the animals, nutritional and hormonal factors can play a major role in limiting growth rate and altering mature size, reducing or increasing fat content of the carcass at a given age. Heavy mature weights are not desirable for ruminants maintained for reproduction. Growth stimulants or depressants and agonists altering body size and composition may prove beneficial in enhancing production efficiency in cow herd and in finishing animals.

Application of Immobilized Enzyme in Dairy Products



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In dairy industry, the use of enzymes, particularly exogenous enzymes are not fully exploited and limited to a few major and some minor applications. Enzymes play important role in the preparation of certain dairy products like cheeses, yoghurt etc., by improving texture, flavor and bringing about desirable changes in the product. Lipolytic and proteolytic enzymes can accelerate the production of flavor compounds. Successful use of preparations containing these enzymes is complicated by the need to attain a satisfactory balance among the various enzymes involved in the cheese ripening process.

An immobilized enzyme is an enzyme that is physically attached to a water-insoluble matrix, supporting material, or carrier. The immobilized enzyme is unable to move due to its linkage to the support or matrix, and its phase difference from substrates and products. Carriers, matrixes, or supporting materials frequently used are: ceramics, spongy glass, cellulose, sand, synthesized polymers, charcoal, metal oxides, stainless steel and polymeric gel. Today, in many cases immobilized enzymes have revealed highly efficient for commercial uses. They offer many advantages over enzymes in solution, including economic convenience, higher stability, and the possibility to be easily removed from the reaction mixture leading to pure product isolation. An immobilized enzyme is, therefore, attached to an inert, organic, or inorganic or insoluble material, such as calcium alginate or silica. Further more, the attachment of an enzyme to a solid support can increase its resistance to various environmental changes such as pH or temperature.

Immobilization of Enzymes

It is always cost-effective to use the enzymes more than once. Most of the enzymes are in solution with the reactants and/or products and hence it is

difficult to separate them after completion of chemical reaction. In order to reuse the enzymes again after separation from the products during chemical reaction, it is necessary to employ techniques that are helpful in attaching the enzyme to the reactors. This idea has led to the employment of immobilization techniques for enzymes. The concept of enzyme immobilization was first evolved, when difficulties were experienced during the use of crude enzyme preparations in the production of wine, cheese or in tanning. The phenomenon of immobilization of enzyme on a support, was first reported by J.M. Nelson and E.G. Griffin in 1916. They reported the adsorption (immobilization) of invertase on charcoal/alumina without loss of activity. However, the technique of enzyme immobilization could be established only after a lapse of about 40 years, in 1954- 1961 when many researchers developed relevant procedures and the equipments.

In simple terms "immobilized" means unable to move or stationary. An immobilized enzyme is an enzyme which is attached to an inert, insoluble material such as calcium alginate over which a substrate is passed and converted to product. This technique has revolutionized the prospects of enzyme application in industry.

Immobilization is defined as the imprisonment of a biocatalyst in a distinct phase that allows exchange with, but is separated from, bulk phase in which substrate, effectors, inhibitor molecules are dispersed and monitored.

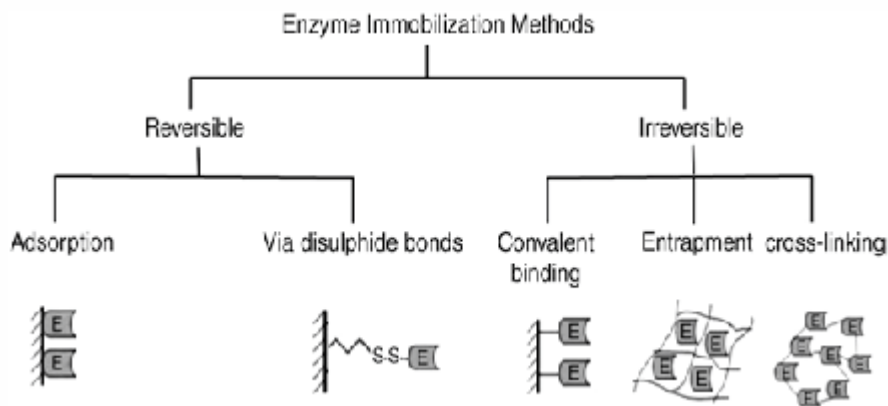
Immobilized enzyme is physically entrapped or covalently bonded by chemical means to an inert and usually insoluble matrix, where it can act upon its natural substrate. The matrix is usually a high molecular weight polymer such as polyacrylamide, carrageenan, chitin, cellulose, starch, glass beads, etc.

Advantages:

1. Immobilization allows separation of enzymes from the products after completion of chemical reaction and thus can be reused or recycled.
2. Immobilized enzymes have ability to bind to a matrix, by which it typically possess greater resistance to change in pH and temperature and have operational stability than the soluble form of the enzyme.
3. Reaction mixture or products specifically contain only solvent and reaction products and so more or less do not require complex purification as the processed product is not contaminated with the enzyme.
4. Immobilization improves the efficacy and efficiency of an enzyme.
5. Certain manipulations of chemical reactions are better possible with immobilized enzymes

Methods of immobilization

The Traditional Methods of Enzyme Immobilization can be classified as follows:-



1. Carrier binding

In this method, the enzymes are bound to water in-soluble carrier molecules. Based on the technique of binding, this is further divided into:-

- a) **Physical adsorption:-** This is the immobilization of an enzyme on the surface of water-insoluble carriers.
- b) **Ionic binding:-** This process involves ionic binding of the

enzyme to water-insoluble carriers containing ion-exchange residues.

2. Covalent binding

This is based on the binding of enzymes and water-insoluble carriers by the formation of covalent bonds between the enzyme and the support matrix. e.g. Glutaraldehyde

3. Cross linking

This is the process of intermolecular cross-linking of enzymes by bi-functional or multi- functional reagents.

4. Entrapment

Here enzyme is trapped in insoluble beads or microspheres i.e. incorporating enzymes into the lattices of a semi-permeable gel or enclosing the enzymes in a semi-permeable polymer membrane

Whole Cell Immobilization

The term "immobilized cells" refers to keeping the cell in one place. Generally, in a reaction environment, cells are floating around in nutrient liquid whereas in cell immobilization, the cells

are trapped or stuck to a sticky surface while nutrient flows over them. This method is more appropriate and useful when there is a need for using or when a series of enzymes are required in the process.

Whole cell immobilization was defined as "the physical confinement or localization of intact cells to a certain region of a space with preservation of some desired catalytic activity", and is a process that often mimics what occurs

naturally when cells grow on surfaces or within natural structures.

Advantages of whole-cell immobilization

- I. Enzyme isolation and purification steps are not required
- II. Show the higher stability in the catalytic power and enzyme activity,
- III. Have multivariate enzyme applications, eliminating the need for immobilization of multiple enzymes
- IV. Intracellular enzymes need not be extracted prior to the reaction; they may be used directly
- V. The end products can be recovered in a simple manner.
- VI. The technique is cost effective.

Disadvantages

- I. Low productivity
- II. Lower resistance
- III. Limitation of mass transfer
- IV. Problems with degradation of product
- V. Byproducts are formed due to lysis of cells or toxic metabolites

The release of cells growing in the peripheral layer of highly colonized gel beads can be used to efficiently produce biomass in the bulk liquid medium. This cell release activity can be used for producing single or mixed strain cultures and to continuously inoculate food liquids to process fermented foods such as fermented milk products, bulk lactic starter cultures, mass Probiotic cultures and pre-fermentation of milk. The immobilized cell technology can be used for production of different metabolites and functional ingredients from LAB using this low value whey permeate containing high lactose and mineral contents, used as a culture medium for the production of lactic starter cultures or metabolites. Lactic acid production, Exopolysaccharide production and Bacteriocin production are few more applications. The other food industries like in beer and wine making are the best examples of industrial exploitation of immobilized cell technology

Heat stress: Effects and Mitigation Strategies in Sheep and Goats



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Mahatma Gandhi, the father of our country, referred goats and sheep as "poor man's cows." These small ruminants are easy to breed, requires less investment and yields higher profits for marginal farmers and landless labourers. Sheep and goats are popular because they may produce meat, milk, skin, offal, horn, dung for fire, wool, and fiber, among other things. The word "heat stress" refers to the discomfort and physiological strain due to the exposure of the animal to an extreme hot environment. For normal body function temperature should be maintained within a relatively narrow range, beyond which there is risk of organ dysfunction, and even death. The thermal environment that causes heat stress is a matter of concern that negatively influences livestock production and reproduction performance, growth, milk quantity and quality, as well as natural immunity, making the animals more susceptible to different diseases. The increasing demand for animal products paralleled by the frequent hot climate is a serious threat for the agriculture sector. In extreme environmental conditions, sheep and goat perform better than other ruminants. Sheep and goats adapt to extreme weather conditions via behavioral, morphological,

physiological, and largely genetic basis. The goat and sheep breeds tend to tolerate heat better than other livestock species. But, despite their extreme tolerance, the productivity of these animals often declines due to heat stress. Therefore, proper breed selection and adoption of stringent managemental strategies can sustain and augment animal production under an increasingly challenging environment.

Effects of heat stress on feed and water intake of sheep and goat:

Interaction between stress and nutrition results in nutrient deficiency as HS is associated with marked reduction in feed intake. Feed intake decreases in heat-stressed animals in an attempt to create less metabolic heat. Change in the thermal environment induces a decrease of blood flow to the rumen (76% under severe stress and 32% under moderate stress) and reduction in both ruminal motility and rumination. It also lowers the dry matter intake in goats by 30%. Ultimately the body weight loss has been seen.

Likewise, small ruminants may experience moderate to severe water restriction during drought periods, when grazing in areas far from watering sources and their





Fig: Kid girl shepherdess happy with flock of sheep and goat

requirements for water in dry areas are high due to high temperature and radiation load from the sun. In general water deprivation for three days or more would have detrimental effects on feed intake by ewes which exhibited reduced milk production, body weight, jaw movements during rumination, respiratory rates and increased rectal temperatures. However, goats kept under HS conditions doubled their water consumption which facilitates heat loss by sweating and panting.

Effect of heat stress on productivity of sheep and goat:

A. Effect on milk quantity and quality:

HS decreases milk production of dairy animals, and half of this reduction in milk yield is due to reduced dry matter intake. During one experiment it was found that dairy goats kept under HS in a climatic chamber reduce their milk yield by 3–10%. The protein level and protein fraction also reduces in heat stress. Decreased protein intake and increased sweat secretion that contains protein and urea might have limited the availability of amino acids for milk protein synthesis. In contrast, milk fat contents did not differ between HS and control goats. Thus, milk of HS goats had different coagulation properties which could have an important impact on cheese industry.

B. Effect on meat quality and carcass characteristics:

High temperatures lead to dehydration in water deprived animals and this can affect meat quality by making it darker in, and because of its dryness it has less weight loss during cooking. Sheep and goats slaughtered under higher ambient temperature (35°C) causes higher pH (5.78 vs. 5.65) level and lower color (lightness, redness and yellowness), and lowers juiciness than those slaughtered at lower temperature (21°C).

Effect of heat stress on reproduction and fertility of sheep and goats:

Summer HS is a major contributing factor to low fertility of domestic animals inseminated in the summer months. Effects of HS on fertility is more

pronounced in lactating animals because the large amounts of heat produced as a result of lactation make it difficult to regulate body temperature during HS. Non-lactating animals and animals for meat purposes are much less likely to experience infertility during HS due to seasonal breeding patterns that ensure that animals are not bred at the warmest time of year, and relatively low amounts of metabolic heat production as compared to lactating animals. HS conditions drastically affect the sexual behavior, reduce the sexual activity and in turn reduce sperm quality, sperm production and motility, resulting in poor conception by reducing testosterone (hormone) level.

Methods for heat stress mitigation:

From above information it can be said that heat stress adversely affects the small ruminants i.e. sheep and goat in various ways that ultimately leads to production loss and economical loss. Therefore, a variety of methods should be adopted by small ruminant owners to overcome the negative effects of HS like.

Use of shades:

Shade is the easiest method to reduce the impact of high solar radiation, and it is applicable under extensive conditions. The use of shades, fans or evaporative cooling should be provided which is not possible in semi-intensive systems as sheep and goats are grazed in the open during most of the day, and this necessitates other strategies like portable shades. Providing sheep and



Fig: Portable shade

goats access to shade leads to improvements in weight gain, milk production and reproductive performance. A well-designed shade structure reduces heat load by 30–50%. Shelters do not need to be complicated or elaborate, trees and shrubs can serve as shelters for animals from solar radiation which is a very good cost alternative.

Handling animals should be kept at minimum. Sheep and goats can be handled in the early morning or late evening time during milking, transportation, and the afternoon work should be avoided when body temperature is already high. Delay the afternoon milking for 1-2 hours.

investment for the marginal farmers. So, it is important to maintain good health of these animals. Heat stress is being the major factor affecting the production and reproduction of the animals. Various effects of stress have been seen on behavior like shade seeking behavior, panting in order to reduce heat stress. It also reduces the productivity of sheep



Ration modifications:

- 1. Grazing hours:** Changes in feeding schedules that includes feeding at cool hours
- 2. Ration composition:** Feed containing low fiber rations during hot weather should be given as it reduces the metabolic heat production. More nutrient-dense diets are usually preferred during the HS period. In dairy goats 4% fat supplement during summer lowers rectal temperature. Soybean oil fed to goats in HS conditions, increases milk fat content.
- 3. Feed additives:** antioxidants such as vitamin C and E supplementations decreased rectal temperature and respiration rate in sheep and goat.
- 4. Water:** The water requirements of sheep and goats increase under HS conditions; thus, it is essential that animals have a continuous access to adequate, clean, cool and fresh water.
- 5. Minimize handling time:**

Fig: Feed and water management in sheep and goat during heat stress

Housing management:

Proper selection of site of house with minimal radiation, air temperature and humidity, and maximal air velocity will help in mitigation. Adequate space allowance, feces accumulation management and continuous and careful monitoring in terms of temperature, relative humidity and air quality are crucial aspects in sheep and goat housing. In addition, fully enclosed shelters are not recommended for hot climates because of the decreased natural air velocity, therefore, it is preferred to use partially enclosed shelters. Cooling sheep and goats by spraying could reduce HS symptoms and improve animal welfare. Direct wetting of animals is often used as an emergency measure and can be an effective and can increase the milk production and feed intake in sheep and goat.

Conclusion:

Sheep and goat farming is the main source of income with the lesser

and goat i.e. reduce their milk yield by 3–10% as well reduces the quality of meat. Reduction in dry matter intake and lower water availability will ultimately lead to reduction in the production. Heat stress reduces the sperm quality and reproductive ability of the animal. Mitigation can be done by various providing proper shade, providing good amount of water in summer, feeding low fiber and high fat feed. Addition of feed additives like vitamin C and vitamin E would also help in reducing heat stress. Maintenance of proper ventilation and temperature in the animal house will also help in heat stress management.

Moreover, spraying water during hot hours on animal helps in the mitigation. It is important to take care and proper management of the animal during summer period to reduce the incidence of heat stress in order to reduce the productivity, reproductivity loss and ultimately to reduce economical loss to the marginal farmers.

Improving the feed out quality of drought-stressed corn silage



CHR HANSEN

Improving food & health

By: Kristian Witt,
Global Product Manager, Silage

Recent years have been marked by below-average rainfall and above-average temperatures in several parts of the world. In the US, the drought of 2012 was the worst in more than 50 years. Southern Europe, Russia, China and Ukraine have also suffered from higher temperatures and lack of rain. These conditions have necessitated changes to normal annual harvest and forage management practices.

Drought-stressed corn can be a good source of high-quality silage, but the key is to manage it carefully — from harvest to packing, and from storage to feedout.

Here is a quick guide to ensuring high feed values from drought-stressed corn silage:

Closely monitor whole-plant moisture

The whole plant moisture of drought-stressed corn still standing in the field can be deceptive. Even if it looks dry and dead, it can contain over 70% moisture. Start testing moisture levels two to three weeks prior to anticipated harvest. Ideal dry matter at chopping should be between 30% and 38%, depending on the type of storage. Once the plant dies, it can dry down quickly, so be prepared to harvest fast. When dry matter exceeds 38%, using a silage inoculant, such as SiloSolve® FC or SiloSolve® AS, can help minimize problems during feedout.

Be aware of varying levels of crop stress, moisture and nutrient content

Different soil types and conditions create variable crop stress, moisture and nutrient content within a field, so you want to continuously test for moisture during harvesting. During feedout, increase nutritional testing so you can make adjustments for variability and reduce the risk of feedout problems. We recommend SiloSolve® FC to accelerate fermentation over a broad range of moisture levels and improve aerobic stability during feedout, especially if you are short of forage and expect to start feedout well before three months of fermentation.

Pack, pack and pack again

Drought-stressed corn silage packs like grass or cereal silage. To increase the packing density, additional weight on the packing tractor may be needed. Consider using Biomax® Pro to quickly lower the pH level and decrease residual plant cell respiration caused by the presence of oxygen.

Test nitrate levels

Drought-stressed corn is often high in nitrates. Nitrates tend to accumulate in the lower stalk, so cutting at 12 to 15 inches can decrease nitrates in the silage. However, this might not be practical because it will reduce your tonnage.



Note that nitrates levels can spike after rain, so it's best to wait three to five days after rain before you start harvesting the crop. Silage fermentation can reduce nitrate levels by 20 to 50%, but allow at least four weeks after ensiling for nitrate levels to fall before feeding. Test silage for nitrates prior to feeding and periodically during feeding to assure nitrate levels are below detrimental levels. For extra assurance, Biomax® Pro promotes rapid fermentation, which helps convert nitrates to a safe form.

Be aware of dangerous silo gas

Silo gas is always a concern with corn silage and increases with higher nitrate levels in drought-stressed corn. Nitrates can turn into nitrous dioxide, an extremely toxic gas. Even brief exposure to silo gas may cause permanent injury or death. Proceed with extreme caution if you notice a faint, brown-tinted, low hanging gas, stained forage or a bleach-like odor. If you

detect any of these signs, leave the area immediately. Look for signs of mycotoxin contamination from the field. Drought-stressed corn is particularly vulnerable to mold- and/or yeast-spore invasion. This typically takes place when corn pollinates under drought stress and high heat. To inhibit the further growth of molds and yeasts in the silage, consider applying SiloSolve® MC.

Monitor closely, even if crop conditions improve

Severe drought stress causing abnormal plant and ear development requires careful management, even if more normal rainfall returns later in the season. Mycotoxin threats may actually increase. Expect the crop to have lower starch, higher but more digestible fiber, and elevated plant sugars. Biomax® Pro and SiloSolve® MC efficiently use soluble sugars to rapidly drive fermentation to low terminal pH

—ideally < 4.0 — helping you get the most feeding value from every ton of silage harvested.

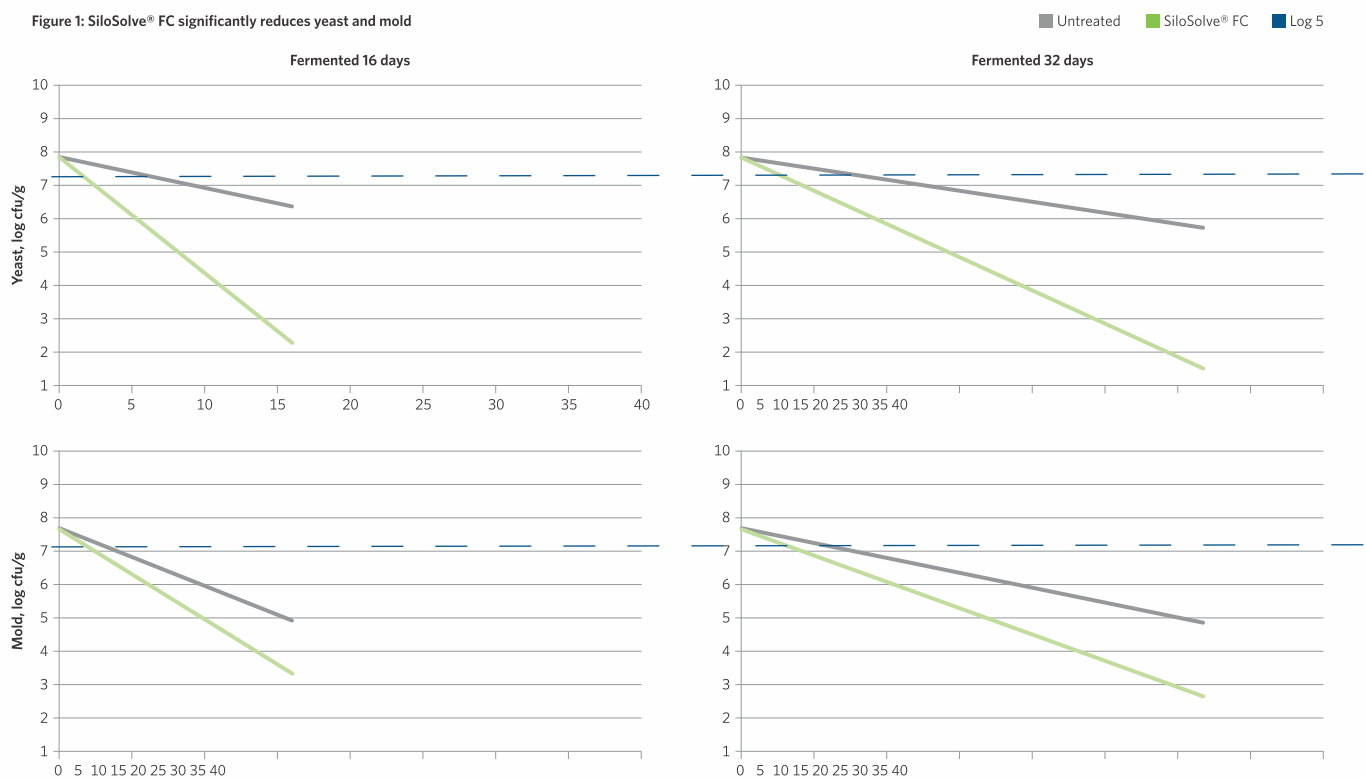
Don't underestimate the value of drought-stressed corn

Although grain content may be low or not present, drought-stressed corn silage can have up to 75% to 90% the nutritional value of normal corn silage. Ask your nutritionist for advice on feeding drought-stressed corn silage.

Early feed out – an additional challenge

In addition to the challenges of managing drought-stressed corn silage, if you are short on forage, inadequate fermentation time and aerobic stability of the new crop at feedout may compound the issue. SiloSolve® FC hastens fermentation and extends aerobic stability in as few as two to four days after sealing the silo, although we recommend a minimum of seven days of fermentation.

Figure 1: SiloSolve® FC significantly reduces yeast and mold



Silage: A Quality Roughage Available Round The Year For Feeding Dairy Animals

What is silage?

Forage which is still green and nutritious can be conserved as succulent roughage almost in its original condition through a natural 'pickling' process known as fermentation. Anaerobic fermentation of carbohydrates present in forage results in production of lactic acid which acts as preservative. Silage is made in the absence of air in a suitable silo. Forage conserved this way is called 'ensiled forage' or 'silage'.

The silage is made when green fodder is surplus and can be kept for two to three years without deterioration in its quality. Low pH of silage make it germ free. Good taste and sour-sweet aroma of silage make it palatable to animals. Silage can be fed at any time of the year, especially in lean seasons when green fodder is not available to feed dairy animals.



Good quality silage

Silage making

Maize, Oats, Jowar, Bajra, Hybrid Napier, cultivated and natural grasses rich in soluble carbohydrates are most suitable for ensiling. Crop should be harvested between flowering and milk stage when it contains 30-35% dry matter and chopped before ensiling. The quality of silage can be improved with the use of suitable additives such as molasses, urea, common salt, formic acid etc.

Silage is prepared in an air-tight structure (silo) designed for preservation of high moisture fodder as silage. Low capacity Pit and Surface silos are suitable for small and medium farmers. Normally, one cubic meter space is required for ensiling 500 kg fodder. The capacity of a silo should be calculated based on the number of animals to be fed and the length of the feeding period.



Dr. Lokendra Chauhan
Dr. Rajesh Roshan, and
Dr. MU Siddiqui

NDDB Dairy Services, New Delhi.

“ **Nutrients are essential for growth and production performance of all living beings. Feeds (concentrates) and fodders (roughages) make the nutrition of livestock. Concentrates are livestock feeds that are low in fibre content and high in proteins and other nutrients, whereas roughages are mostly fibres. Roughages consumed as feedstuffs by cattle and buffaloes include grazed roughages as pasture, preserved roughages like hay and silage and crop residues/by-products such as straw, stover and hulls. Besides green fodder, roughages in the form of straw, hay and silage comprise the bulk of nutrition of dairy cattle and buffaloes.** ”



The crop that is to be ensiled is harvested and chopped into small pieces of 2-3 cm size for better packing. Chopped fodder should be evenly distributed throughout the silo and pressed manually or by tractor, layer by layer of 30-45 cm. Filling and pressing should be completed as fast as possible. Additives are mixed during filling of fodder in the silo, if needed. After filling and pressing, the silo is covered 3-4 feet above the ground level with thick polythene sheet. Then weight is put using mud layer/sand bags/used tyres on the sheet to prevent entry of air and water. The silage would be ready for use in 6-8 weeks. Good silage is tender, has acidic taste and smell and has yellowish or brownish green colour.

months or so.

Advantages of silage feeding

- Silage is a good source for replacing green fodder as it is succulent, nutritious and easy to digest by dairy animals for producing more milk.
- Crops can be ensiled when the weather conditions donot permit their conservation ashay or dry fodder.
- Enhances green fodder productivity by improving harvesting intensity. So use of silage makes it possible to keep more animals on a given area of land under fodder crops.
- Silage provides good quality fodder in any season of the year, to sustain

l) of Govt. of India. NDDB Dairy Services facilitated Maahi and Payaas Milk Producers Companies (MPCs) in Gujarat and Rajasthan respectively in organizing 281 silage making demonstrations. These demonstrations were witnessed by 5400 farmers and as a result 357 farmers adopted silage making to feed their dairy animals. The farmers who cannot make silage are purchasing silage from local market, if available. Looking at a certain demand for silage, a few MPCs have started procuring silage and supplying it to their producer members. So far, 175 MT silage has been procured and supplied to members by MPCs.

Conclusion

Silage is the best option as a replacement of green fodder. Since green fodder is not available in lean season, silage making can help farmers in providing succulent and nutritious roughage to their dairy animals round the year. Silage making enhances the fodder productivity by increasing crop intensity. It can maintain the production level of milking animals even when green fodder is not available. Silage making is cost effective and farmers are to invest a little amount for construction of silo and buying a chaff cutter. To economize the dairy farming, farmers must adopt silage making and feeding it to their cattle and buffaloes.



Ensiling: Pressing of fodder by tractor

Silage can also be made in plastic bags of various sizes suiting to farmers' need. For this, chopped green fodder is filled in the bag and pressed as hard as possible to remove air and to create anaerobic condition inside the bag. Once the bag is full, it is sealed properly. The silage bag is stored away from direct sunlight and protected from rain. After 3-4 weeks' time, good quality silage is ready for feeding animals. To retain the quality, silage bag should be closed quickly after removing the day's requirement of silage. If silage is not needed immediately, the bag can be kept for 12

milk production.

- Crop from a larger area can be stored in less space as silage than as dry fodder.
- Silage feeding controls parasitic diseases as parasites present in different stages in green fodder are destroyed during ensiling.

Silage Making Demonstrations

Considering the importance of silage as a nutritious roughage, silage making demonstrations were carried out as a part of fodder development program, under National Dairy Plan-Phase I (NDP-



Making silage in plastic bag

Bypass Fat - In Dairy Animals Diet



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Dietary fat, which is not degraded in the rumen of animals, but gets degraded in the lower digestive tract is known as bypass fat. The bypass fat is also known as rumen protected fat, calcium salts of long chain fatty acids, calcium soaps. Under field condition, due to limited availability of quality feeding of cultivated fodders and energy rich supplements there is huge loss of body weight after calving. Crossbreed cows and buffaloes often loses around 80-100 kg body weight after calving. After this huge loss in body weight such debilitated animals don't come to heat unless they are fully or partially recovered from the lost body weight. This condition leads to delay in conception and results into extended inter-calving interval.

There is huge loss of energy through milk so there is decrease in lactation yield and drop in feed intake, immediately after calving of dairy animals. Overall, it is a significant economic loss to the farmers. These condition leads to negative energy balance along with drop in milk production, reproductive performances and body condition is adversely affected. Adverse effect is more in cross breed cows and high yielding buffaloes. Bypass fat is rich source of energy and calcium. Thus, supplementing bypass fat improves the production performance and body score of high yielding animals.

Inclusions of raw edible oil beyond certain levels may cause digestive disturbance in ruminants by increasing energy density of ration and may

adversely affect fibre digestion and by binding with the divalent mineral ions. Therefore, it is essential to supplement the fats in such a form, which can provide energy without affecting fibre digestion in the rumen. This is possible by supplementing fat in rumen protected form, which does not interfere with the fibre digestion in the rumen. Bypass fat gets digested in the abomasum at acidic pH 2.5 without interfering with the other digestion processes inside rumen. Natural source of bypass fat is whole oil seeds with hard outer seed coat, which mainly protects the internal fatty acids from lipolysis and bio-hydrogenation inside the rumen.

Characteristics of bypass fat supplementation

Bypass fat mainly composed of fatty acids which are associated with calcium ions instead of glycerol backbone. When the calcium is associated with fatty acids, the fat supplement is thus formed as inert inside the rumen. Bypass is less soluble in rumen whereas, it is less susceptible to biohydrogenation. The fatty acids are more digestible in the duodenum, due to high acidity, the detergent action of bile acids, lysolecithin and fatty acids. Feeding bypass fat to early lactating animals increases the milk yield and fat yield and ensures the early conception. Theoretically, the efficiency of nutrient utilization is maximal for milk production, when supplemental dietary fat provides 15-20% of the dietary metabolizable energy or 7-8% of the dietary fat on DM basis.



Specification of bypass fat

supplement for early lactation and for

Characteristics	Requirements
Moisture (%)	4-5
Fat content (%)	80-84
Calcium content (%)	7-9
Colour	Light brown to pale yellow
Physical appearance	Free flowing granules
Protection (%)	78-82

- Increases the peak milk production and persistency of lactation.
- Fulfills the nutrient requirement of high yielding animals.
- Improves the Reproductive performance of the animal which can be beneficial to return to positive energy balance sooner which can affect follicle size, ovum fertility and progesterone levels.
- Decreases the chances of metabolic disorders such as ketosis, acidosis and milk fever.
- Increases the productivity and productive life of ruminants.
- Protects from heat stress.

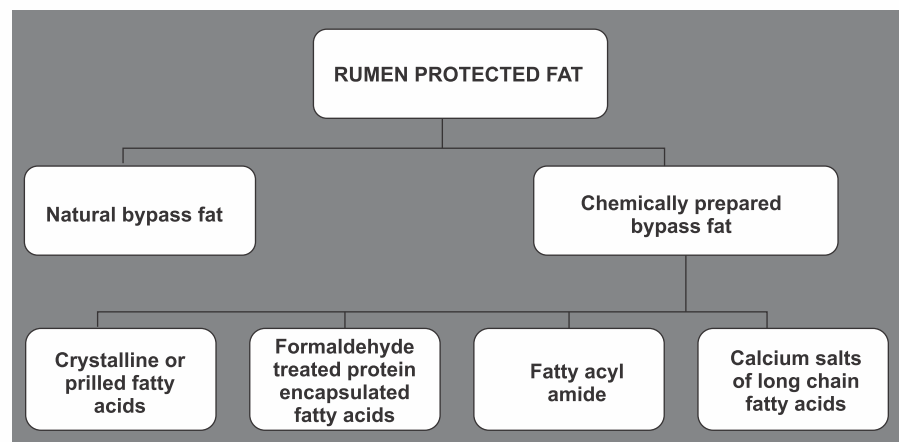
Recommended daily feeding rate of bypass fat

- For Crossbred cow- 100-150 g
- For Buffaloes- 150-200 g
- Bypass fat can also be incorporated in the feed of growing calves and lactating animals at 1.5-2 % for increasing the energy density of feed.
- The Bypass fat can be supplemented to dairy animals by mixing with concentrate mixture. It can be given as a single dose or in divided doses.

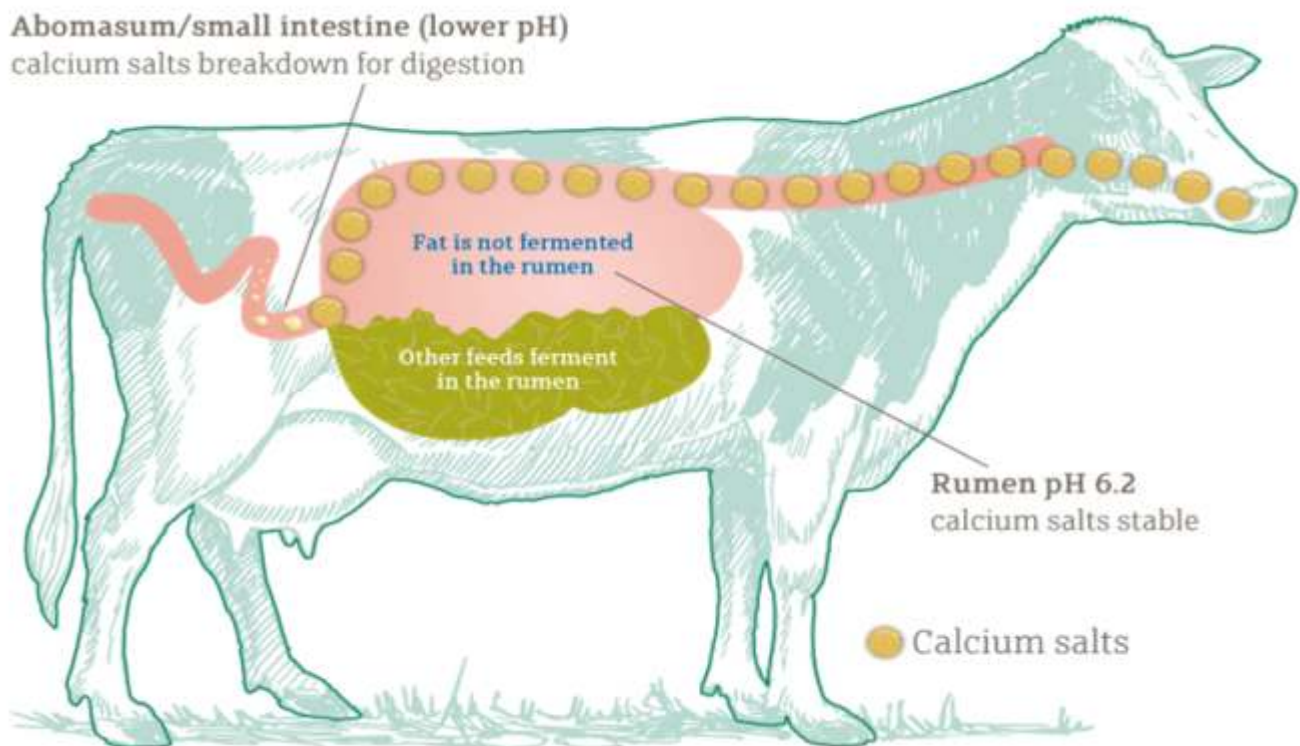
advance pregnant animals to overcome negative energy balance.

Benefits of feeding bypass fat

- It is the Ideal energy dense



Abomasum/small intestine (lower pH)
calcium salts breakdown for digestion



Sustainable Livestock Production: A Water Footprint Perspective



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Introduction

Our water resources are vital for life on this planet and it is essential that they are safeguarded. The term “water footprint” is used to indicate the amount of fresh water that any given process or activity uses. As the global population grows and the projected increase in production and consumption of animal products continues, it is highly likely that there will be further pressure on our already stretched freshwater resources. Solutions are needed for a water resource future that not only meet today's challenges but also provide strategies to combine the best use of water resources with respect for all aspects of sustainability, including farm animal welfare.

Water consumption and pollution can be assessed using the water footprint concept which distinguishes a green WF (consumption of rain water), a blue WF (consumption of surface and ground water) and a grey WF (pollution of surface or ground water). Globally, agriculture accounts for 92 % of the global fresh water footprint; 29 % of the water in agriculture is directly or indirectly used for animal production. On top of the water needs for growing feed, water is needed to mix the animal feed, for maintaining the farm, and for drinking of the animals. In the period 1996–2005, the annual global WF for animal production was 2422 Gm³ (of which 2112 Gm³ green, 151Gm³ blue



and 159 Gm³ grey) .Of this amount, 0.6Gm³ of blue water (0.03%) was needed to mix the feed, 27.1 Gm³(1.1%) was drinking water and 18.2 Gm³ (0.75%) was needed for the maintenance of livestock farms. Water for animal products, therefore, mainly refers to water consumed or polluted to produce animal feed.

Components of Water footprints:

The amount of water used during the production of a given product can be measured throughout the whole life cycle of that product. This provides a standardized measure of the liters of water used to produce a given unit of



product, which is termed its water footprint. The water footprint can be used to assess and compare water use in different products and farming systems. Different types of water footprint are classified in the water footprint methodology, and these are calculated separately:



Green water footprint: refers to consumption of green water resources (rainwater in so far as it does not become run-off).

Blue water footprint: refers to consumption of blue water resources (surface and groundwater) along the supply chain of a product. 'Consumption' refers to loss of water from the available ground-surface water body in a catchment area. Losses occur when water evaporates, returns to another catchment area or the sea or is incorporated into a product.

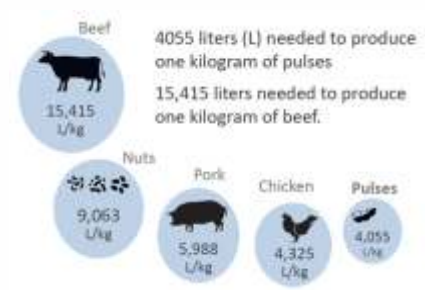
Grey water footprint: refers to pollution and is defined as the volume of freshwater that is required to assimilate the load of pollutants given natural background concentrations and existing ambient water quality standards. It is an indicator of freshwater pollution.

The water footprint of a live animal consists of different components: the indirect water footprint of the feed and the direct water footprint related to the drinking water and service water consumed. Service water refers to the water used to clean the farmyard, wash the animal and carry out other services necessary to maintain the environment.

It is important to consider the three water footprint components separately

because their availability varies, both regionally and temporally. The three types of water use also have different hydrological, environmental and social impacts, as well as different economic opportunity costs – other uses to which the water could be put.

Livestock farming systems:



The three farming systems compared follow the Food and Agriculture Organization classification of industrial, mixed and grazing farming systems:

It is relevant to consider from which type of production system an animal product is obtained: from a grazing, mixed or industrial system. Animal products from industrial production systems generally have a smaller total water footprint per unit of product than products from grazing systems, with an exception for dairy products (where there is little difference). However, products from industrial systems always have a larger blue and grey water footprint per ton of product when compared to grazing systems, this time with an exception for chicken products. It is the lower green water footprint in industrial systems that explains the smaller total footprint. Given the fact that freshwater problems

generally relate to blue water scarcity and water pollution and to a lesser extent to competition over green water, this means that grazing systems are preferable over industrial production systems from a water resources point of view. In the case of cattle, pigs, sheep and goats, the total water footprints per ton of product are larger for grazing systems because of the worse feed conversion efficiencies, but the fact that these systems depend more strongly on rough ages (which are less irrigated and less fertilized than the feed crops contained in concentrate feed) makes that the blue and grey water footprints of products from grazing systems are smaller. This compensation through the feed composition does not occur for the case of chicken. The reason is that chicken strongly rely on concentrate feed in all production systems. Mixed production systems generally take a position in between industrial and grazing systems. Not accounted for in this study is that industrialized animal production often produces large amounts of animal waste that cannot be fully recycled in the nearby land. Such large amounts of waste produced in a concentrated place are known to pollute fresh water resources if not handled properly.

Major factors in the water footprint of an animal product:

The water footprint of an animal product accounts for water use during all stages of production, including feed production, drinking water and water used to clean animal housing and slaughterhouses and to manage pollution. Of these, feed production is the major factor determining water footprint. The water footprint of an animal product depends on two main factors:

1. How much the animals eat, measured as the feed conversion efficiency, which is defined as the amount of feed dry mass input to produce a unit of meat output, and
2. What type of feed the animals eat and the water used during feed production. The feed conversion efficiency depends on the type of production system and in general improves from grazing to mixed

systems and from mixed to industrial systems. It is affected by animal type, breed, age at slaughter and level of physical activity. Feed ingredients can be grouped in two categories: concentrates and roughages. Because roughages such as grass, straw or forage are mainly rain-fed and concentrates such as cereals or oil crops are often irrigated and fertilized, the blue and grey water footprint of concentrates is much higher: 43 and 61 times that of roughages, respectively.

Feed conversion efficiencies are higher from grazing through to industrial systems in beef. Ruminants such as cattle have the ability to digest roughages and need not rely as heavily on concentrates as do monogastric species e.g., chicken and pigs. Roughages, such as pasture or hay, have large green water footprints but if they are not irrigated or fertilized, they have smaller blue and grey water footprints which provides an advantage in terms of conservation of scarce freshwater resources. The tendency in beef is for blue and grey water footprints to be higher in industrial farm systems than in grazing farm systems.

Implications for farm animal welfare

The study data indicate that grazing-based extensive systems can be preferable for water resource management. These systems can also provide better farm animal welfare. We consider that animal welfare is a vital consideration in the development of sustainable farming. Production systems affect animal welfare in differing ways; the potential for good farm animal welfare declines from grazing systems to increasingly industrial farm systems. The overall blue and grey water footprints of livestock farming are expected to grow as industrial systems increase. These are important considerations in a world with limited freshwater.

Beef cattle

Cattle and other ruminants in grazing systems rely to a large extent on roughages, such as grass or hay, which have lower blue and grey water footprints, provided that pastures are rain fed and not heavily fertilized. Industrialisation of beef production requires a diet higher in concentrates,

particularly during the finishing period, which increases the blue and grey water footprints per unit of product. Producing cattle in industrial scale feedlots can also have major welfare consequences.

Meat chickens

Technological advancements in poultry production have resulted in ever increasing growth rates and efficiency in the conversion of feed into meat.

However, the focus on feed conversion has come at an unacceptably high cost to animal welfare. Intensive chicken meat production systems, keep birds indoors for their entire life, in crowded and often barren conditions. Rapid weight gain exceeds their body's ability to grow strong enough bones, leading to skeletal disorders and painful lameness. Discomfort and pain mean the birds spend much of their time lying down on the litter resulting in lesions on the foot pad, hock and breast area. At times, their heart and lungs cannot cope, leading to conditions such as sudden death syndrome.

Given the high impacts of the intensification of chicken farming on animal welfare, we advocate those future solutions for chicken meat production should consider a balance between feed efficiency, water use and the welfare of the animals.

Pigs

More than half of the world's pigs are produced in intensive industrial systems that commonly use practices such as confining pregnant sows in stalls with so little space that they cannot turn around. Millions of fattening pigs go on to live short lives in crowded conditions, in highly stocked barren environments. These practices, combined with low-fibre diets and barren environments, lead to poor welfare in breeding and fattening pigs.

Pigs rely to some extent on grains and concentrates in all farming systems, although there are variations between grazing, mixed and industrial systems. Therefore, feed conversion efficiency is not the predominant factor determining the water footprint. The study indicates that a higher welfare pig farming system can perform as well or better in terms of water footprint as long as pigs are provided a low-water-footprint feed.

Minimising Water Use

The water footprint is determined by both the feed composition (what the animals eat) and feed conversion efficiency (how much the animals eat per unit of meat produced). Across species, feed conversion efficiencies improve from cattle, to pigs, to broilers.

Well managed grazing systems for beef cattle appear to have the best potential in terms of freshwater resource use and in providing acceptable levels of animal welfare. Use of marginal lands not suitable for other crops to graze cattle and other ruminants is also efficient from a land use perspective.

The projected combination of production and consumption increases and the shift towards more industrial systems could increase the use of feed concentrates and thus the overall water footprint of the livestock sector, particularly in the blue and grey components. Solutions need to be developed to address both the high-water footprint of concentrate feeds and poor animal welfare in these systems.

The water footprint of animal production globally, which is around one quarter of the total water footprint, can also be decreased by replacing animal products by food products of plant origin, or by reducing food waste. Waste represents a loss of around one third of all food being produced. In developed countries losses occur at the retailer and consumer end of the supply chain, while in developing countries they occur at the producer level due to lack of infrastructure for transport and storage.

Conclusion

Humanity is facing unprecedented challenges to feed the global population while conserving the world's limited freshwater resources. The sustainable solutions that reduce water use in livestock systems can be consistent with improving animal welfare. More extensive, grazing-based systems can reduce pressure on blue and grey water resources, and often provide better animal welfare. Grazing systems can make use of marginal lands which are not suited for crop production and this can be considered to be efficient use of the world's food production resources.



Rise of MooFarm Agritech Startup



MooFarm was founded in 2019 by Param Singh, Aashna Singh, Abhijeet Mittal, and Jitesh Arora to organize the pre-farm gate dairy sector for a large and unexplored market that constitutes almost 4.6% of India's gross domestic product. It is an information technology company that bridges the technology gap to help marginalized dairy farmers. The company is located in Gurgaon, Haryana. The Agritech startup has raised \$2.4 million in a seed round led by Accel India with participation from Rockstart's AgriFood and Navus Ventures.

The company focuses on economy and profitability, empowering the small-scale dairy farmers by connecting them to high-yielding cattle, qualified veterinarians, financial services and digital advisory through its mobile app and a

network of village-level micro-entrepreneurs.

The team of MooFarm brings substantial operational and technical expertise to organize over \$50 billion pre-farm gate dairy sector in India. It is expanding the innovative offering to Indian smallholder farmers. **Over 1 million dairy farmers across India have downloaded the digital advisory mobile app in more than 10 states.**

MooFarm is enhancing access to better technology for rural farmers by inserting a complete dairy farm management tool with a built-in e-commerce platform into the dairy farming process of rural India. \$3.6 million has been raised in funding over 3 rounds. The latest funding was raised on December 14, 2021, from a seed round.

The company believes in zero hunger, gender equality,





responsible consumption and production, and climate action. The aim is to make the farmers prosperous. The people who work at MooFarm have an idea that optimum results are born out of perseverance, determination, and a strong team connection. A group of young and dynamic individuals coming from diverse backgrounds joins the team intending to empower the dairy farmers.

The startup has seen a 30 percent month-on-month revenue growth with the realized annual revenue run-rate of Rs 100 crore in the past two quarters. **The founder and CEO, Param Singh, speaks on the development and says that the fresh capital will hire the best tech talent, grow revenue, and expand on operational locations.** The investment will help accelerate our vision to build sustainable food systems for 100 million dairy farmers and one billion consumers.

The company has a clear vision for the Indian dairy industry to support the founders to drive a more connected, efficient, and resilient food supply system.



Sid's Farm brings Double Toned A2 Buffalo Milk to Hyderabad

SID'S FARM

Wake up to health!

A2 Buffalo Milk Double Toned

Introducing the *Truly Fit* Buffalo Milk

MRP - ₹40/-

SID'S FARM

A2 BUFFALO MILK DOUBLE TONED

Sid's Farm, a premium dairy brand based in Telangana, has expanded its product portfolio and launched double-toned A2 buffalo milk in the market, beginning in Hyderabad. The product, which is priced competitively at Rs 40 per 500ml packet, is aimed at the calorie-conscious, young children, and those with dietary restrictions.

The lean buffalo milk is low in fat, yet it still has all of the benefits of buffalo milk, but with less calories. Furthermore, because Sid's Farm places a premium on quality, the milk is fortified to provide even more nutritional value.

The double toned A2 buffalo milk will be available for order and home delivery on the Sid's Farm app, in addition to real outlets and retailers. To sell the product, the company also intends to tap into the client base of leading large format retail establishments throughout the city.

"Our customers have long told us that

while they love our buffalo milk, it is extremely fat rich and they would love to have a low-fat buffalo milk option for everyday use," said Dr. Kishore Indukuri, founder of Sid's Farm and an IIT Kharagpur.

Sid's Farm now has a 4000 sq ft milk processing facility as well as a model dairy farm spread across more than 4 acres of land. Today, the cutting-edge laboratory performs approximately 2000 tests per day to detect any adulteration in milk. Sid's Farm strives to make quality the main selling point of its milk and any other product it brings to market. Sid's Farm's target customers are willing to pay a 14-15 percent price premium for a high-quality product. The milk and milk product-based business entity aims to capture 10% of the Hyderabad market by 2025 by offering quality milk and well-researched milk-based products as a healthy alternative.

Mahaan Milk Foods - A Dairy CSR



Making a Difference



Mahaan Milk Foods has always believed in producing healthy and wholesome foods along with contributing back to society through its Corporate Social Responsibility. They have showcased a mission to change lives for better through their CSR initiatives. Their determination lays forward a significant impact on making the world a better place today and in the future.

Considering the environment and looking forward to a vibrant change, Mahaan Milk Foods have implemented robust environmental monitoring, water monitoring, and air monitoring programs as part of their CSR Activity. Their environment acclaimed initiative involved benefiting the environment by reducing our carbon footprint, recycling our wastewater and materials and planting trees

They aim to pursue a journey toward becoming a carbon-free and zero-effluent discharge facility for processing their end-to-end need. In order to accomplish this goal by 2030, they have committed themselves to serve a better future with responsible commitment.

The company has been striving and serving generously to strengthen the communities to aid empowerment initiatives. Their recent industry revolved around Ambulance donation, which outlines the company's grassroots efforts to support children and families, and state governments also supported the initiative to promote welfare activities.

Mahaan Milk Foods has also taken up social responsibility as the core component for working for the welfare of families fighting malnutrition in India. They have ventured forward to improve the condition of the community through water filter installation to curb water-based diseases in rural and semi-urban communities.

As a business, they have taken a long-term view and focus on relevant social development initiatives that extend in impact to future generations. The company has committed to creating an effect that lasts for generations through its deeds and follows every protocol to produce the best quality products for the users.





Bhupesh Baghel, The Chief Minister of Chhattisgarh, releases Rs 10.70 crore to Godhan Nyay Yojana beneficiaries

During a programme in Rajpur, Balrampur district, Chief Minister Bhupesh Baghel virtually released an amount of Rs 10 crore 70 lakh online to cattle rearers, women Self-Help Groups associated with Gauthans, and Gauthan committees under the Godhan Nyay Yojana. The sum includes a payment of Rs 2.34 crore in lieu of cow dung purchased from cattle rearers, farmers, and landless from April 16 to April 30, as well as a dividend payment of Rs 5.04 crore to Gauthan committees and Rs 3.32 crore to women SHGs.

Agriculture Minister Ravindra Choubey, Urban Administration Minister Shiv Kumar Dahriya, Parliamentary Secretary Chintamani Maharaj, Advisor to Chief Minister Pradeep Sharma, Chief Secretary Amitabh Jain, Additional Chief Secretary to Chief Minister Subrat Sahoo, Principal Secretary and Godhan Nyay Mission Coordinator Alok Shukla, Agriculture Production Commissioner Kamal Preet Singh, and other senior officials attended the event.

The Godhan Nyay Yojana is the only such scheme in the country and the globe, under which cow dung is purchased for Rs.2 per kilogramme in the Gauthans of Chhattisgarh.

In the state-run Gauthans, cow dung obtained under the scheme is utilised to make various products like as vermicompost, super compost, and super compost plus on a big scale.



Elanco and Royal DSM Announce Strategic Alliance in U.S. for Bovaer®

Press Release

ANIMAL
NUTRITION
AND HEALTH



Elanco and Royal DSM Announce Strategic Alliance in U.S. for Bovaer® – A Revolutionary, Methane-Reducing Feed Additive for Cattle

Elanco Animal Health Incorporated (ELAN: NYSE) and Royal DSM have created a strategic alliance connecting two leading, sustainability-focused companies to address one of society's most significant opportunities of the decade, mitigating climate change by reducing greenhouse gas emissions from farming. Elanco has secured the exclusive U.S. licensing rights to develop, manufacture and commercialize Bovaer® for beef and dairy cattle.

Bovaer® is a first-in-class and best-in-class methane-reducing innovative feed additive for beef and dairy cattle, already available in Europe, Brazil, Chile and Australia. More than 50 peer-reviewed studies and 48 on-farm trials in 14 countries show Bovaer® consistently reduces enteric methane emissions by approximately 30% for dairy cows and even higher percentages for beef cattle¹.

DSM and Elanco intend to provide farmers, dairy and beef companies, and retailers with a solution to substantially lower the carbon footprint of beef and dairy production, supporting the animal protein industry's ESG efforts and helping secure a sustainable future for the planet. The methane reduction from feeding a million cows Bovaer® is equivalent to planting 45 million trees or removing 300,000 cars from the road. With 9 million dairy cows and 14 million beef cattle on feed in the U.S. alone, the product would contribute to a significant and immediate reduction of the environmental footprint of meat and dairy products, supporting the Global Methane Pledge to cut emissions 30% by 2030².

The strategic alliance is expected to enable both parties to maximize the opportunity for the product in the U.S. market, once approved, while also nearly doubling previously announced Bovaer® production capacity globally. Elanco will be responsible for the U.S. approval process, commercialization strategy and product supply, supporting DSM supply in markets outside the U.S. Elanco will assess and evaluate the regulatory submission and manufacturing options with the intent to bring Bovaer® to the U.S. market as quickly as possible. Already the State of Indiana, for example, has indicated its support for expanded manufacturing investment in the state as it continues to build public-private partnerships supporting the state's growing agriculture economy.

With an estimated global market opportunity for livestock methane reduction of \$1 billion to \$2 billion, Elanco expects Bovaer® to have blockbuster annual revenue potential in excess of US\$200 million in the U.S. market with initial contribution by mid-decade. This alliance is not expected to impact Elanco's previously stated financial commitments.





State Level Executive Committee on National Livestock Mission Explored New Project Proposals for Sikkim

State Level Executive Committee on National Livestock Mission has its 7th Session at Animal Husbandry & Veterinary Services Head Quarters at Krishi Bhawan Conference Hall on 5th May 2022 under the chairmanship of Dr. P. Senthil Kumar, Secretary, AHVS Dept. The meeting was attended by Pr Director, BM Chettri, Directors, Addl Directors and Deputy Directors and other scheme implementing officers of the Dept. At the outset, The SLEC convenor Dr. Saharman Rai, Addl Director, AHVS made a presentation on the progress made under NLM and current status of implementation of NLM in Sikkim. Secretary AHVS suggested all the sections of the department to explore projects under innovation category for all species under NLM for funding in the current financial year. Accordingly, the primary objective of the 7th SLEC was set to explore new projects under Innovation category under NLM for development Piggery, Sheep, Goat, Poultry and other species in Sikkim. The project such as Genetic improvement of pig breed and Establishment of Semen lab at Assam Lingzay, expanding the cattle insurance, Capacity Building, Training and Extension on various Livestock development in the state including Popularizing Ethnoveterinary practices, NBAGR's interest on study of A2 milk of Siri cows, Organization of Calf rally and Livestock shows, Artificial Insemination project on Goats, Innovative round the year production of broilers using insulation technology, Enhancement of fodder production, adoption of silage making and fodder block making, fodder bailing, conservation of indigenous Singharey goat was discussed and accepted by the SLEC for submission of the above projects to Government of India for seeking funding under National Livestock Mission. The secretary requested all scheme heads to prepare and submit the proposal as per discussion held in the SLEC and follow it up with the ministry for seeking funds for its implementation. The meeting ended with vote of thanks.



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Improve Feed conversion efficiency
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Herd economics
Reproductive performance

Improve Growth performance of heifers
Feed efficiency
Quality and dung scoring
Profitability, better milk fat, SNF

Mother Dairy Launches A New Campaign For Its Mishti Doi Product



Mother Dairy Fruit & Vegetable Pvt. Ltd., Delhi's beloved dairy major and a wholly owned subsidiary of the National Dairy Development Board (NDDB), has announced that it has begun a journey to strengthen its presence and visibility in the state of West Bengal, with the goal of growing its value-added dairy products portfolio at a CAGR of over 30% in the next five years.

For Pôila Boishakh 2022, the Company has launched its first-ever regional mega TVC-led campaign for Mother Dairy Mishti Doi, includes a television commercial starring actor Abir Chatterjee, for its Kolkata clients.

Mr. Sanjay Sharma, Business Head – Dairy Products, Mother Dairy Fruit & Vegetable Pvt. Ltd., elaborated on the strategy, saying, "Over the years, we have tried to build upon the necessary infrastructure, including manufacturing and distribution capacities, to cater to our consumers in the east." Today, the Eastern market is, after the North, one of the fastest growing markets for our value-added dairy products portfolio, with a CAGR of around 35% over the last five years. We are grateful to Kolkata and West Bengal consumers for their enthusiasm for our product line, particularly the regional specialties. Our Mishti Doi, which has received a lot of attention from the audience here, is proof of that.

"Our dairy products offer the classic wonderful refreshing taste that prolongs the time spent with friends and loved ones," stated Mr. Randhir Kumar, General Manager – Marketing (Dairy Products), Mother Dairy Fruit & Vegetable Pvt. Ltd., speaking about the new campaign. Using this as a starting point, we'll break down our entire proposition into product categories across our various business units. Mishti Doi has long been one of Mother Dairy's most popular product categories in this market, and this state-specific delicacy remains a powerful carrier product for all of our dairy goods.

The Union Minister for Fisheries, Animal Husbandry, and Dairying Launches Mobile Veterinary Units (MVUs) to Provide Veterinary Services to Farmers Right on Their Doorstep



The Minister said that this is the best programme to assist farmers and dairy owners to take care of the health of their dairy animals at the right time and to double the farmers income thereby uplifting their economic status by utilizing these Mobile Veterinary Vehicles in the right manner.

Shri Parshottam Rupala, Union Minister for Fisheries, Animal Husbandry and Dairying inaugurated Mobile Veterinary Units (MVUs) in Karnataka to provide veterinary services at the farmer's doorstep based on the phone calls received at the Call Centre from the farmers. Shri Basavaraj Bommai, Karnataka Chief Minister and Shri Prabhu B Chavan, Karnataka Minister for Animal Husbandry also graced the inauguration event.

The overall aim of the 'Livestock Health & Disease Control programme' of Government of India is to improve the animal health by way of implementation of prophylactic vaccination programmes against various diseases of livestock and poultry, capacity building, disease surveillance and strengthening of veterinary infrastructure.

Shri Rupala during the inauguration event yesterday announced that in order to increase accessibility of veterinary services at farmer's doorsteps, funds for Mobile Veterinary Units (MVUs) will be provided to the States/UTs under this scheme @ 1 MVU for every one lakh livestock population. These MVUs will be customized fabricated vehicles for veterinary healthcare with equipment for diagnosis, treatment & minor surgery, audio visual aids and other basic requirements for treatment of animals.

Karnataka State has been sanctioned with 290 Mobile veterinary vehicles against 289 lakh number of animal population, which will operate throughout the State by Public Private Partnership. Rs 44.00 crores has been sanctioned to procure 275 new veterinary services fabricated vehicles @ Rs 16.00laks per vehicle. Remaining 15 already existing Pashu sanjivini vans will be utilized to match up 290 required vehicles.

The Minister urged the farmer's community and dairy owners and each and every one who involved in dairy activities to utilize the 290 Mobile veterinary vehicles for all the veterinary services by calling Toll free Animal Helpline Number 1962.



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 Philippines 2022**
Dates: August 24 - 26, 2022
Venue: World Trade Center
City: Pasay city
Country: Philippines
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.victamasia.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

Farmers raising indigenous cows would receive Rs 900 per month by the MP government.



The Madhya Pradesh government has announced that farmers who raise indigenous cows will receive a monthly payment of Rs 900. The remark was made by Chief Minister Shivraj Singh Chouhan on Monday while virtually speaking at a Niti Ayog workshop on agriculture.

The CM also announced the formation of the Madhya Pradesh Natural Agriculture Development Board to promote natural farming.

"Farmers should raise at least one desi (indigenous) cow for natural farming. We have decided to give such farmers Rs 900 per month. As a result, a farmer will receive a total of Rs 10,800 per year for a desi cow", Chouhan stated during his address at this workshop.

He also stated that the MP government plans to launch special activities to promote natural farming in 100 villages in each of the state's 52 districts.

Natural disasters have occurred during the current Kharif crop season. Natural farming activities will begin in the state's 5,200 villages during the current Kharif crop season. We are looking for such farmers. So far, 1.65 lakh farmers in the state have expressed an interest in natural farming. Workshops will also be held in the state to foster an environment conducive to natural farming, he added.

Natural farming will be promoted in agricultural fields on both sides of the

Narmada river, according to Chouhan.

The CM also stated that five full-time workers will be appointed in each block to promote natural farming and will be paid an honorarium.

Gujarat Governor Acharya Devvrat, Uttar Pradesh Chief Minister Yogi Adityanath, and Andhra Pradesh Chief Minister YS Jagan Mohan Reddy also spoke at the workshop, according to a public relations department official.

Remilk, an Israeli dairy company, plans to construct the world's largest animal-free dairy factory in Denmark



Remilk, a food tech startup that develops cultured milk and dairy, announced on Tuesday that it intends to build the "world's largest" facility for the production of cow-free milk in Denmark.

According to the company, the 750,000-square-foot (69,677-square-meter) facility will be built within an eco-industrial park in the city of Kalundborg. This new plant in Denmark will replace *50,000* cows per year and is part of the ground-breaking Kalundborg Symbiosis project, which is the world's first industrial symbiosis with a circular approach to production, converting wastestream in one company into a resource in another.

Remilk, which was founded in 2019, produces milk proteins through a yeast-based fermentation process that makes them "chemically identical" to those found in cow-produced milk and dairy products.

Using precision fermentation, Remilk produces dairy proteins that are identical to those found in animal products. Cows

are not required in any way, and the resources required to develop dairy products are minimal in comparison to those required to rear farm animals. The company was founded on the principle of completely disrupting an archaic industry that has a "devastating impact" on the planet. Following its Series B funding, the company was valued at \$325 million, with sales projected to reach \$600 million by 2026.

Holland intends to establish a dairy trading excellence centre in southern Uttar Pradesh



The Dutch government is eager to create additional DTCEs in India, as well as CoEs for horticulture, floriculture, and food processing. It will help Indian floriculturists pack and ship their products to other regions of the country as well as overseas, according to the Dutch agriculture adviser.

The DTCE will help dairy farmers implement Dutch technology to improve milk quality and quantity. Farmers will learn about running dairy farms, including marketing methods, in addition to receiving training. They will be taught about dairy farming. They'll be able to get information on the genetic materials as well.

Ambassador van den Berg of the Netherlands highlighted the possibility of creating a similar dairy coaching centre in Chennai. "India has the potential to develop numerous such centres of excellence," van Erkel said.

The milk yield per cow in the Netherlands is much higher than in India, according to

the Dutch Agriculture Counsellor. Furthermore, a farm with around 150 cows is managed by 2-3 persons, whereas Indian dairy farmers only have 10-20 cows. 'We have large cooperatives in Holland compared to Tamil Nadu cooperatives,' he remarked.

The DTCE may even set up a small-scale cheese machine, similar to those set up by Dutch dairy farms beside their farm gates, and sell these products.

Cow burp emissions have been seen from space

Methane emissions burped up by cows have been observed from space.

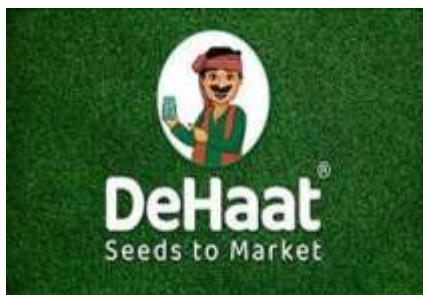
The emissions were detected by environmental data company GHGSat's high-resolution satellites in February, according to a news release from the company. In April the company's analysis confirmed that the emissions came from a cattle feedlot in California's Joaquin Valley.

The satellites recorded five emissions, says GHGSat. If these emissions were sustained for just one year, enough gas would be released "to power 15,402 homes," the company said.

Methane emissions from cattle have been identified as a significant contributor to climate change. As cows digest their food, they release methane, mostly through their gassy burps. But the methane they burp up is a powerful greenhouse gas that traps heat in the atmosphere. The Food and Agriculture Organization (FAO) says that farm cattle contribute to 10% of greenhouse gas emissions worldwide generated by human activity.

DeHaat acquires Y-Cook a food tech company

DeHaat the Patna-based Agri Tech platform acquired Y-Cook India in an all cash deal. Y-Cook a food technology firm



that distributes ready-to-use steamed products was founded by Janardhan Swahar, Vijay Reddy, and Gayathri Swahar in 2011. It processes sweet corn and pulses, which are exported to nine countries.

The business will operate as an independent entity under the DeHaat umbrella and will be led by Swahar. Acquisition of Y-Cook will provide the DeHaat farmers' with access to niche markets and customer base within India and overseas.

DeHaat in the coming year is aiming at expanding its customer footprint to more than 15 countries with a wide range of fresh and processed products sourced directly from farms with a 100% traceability system. DeHaat has already acquired Maharashtra-based business-to-business (B2B) Agri input marketplace Helicrofter for an undisclosed amount in January 2022.

Dibrugarh has its own cow ambulance

Shree Gopal Gaushala, a social organisation from Dibrugarh, launched an ambulance service for cows suffering from accidental injuries and serious diseases. The ambulance, that has a hydraulic lifting system to pick up cows, has been brought from Ahmedabad.

This ambulance service is the first-of-a-kind in the northeast region. The service was inaugurated by Dibrugarh deputy commissioner Biswajit Pegu.

The Shree Gopal Gaushala is already been running a cow hospital manned by veterinary doctors. The introduction of the cow ambulance is the next step towards this service of injured animals.

IIM Ahmedabad startup incubator invests in a dairy-tech startup

OnelImpact Technologies, an agri-fintech startup based at IIM Ahmedabad, has announced that it has raised seed funding from IIMA startup incubator CIIE.CO.

The startup received funding from the IIMavericks programme, which provides mentoring and financial support to graduating students in innovative endeavours such as start-ups.

OnelImpact Technologies is a startup that aims to make credit more accessible to dairy farmers. Maharshi Thaker, a second-year student at IIM Ahmedabad, founded it. The company intends to assist farmers in lending by enabling identification, risk profiling, and credit portfolio diversification through the use of digital technology, artificial intelligence, and machine learning capabilities. "The company intends to use the new funds to scale up loan disbursements to dairy farmers and validate proof of concept," said CIIE.CO, IIM Ahmedabad in a statement.

"I've always been very purpose driven, and dropping out of the IIMA placements was a big decision for me, but I was determined to build a business that would add value and benefit the masses." "In pursuing my dream, I received tremendous support from the IIMavericks programme, and today, we, at OnelImpact, are on the path to revolutionise Agri-lending in India through digital technologies," Thacker added.

Kerala intends to transport cattle feed raw material via rail: Minister J Chinchu Rani

According to Animal Husbandry and Dairy Development Minister J

Chinchu Rani, the Kerala government has struck an agreement with the Centre to utilise special trains to transport raw materials for creating cattle feed to the state.

"Our move comes ahead of the launch of microchips that store complete data on the health of cows under the E-Samridh programme, which we are starting on an experimental basis in Pathanamthitta," Smt Chinchu Rani said at a function at the state-owned PSU's headquarters near Irinjalakuda, where Higher Education Minister Dr R. Bindu unveiled an updated version of the KFL (Kerala Feeds Ltd) website with details of the company's latest products.

Minister Dr. Bindu, who presided over the occasion at KFL's Kallettumkara headquarters, urged the company to start producing feed for pets and birds, adding that they are growing popularity across the state. She said, "The company can set up a state-of-the-art plant for this endeavor."

"The new facilitation centre will assist in the prevention and treatment of diseases in the realm of animal husbandry, especially poultry," said the minister, who is also a local legislator. "It can also encourage farmers to produce grass for livestock fodder."

Milky Mist, partners with Dvara

E-Dairy to adopt digital cattle management solutions



Milky Mist, one of the largest milk aggregators and a leading dairy brand in South India, has partnered with Dvara E-Dairy Solutions to provide new-age technology solutions to its over 60,000 dairy farmers across the 13 districts in Tamil Nadu.

The company aims to raise the milk yield and production capacity of the farmers consequently improving their livelihood by adopting of new-age technologies like Artificial Intelligence that Dvara E-Dairy is pioneering.

Dvara E-Dairy will provide Milky Mist farmers with technological solutions like the Surabhi Score for Financial Access (SSFA) and cattle-specific recommendations & Dvara Surabhi Index (DSI) to help them manage their cattle's health and adopt scientific methods to improve their procurement volume and enhance their income from dairying.

UP CM asks to officials to set up cow shelters at block level

UP Chief Minister Yogi Adityanath directed officials to save the bovines from the heat by setting up cow shelters at the block level. The shelter should have a capacity of 2,000-2,500 cows with proper arrangements for green fodder, straw, water etc. Cleanliness and safety of cows are to be a priority in the summers.

World Dairy Summit 2022 in September in Delhi

International Dairy Federation (IDF) –announced that The World Dairy Summit 2022 will be held in person from September 12-15 as it opened registration for the flagship annual event of the global dairy sector.

The theme will be 'Dairy for nutrition and livelihood', and the programme would include multiple scientific, technical, business, and marketing sessions wherein dairy experts, leaders, and interested stakeholders, from around the world get to connect, learn and exchange about the dairy sector worldwide.

India had last hosted the International Dairy Congress in the year 1974.

IDF WORLD DAIRY SUMMIT

DAIRY FOR NUTRITION & LIVELIHOOD

September 12 - 15, 2022

New Delhi, India



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

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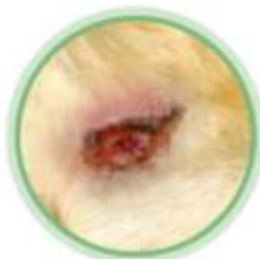
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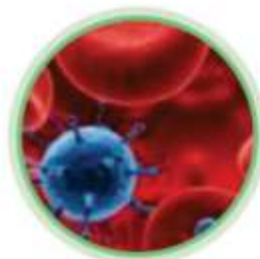
Maggotidal



Fly Repellent



Wound Healer



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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

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—— For more **SNF** and **MILK** yield ——
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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



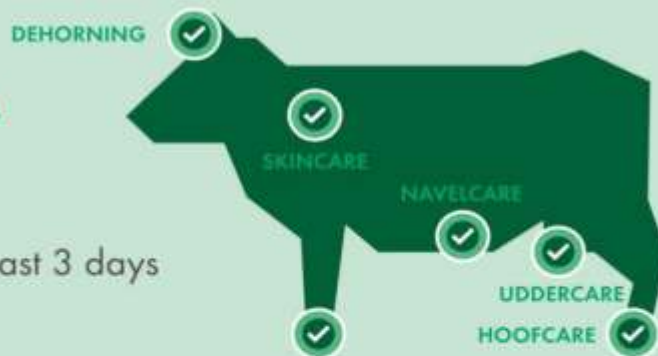
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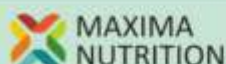
- ✓ Micronised powdered organic minerals
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- ✓ Protective layer with strong adhesion, for at least 3 days
- ✓ Sprays at every angle, even upside down



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