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From the Pen of Chief Editor



Principles of Properly Managing A Dairy Herd to Sustain High Milk Production

The dairy industry relies primarily on the farm's economic volatility. The well-being of the herd has a huge effect on the farm's economic profile. Both of them are inter-related.

Dairy Herd management is an important factor in the success of dairy farms that maintains long-term high production. Several key factors need to be managed successfully: Cow nutrition, reproduction, comfort, and milking.

Forage production, feed & nutrition, fertility, youngstock management, herd size, health management, Dry Cow management, hygienic milk production, and marketing management are the key factors that need to be managed successfully. Forage production management covers all the activities from 'seed to feed', including major agronomic practices for forage production, forage conservation, storage, and feed supply. Feed and nutrition management is the process of understanding the nutrient requirement of dairy cattle at different growth and lactation stages and combining various feed ingredients to meet these needs in a cost-effective manner. Good fertility management is potentially one of the most effective means of improving the sustainability, efficiency, and profitability of dairy farms.

Health management is very important to ensure the optimal care and well-being of dairy cattle and to reduce losses in productivity caused by disease and mismanagement.

Proper execution and smart planning are needed for effective herd management. How well managed a herd is depended on how well they perform during an outbreak. Therefore, Strict hygiene and sanitary conditions of the farm should be maintained.

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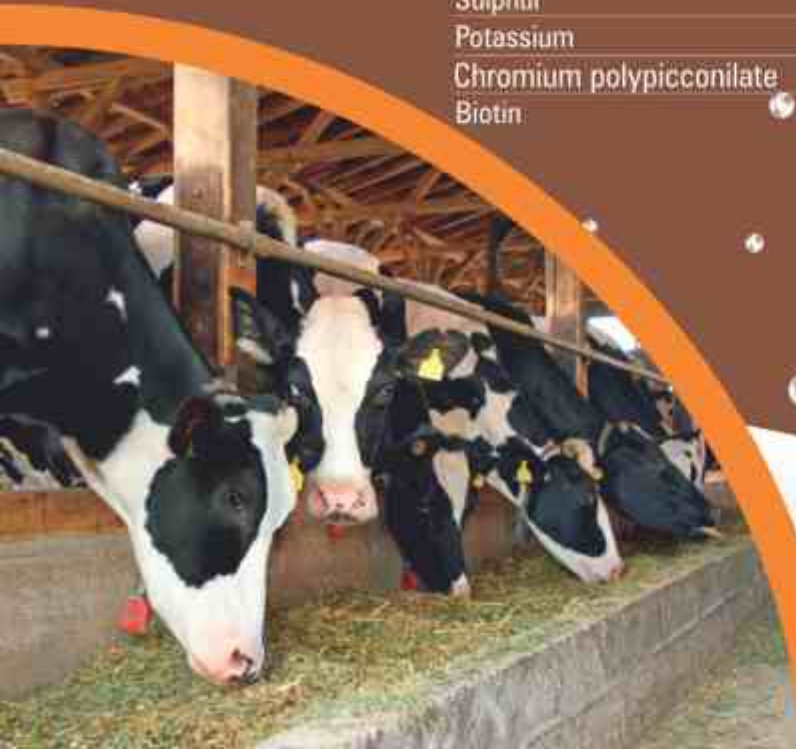
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If you have a claim, take a sample

A story about importance of being in contact with new clients and using vacuum bags as back up samples



The setting

The farm W... GbR is located in Niedersachsen, in Germany. The farmer has about 240 dairy cows producing daily on average 33 kg milk containing 3.9% fat and 3.6% protein. He decided to test **SILOSOLVE® MC** for the 5th cut of grass (pasture) in October 2019. The weather during the cut was cold and cloudy. After one day of wilting in the field, the grass was still very wet. The farmer expected about 200 t of grass and purchased the required amount of **SILOSOLVE® MC** in advance.

The harvest

Grass was collected using self loading wagons during one day. The ambient temperature increased from 5°C in the morning till 20°C in the afternoon. The dry matter content of the grass increased as well, from about 25% at the begin till about 35% at the end.

SILOSOLVE® MC was applied via applicator installed

above pick up on the wagon. The farmer realized quickly that the harvest will be much higher than 200 t. He decided to apply another inoculant from the local supplier (a combination product containing *L. buchneri*, *L. kefir*, *L. plantarum*, *Pediococcus pentosaceus*) for the rest of the crop. Grab samples were taken from each loading wagon during the filling of the pile.

At the end, collected samples of grass inoculated with **SILOSOLVE® MC** and local product were pooled separately and ensiled using vacuum sealer.

The silage management

The crop contained visible amounts of soil. Also the access paths were not optimal for a clean delivery of the crop to the pile. Finally, the start of the pile contained high levels of soil (see pictures).

The complaint

The pile was opened for feeding at the beginning of





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January 2020. The farmer prepared pooled sample from the face of the bunker. The analysis showed high content of the butyric acid. The farmer was "unsatisfied" with the effect of the inoculants.

As a sanity check, samples prepared during the harvest and kept in vacuum bags at room temperature for an extra analysis were "activated". These samples were representing grass inoculated with **SILOSOLVE® MC** and grass inoculated with a local product separately. Additionally, the analysis for Clostridia spp. was requested. The results of sample analysis from "farmer", **SILOSOLVE® MC** and local inoculant (XX Inoculant) are presented in the Table 1.

Discussion

The analysis showed that the sample collected and sent by the farmer contained a very high level of ash (> 10% of DM), indicating high level of contamination by soil. A combination of low dry matter and high contamination by soil creates optimal conditions for Clostridial fermentation. Clostridia were not analysed in this sample, but high concentration of butyric acid (> 0.3% of DM) indicates the clostridial fermentation in the front part of the silage pile, where the sample was taken.

The **SILOSOLVE® MC** sample, that was prepared from the subsamples taken directly from the loading wagons, did not contain additional contamination by soil from

the road to the pile. Nevertheless, the ash content was quite high as well. The dry matter content was low. But the content of butyric acid was on very low level (< 0.3% of DM) and contamination level by Clostridia spp. was below the maximal critical level recommended by the laboratory performing the analysis. The silage had a maximal fermentation quality level according to DLG.

The local product sample was prepared from the subsamples taken directly from the loading wagons in the afternoon. The dry matter content was optimal for a good fermentation, but the ash content was relatively high (> 10% of DM). The butyric acid content was on the low level (< 0.3% of DM). This sample also had a maximal fermentation quality level according to DLG, but the contamination by Clostridia spp. exceeded the critical level recommended by the laboratory. A risk for animal health was highlighted in the analysis certificate.

Follow up

The results of the analysis were discussed with the farmer. It was recommended to take stronger attention to grass cut, tedding, pick up and quality of delivery roads to the bunker to avoid contamination of the crop by soil.

Finally, the farmer agreed that **SILOSOLVE® MC** did a great job even under challenging conditions.

Take home message

"Take a sample..." It is very useful to accompany the new very important customers during the ensiling. It allows to record all possible challenges that can negatively affect the results later – and expected in many situations a convincing and important piece of the puzzle to explain, what the product does – vs. the impact of management.

One sample from the face of the bunker or from the pile is only a snapshot and may not show the correct full situation. "Take a sample..." again or use your back up samples. Use the **SILOSOLVE® FC Seing-is-Believing™** protocol to prepare reference treated and untreated samples by applying **SILOSOLVE®** manually at the beginning of any large scale field trials.

SILOSOLVE® MC allows the control of Clostridia spp. under challenging conditions in crops with low dry matter content and partially contaminated by soil. But no silage inoculant can compensate for management errors during the silage preparation.

Table 1. Results of analysis from different samples

Value on dry matter (DM) basis	Farmer	SILOSOLVE® MC	XX Inoculant
DM, %	27.7	25.5	33.8
Ash, %	18.3	15.7	14.1
Crude protein, %	20.0	19.1	18.7
Ammonia-N, % total N	not analysed	6.4	7.0
Water soluble carbohydrates, %	< detection level	< detection level	0.5
pH	4.2	3.9	4.1
Lactic acid, %	7.02	12.22	9.88
Acetic acid, %	1.74	1.05	0.93
Butyric acid, %	0.94	0.1	0.16
DLG fermentation quality* points	62	100	100
spp**	not analysed	350	887
CFU/g			

* DLG quality points: 90-100 very good, < 51 bad, not allowed to feed.

** Safe level recommended by the laboratory < 500 CFU/g

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Role of Calcium Propionate in Dairy Animals

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With the modernization, the dairy sector is focussed on the increased production through enhanced or improved feeding managemental practices. At the same time, due to more production stress on the animals, the requirements of the various nutrients also change. After parturition, dairy animals face major two metabolic disorders namely Milk fever and Ketosis, out of which, first one is caused due to lack of calcium or Hypocalcaemia or excess loss of the calcium through milk or colostrum while the latter one has the root cause of Negative Energy Balance (NEB). With respect to the calf development, the daily weight gain is an important factor to get the proper weight at the first heat. Since, the rumen is not fully developed at the initial stages, absorption of the nutrients hamper. In livestock feed industry, the problem and hazardous effects of mycotoxin and fungus development cannot be neglected. India is a developing country with majority of the population involved in agriculture and livestock sector. Due to more emission of the methane gas from the livestock, we contribute to the global warming. All these issues can be resolved with the help of one stop solution i.e. calcium propionate. It can be used as a feed preservative, growth promoter and a source of calcium and energy at the same time. Propionic acid, which is hydrolyzed from calcium propionate and formed under acidic conditions in the rumen, is absorbed by the rumen

epithelium, passes to the liver through the portal vein, and synthesizes glucose. Propionate is an obligatory anaplerotic metabolite for the tricarboxylic acid (TCA) cycle. It enters the TCA cycle through succinate, thus providing carbons that can either remain within the TCA cycle or be extracted from the cycle for gluconeogenesis.

1. As a gluconeogenic precursor :

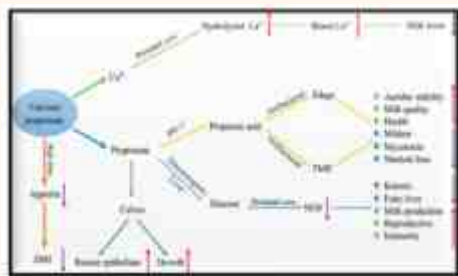
After parturition, with a high milk yield, the nutrient intake of dairy cows increases to meet the output of milk, resulting in a negative nutrient balance that requires the mobilization of body reserves i.e. body fat. The metabolic diseases fatty liver and ketosis are due to the extent of glucose deficit that induces the excessive mobilization of body fat. In addition, during the perinatal period, the DMI of dairy cows is hampered as the rumen volume is occupied by the growing foetus and other hormonal changes. Due to this, dairy cows enter the state of NEB in early lactation. Cows showing excessive NEB utilize their body fat as a source of energy to maintain the rapidly increasing milk yield, which leads to excessive body fat mobilization, ketosis and fatty liver syndrome. The animals which are more healthy are more prone to these conditions since their body fat reserves get reduced drastically, which ultimately affects their Body Condition Score (BCS). The failure of cows to meet their glucose demands for lactation leads to an impaired immune

response and an increased risk of disease that may affect milk production and profitability. For cow rearing, the dietary energy can be improved through fat or concentrate supplementation to alleviate NEB, but excess fat supplementation inhibits rumen microbial growth, decreases the rumen pH value, and increases the rate of subclinical ruminal acidosis. Calcium propionate gets dissociated into calcium ion and propionate once ingested.

Propionate can directly regulate its own metabolism in isolated bovine hepatocytes through upregulation of the mRNA expression of cytosolic Phosphoenolpyruvate carboxykinase (PCK1), mitochondrial Phosphoenolpyruvate carboxykinase (PCK2), and Pyruvate carboxylase (PC), which are the key enzymes required for the stimulation of gluconeogenesis from propionate in ruminants. Propionate is the major glucose precursor in ruminants that has a positive energy balance and anti-ketogenic effects. It is used as a readily available energy source to correct metabolic problems in dairy cattle. Propionate, whose liver uptake is preferential and highly efficient, can inhibit hepatic lipid oxidation and the production of ketones. During the perinatal period, calcium propionate is a good available energy source for preventing metabolic disorders in dairy cows, so it can be incorporated into the diet and increase the rumen concentration of propionate, which is



the main precursor for glucose synthesis in the liver.



2. As a preventive measure for milk fever:

Milk fever is a metabolic disorder of adult females occurring most commonly about the time of parturition and characterized by hypocalcaemia, severe muscular weakness, sternal and lateral recumbency, circulatory collapse and depression of consciousness. The excessive loss of Ca through the colostrum (2.3 g / kg) and milk (1.2 g / kg) beyond the capacity of body to mobilize Ca from bone contributes to this situation.

Calcium absorption by the rumen appears to be a key factor in calcium homeostasis at the onset of lactation, and its failure causes uncontrolled hypocalcaemia, leading to parturient paresis. Calcium sources that are soluble at a slightly acidic pH may result in more absorption from the rumen, intestine, or both, than insoluble calcium sources. To increase the calcium absorption, an effective method is to increase the concentration of ionized calcium within the rumen by the given supplement. Providing a highly soluble source of oral calcium induces high concentrations of ionized calcium in the lumen of the gastrointestinal tract. The high concentrations of ionized calcium in the rumen lumen induce a chemical gradient that passively transports ionized calcium from the mucosa through the tight junctions towards the extracellular space on the

serosa side, increasing the concentrations of ionized calcium in the blood.

3. Rumen development:

Rumen development of calves directly affects the growth and development of the calf late production performance as well as health status, so researches about rumen development of calves have always been an important part of ruminant nutrition. Rumen epithelium development plays a very important role in the absorption, metabolism, and transportation of volatile fatty acids (VFAs). VFAs, such as propionic and butyric, provide the main chemical stimuli for the proliferation of the rumen epithelium if the amount is sufficient, indicating that additives of propionate may be used in calf feed as rumen growth promoters. As one kind of propionate, the additive of calcium propionate may also stimulate the epithelium development of calves. G protein-coupled receptors (GPRs) are integral membrane proteins which are activated by an external signal in the form of a ligand or other signal mediator. Propionate can be converted into glucose in the liver, and higher glucose concentrations mean that high energy can be used to increase the body weight of calves.

Monensin is an ion carrier that can change the number of rumen microorganisms, reduce the amount of methane production, increase propionate in the rumen, decrease the intake of dry matter, and improve the efficiency of milk production and weight gain of dairy cows. However, as an antibiotic, the use of monensin in animal feed as a growth promoter may enhance the risk of antibiotic-resistant strains, so it is important to seek alternatives to this compound. calcium propionate as an additive in starter feeds of calves resulted in an equal animal performance before and after weaning in comparison to that of

sodium monensin, which suggests that sodium monensin may be replaced by calcium propionate. Therefore, calcium propionate can be used as a good additive to promote the rumen development and growth of dairy calves.



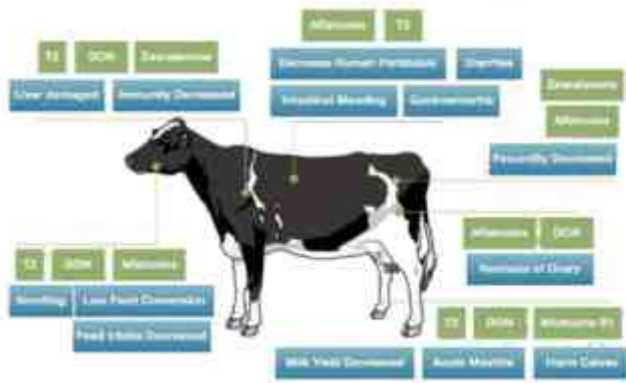
4. In TMR to increase the aerobic stability:

Warm and humid conditions are favourable for mold growth and can result in increased mycotoxin production. The spoilage of TMR in summer is an important factor affecting the production efficiency. To reduce the influence of TMR mold growth and its metabolites on the production performance, health, and milk quality of cows, appropriate methods, including chemical additives, water content control, increasing the number of fresh feed deliveries per day, and the timely cleaning of leftovers, must be taken into consideration. As mentioned above, calcium propionate is a safe and effective inhibitor of mold, and can improve the aerobic stability of feed. Mold growth can be prevented in coarse texture feeds and other high moisture feeds by the addition of calcium propionate. The addition of calcium propionate to TMR inhibits feed spoilage.

5. In silage to prevent growth of the fungus:

Silage is a type of fodder made from

The Harm of Mycotoxin to Dairy Cows



green foliage crops which have been preserved by fermentation to the point of acidification. It can be fed to cattle, sheep and other such ruminants. The fermentation and storage process is called ensilage, ensiling or silaging. The process of silage making takes place under anaerobic conditions. Most often, silage gets contaminated or infested by the fungus by direct or indirect means. Molds identified in fermented feeds include *Aspergillus* sp., *Cladosporium* sp., *Fusarium* sp., *Mucor* sp., and *Penicillium* sp., and their adverse effects may occur through either their deleterious effects on the nutrient quality or their production of mycotoxins.

Several mycotoxins have been detected in corn silage, including aflatoxin B1, citrinin, deoxynivalenol, gliotoxin, and zearalenone. Propionic acid has excellent antifungal activity and has little impact on the activity of lactic acid bacteria. Calcium propionate is an effective tool for suppressing the germination, growth rate, and aflatoxin production of *Aspergillus flavus* in different substrates. Therefore, calcium propionate has the potential, as an additive in silage, to inhibit the growth of molds and decrease the mycotoxin contents in silage. Fresh alfalfa silage is prone to clostridia spoilage because of its low dry matter, low sugar contents, and high buffering capacity. Calcium

propionate decreases the butyric acid content and dry matter loss and increased the water-soluble carbohydrate content. Calcium propionate is a good additive for silage, which can act as a significant inhibitor for the growth of molds and clostridia.

which are potent mycotoxins mainly produced by *Aspergillus flavus* and *Aspergillus parasiticus*, have carcinogenic, mutagenic, teratogenic, and growth inhibiting effects on animals and humans. Calcium propionate is a well-established mold inhibitor that can be used in the feed industry to inhibit mold growth and reduce the incidence of aflatoxicosis in animals. Moreover, because of less feed spoilage, the heat production in feed is also reduced, preventing energy loss and poor palatability of the feed, which the cattle may refuse to eat.

6. Antibacterial properties :

The antimicrobial properties of calcium propionate are dependent upon the corresponding undissociated acids in solution and involve the uncoupling of microbial substrate transport and oxidative phosphorylation from the electron transport system. When exhibiting the same bacteriostatic effect, the effective dose of calcium propionate has been shown to be lower than that of sodium propionate. Propionic acid can interfere with the electrochemical gradients in the cell membrane, disrupt transport processes, and inhibit the uptake of substrate molecules, such as phosphate and amino acids. The antimicrobial activity of calcium propionate is due to the neutral undissociated propionic acid form, which is lipophilic and readily soluble in fungal cell membranes.

7. Livestock feed :

In the feed industry, a warm and humid climate and a long postharvest period favours mold growth and the production of mycotoxins. Molds can cause economic losses and health problems due to the production of mycotoxins. Aflatoxins,

8. Methane mitigation :

Livestock are reared throughout the world, and are an important agricultural product in virtually every country. CH₄ is emitted as a by-product of the normal livestock digestive process, in which microbes resident in the animal's digestive system ferment the feed consumed by the animal. This fermentation process, also known as enteric fermentation, produces CH₄ as a by-product. The CH₄ is then eructated or exhaled by the animal. Within livestock, ruminant livestock (cattle, buffalo, sheep, and goats) are the primary source of emissions. With the help of calcium propionate, we can enhance the propionate production in the rumen which in turn reduces the methane production.



Sexed Semen: Challenges and Opportunities for Indian Dairy Industry

Pramod Chaudhary¹, Nripendra Pratap Singh² and Ninad Bhatt²

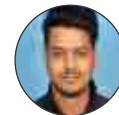
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Introduction

In India, the demand for female calf is gaining much attention day by day especially in the dairy sectors. Drop in crop yield by disaster and also decreasing land productivity one hand and constant increase in the requirement and consumption of good quality of dairy product on the other hand due to raise in purchasing power of the average population, urbanization and increased population. There is an immediate need to expand the genetic merit of dairy animals. In 20th livestock census India's population reached 536.76 million (showed an increase of 4.6% over the 19th Livestock Census). In order to accommodate food demand associated with this population growth it will be needed to produce pre-sexed livestock by sperm or embryo sexing; which offer an encouraging breeding strategy to meet the expanded demand for food production and nutritional security. Application of sexed bovine sperm by using Artificial Insemination is effective in modifying the sex ratio and promptly expanding dairy herds transmit high genetic value animals. It also increases the rate of genetic progress, especially in combination with genomic selection of sires and smooth culling decisions. It also has the potential to help in herd management and cut down the incidence of dystocia by avoiding male calves.

Sexing of semen is based on the principle of difference in DNA content between X and Y spermatozoa. X spermatozoa hold more DNA. With the help of sexed semen technology sorting of X and Y bearing chromosome to produce progeny of a desired sex with 80 to 90% accuracy. But, this technology holds up by many factors like high costs, complexity of operation and lower conception rates than with traditional semen. Despite the drawback, sexed semen will contribute to increased profitability of dairy cattle production.

What is sexed semen?

Semen contains an X or Y bearing sperms to produce a progeny of a desired sex either female or male with having 80 to 90% accuracy. It's coming into existence in 1981 when it was proven that the precise DNA content could be quantified. This technology was developed by the United States Department of Agriculture (USDA) researchers in Livermore, California and Beltsville, Maryland and patented as "Beltsville sperm sexing technology. The introduction of sexed semen was done by US commercial organizations in 2005 (DeJarnette et al., 2009). Sexed semen is produced in India for the first time under the brand name "Sexcel" in 2017 by ABS India using their proprietary IntelliGen technology. First male calf named Shreyas was born in India on 1st January, 2011 by using sexed semen. Sexed semen is being used in about 9 % of all reported breeding in the year 2017 on the globe and is showing a double-digit growth in usage year on year (Sharma et al., 2019).

What are the methods of sperm sexing?

Different methods are used for sperm sexing like Percoll density gradient, Albumin gradient, Free-flow electrophoresis, Identification of HY antigen and Flow cytometry for sperm sexing. The sex sorting process by flow cytometry is the most efficient method to separate X from Y spermatozoa in a large scale (Fig 1 & 2) (Rath et al., 2013). In this technique separation of female sperm cells from male sperm cells is done without any change in the sperm morphology (Table 1).

Parameter	Difference
DNA content	Less in Y sperms
Size	X sperm is larger
Motility	Y sperm is faster
Surface charge	X sperm is negative
Cell surface antigen	H-Y antigen on Y sperm
Sperm surface	Specific protein
F- body	Long arm on Y- chromosome

Table 1. Differences in X and Y Spermatozoa (Johnson,1995)

Sperm sexing measures variation in DNA%. X bearing chromosome contains about 4 % more DNA than Y bearing chromosome (Johnson, 2000).

How to measure DNA?

The DNA content of the sperm is measure by fluorescent dye Hoechst -33342 (a DNA binding fluorochrome [2-(4-ethoxyphenyl)-5-(4-methyl-1-piperazinyl)-2, 5-bis-1H-benzimidazole-trihydrochloride]). This dye penetrates the sperm membrane and then bind, the site where A-T region of nucleic acids are present. X-sperm binds more dye to their DNA than Y-sperm. When the low wavelength laser beam are exposed to these sperm cell then X-sperm cell gives off more fluorescence because it contain more 3-4% more DNA content as compared to Y-sperm. The charge is applied to the droplet having desired cells and these are subsequently deflected into the required population of the sexed cells resulting in high purity and viability.

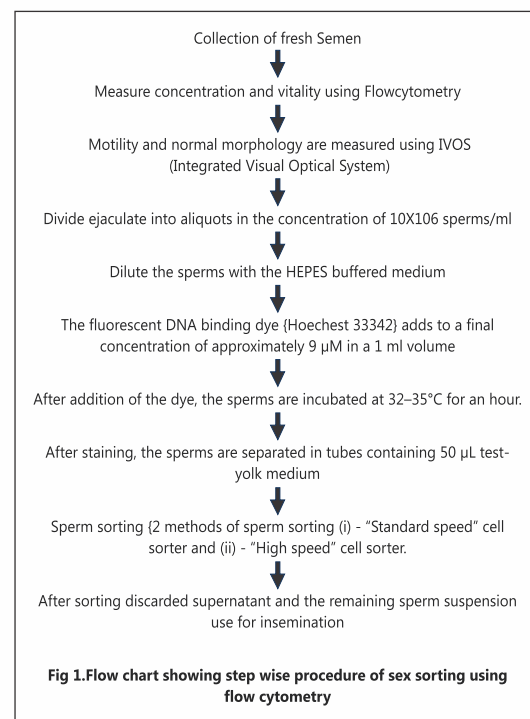


Fig 1. Flow chart showing step wise procedure of sex sorting using flow cytometry

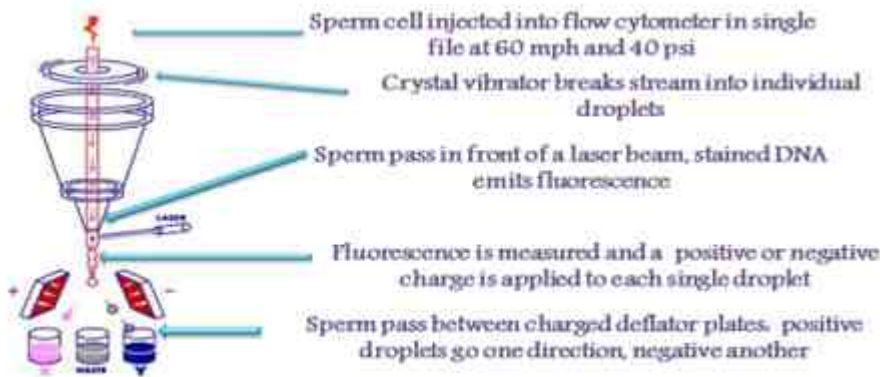


Fig 2. Schematic Diagram of Sex Sorting using Flow Cytometry. (Source: Dairy Knowledge portal, NDDDB)

Importance of sperm sexing

1. Unwanted male calves can be minimized which help the farmers to save resources wastage on management of male animals.
2. Helpful in genetic improvement in case of selection of best female for different traits.
3. Sexed semen can be used for herd replacements and new heifers for herd expansion at a faster rate from within the herd, thereby, reduce Biosecurity risks associated with purchasing a new animal from outside the herd.
4. For progeny testing program, it ensures required number of daughters under short time, thus it increase genetic gain.
5. During the sorting process, dead sperms are removed, which shows the existence of only viable sperms.
6. Reduce the chance of dystocia cases by avoiding production of male calves by use of sexed semen
7. Also helpful in the production of superior breeding bulls as India has limited elite cattle and buffalo bulls.

AI strategies with sex sorted sperm

Even though the significant advances in sex-sorting sperm using flow cytometry in cattle, lower pregnancy per AI (P/AI) and reduced In vivo embryo production is obtained when compared to the rates obtained with non sex-sorted sperm (Seidel, 2014). The P/AI of females inseminated with sex-sorted sperm may be altered by their shortened lifespan in the uterus, decrease in number of sorted sperm per straw and bull fertility (Sales et al.,

2011). The diminished lifespan of the sex-sorted sperm in the female reproductive tract, as a result of mitochondria modification and DNA fragmentation, could change the optimum interval to perform AI relative to ovulation (Rath et al., 2013). Thus, similarly to what is observed when conventional semen is used, P/AI of females inseminated with sex-sorted semen is dependent on the fertility of the bulls, animal categories (lactating cows or cyclic heifers), and management across different farms. Consequently, the major commercial recommendation for the use of sex sorted sperm still has been in heifers after detection of estrus, especially due to their higher fertility (Burnell, 2019).

Under Indian condition it is required to standardize the lower dosage of spermatozoa, site of deposition for AI with good conception rates in our conventional system. There is also an extensive demand to develop instruments to transfer sex sorted spermatozoa non-surgically and develop skill in the above area to carry out good results. The main target should be focused to use of sex sorted spermatozoa in good quality heifers and the healthy cycling females in good body condition with excellent reproductive and productive performance to achieve good results and diligence with thawing and handling.

Demerits of sexed semen technology

1. High cost of maintenance of sexed sorting machine like flow cyotmetry and lower sorting speed and efficiency
2. Higher cost of sexed semen then conventional semen
3. Delayed sexual maturity in heifers under Indian condition
4. The conception rate with sex sorted semen is 10–15% less than conventional semen, which is more

detrimental condition in our country where total coverage of AI is less than 25% of breedable population (Abdalla et al., 2014).

5. Sexed semen contains only 2–4 million sperms/dose as compared to conventional semen which contains 20 million sperms/dose which will be challenge under Indian field condition
6. Sperm from some bulls had higher tolerances for sorting, freezing and thawing than from other bulls also every bull's semen cannot be sexed due to inherent abnormalities in the sperm cells.
7. Lack of skilled manpower.
8. Lack of awareness about sex semen to farmers. The major problem is that it needs highly specialized, non-portable equipment which is quite costly for routine use.

Conclusions

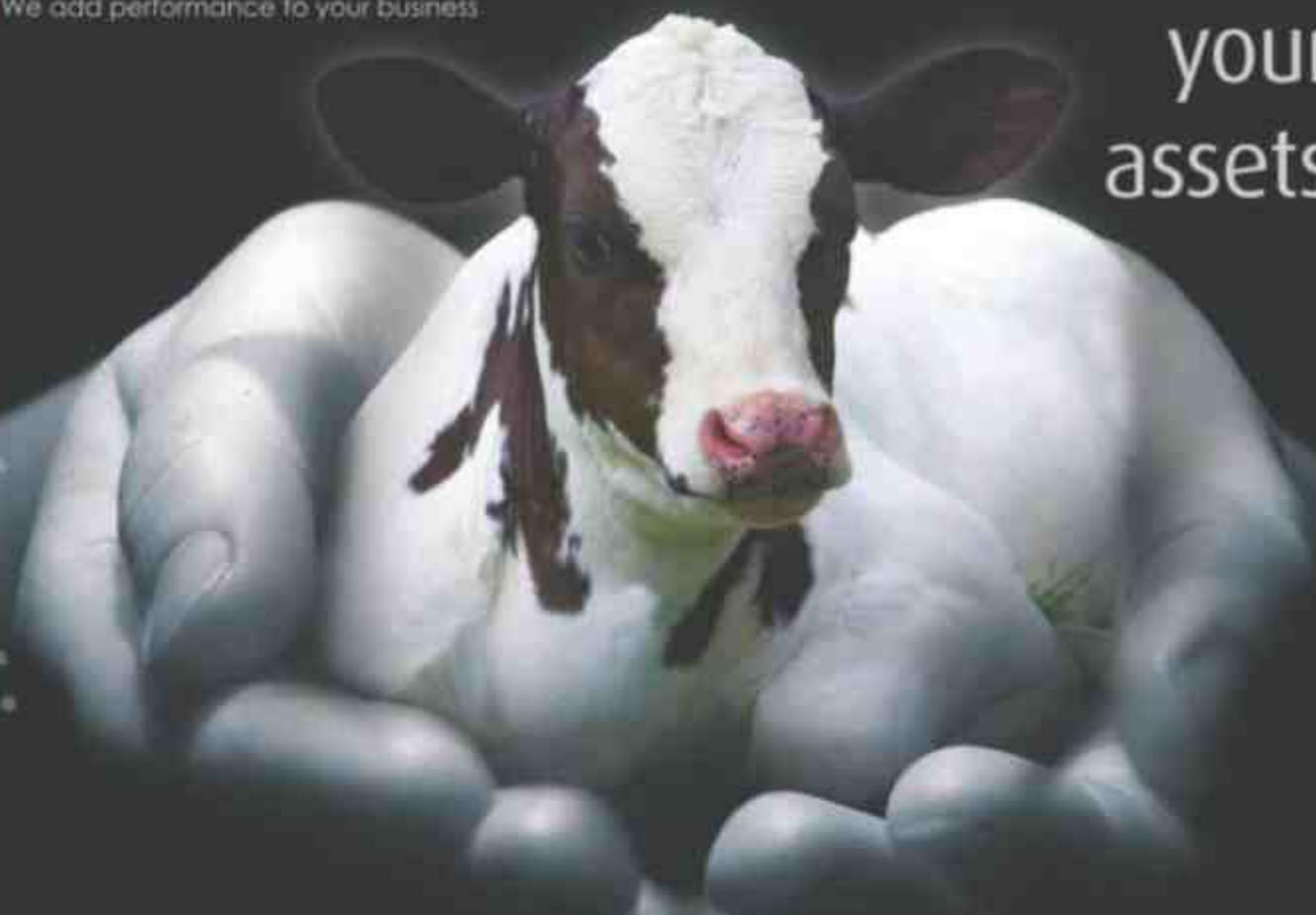
Indian Dairy farmers have started using the sexed semen technology to deal with upcoming challenges in the future Dairy Industry. However, reduction in sperm concentration in sexed semen straw to 2 million viable motile sperm leads to pregnancy depression by 15–20% as compared to conventional system, but fetal female sex ratio is close to 90% with sexed sperm. Optimum fertility from low dose sexed sperm may only be achieved with bulls of high fertility and good managerial practices. Indian farmer needs to be educated and supported financially to adopt sexed semen nationwide. Dairymen could produce more female calves and by this lessen the chance of dystocia at calving, reduce biosecurity risks and genetic improvement at a faster rate. Sexed sperm will cost more and will require greater cattle management and AI breeding skills. More research is needed for sperm sorting efficiency and on large-scale field trials to improve pregnancy rates of low dose, sexed sperm. The Indian government announced, dairy farmers will be provided with sexed semen for Rs 100 per vial by 2020 so that buffaloes and cows produce female calves only.

Conflict of interest

The authors declare that they have no conflict of interest.

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Herd economics
Reproductive performance

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

Manipulation of Rumen Fermentation: Methods And Benefits



Dr. Nishtha Kushwah

**Dr. Nishtha Kushwah, Dr. Sadhana Tiwari,
Dr. Shwetambri Jamwal, Dr. Akanksha Gupta**

ICAR- National Dairy Research Institute, Karnal, Haryana, India

Introduction

Ruminal microbes play a great role in the digestion of ligno-cellulosic feed. Anaerobic fermentation in the rumen converts components of the feed into useful (VFA and microbial protein) and unwanted (methane and carbon dioxide) end products. In tropics, low-quality roughages, crop-residues etc. containing high level of ligno-celluloses, poor in fermentable carbohydrate and good quality protein are given for ruminants. Strategies aiming to optimize rumen manipulation is key to improve feedstuffs utilization and then to optimize ruminant production. Manipulating ruminal fermentation involves maximizing the efficiency of feed utilization and increasing ruminant productivity (milk, meat, and wool production). It is intended to enhance beneficial processes, and delete, minimize, alter, processes that are harmful to the host.

Major benefits of rumen manipulation

- Enhance fibrolytic activity– Helps in manipulation of lignocellulosic bonds
- Increase microbial protein synthesis

- Reduction in proteolysis- Reduction in degradation of protein and decrease in deamination of amino acids
- Reduction in methanogenesis- The provision of an alternate hydrogen sink
- Prevention of acidosis
- Shifting acetate to propionate production
- Novel microbes
- Metabolism of plant toxins
- Synthesis of useful secondary metabolites

Methods of rumen manipulation

A. Genetic manipulation

B. Non-genetic manipulation (Dietary manipulations)

A. Genetic manipulation

In genetic manipulation, attempts were made to develop genetically engineered rumen microbes by gene transfer/manipulation technique to enhance the animal productivity. The potential of application of molecular techniques in achieving the goals of rumen manipulation are enormous.

Objectives of genetic manipulation

- To modify the distribution of fermentation products produced within the rumen to improve fermentation
- To produce metabolites (e.g., hormones) than can improve the metabolic efficiency of the animal
- To introduce improved or novel pathways for degradation of feedstuffs
- To suppress the growth and metabolic activities of undesirable organisms

Approaches of genetic manipulation

- Introduce new species or strains of micro-organisms into the gut
- Genetic modification of micro-organisms already present in the rumen
- Common shuttle vector used- Escherichia coli
- Genes which have been cloned in Escherichia coli are endoglucanase, xylanase, β -glucosidase, amylase, glutamine synthetase
- Donor source of Bacteroides fibrisolvens, Ruminococcus flavefaciens, Fibrobacter succinogenes, Neocallimastix frontalis, Streptococcus bovis

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etc.

B. Non-genetic rumen manipulation

1. Feed additives

2. Defaunation

3. Plant extracts

1. Feed additives

Feed additives are compounds added to the diet in order to improve dietary nutrient utilization, enhance performance, minimize the risk of metabolic diseases, and curtail adverse impacts of diets on the environment

Feed additives classified into:

I. MICROBIAL FEED ADDITIVES (PROBIOTICS)

II. NON-MICROBIAL FEED ADDITIVES

Characteristics of feed additives

- Modulate ruminal pH and reduce lactate accumulation
- Reduce the risk of development of diarrhea in neonates and ruminal acidosis or bloat in older livestock
- Improve the efficiency of ruminal energy utilization
- Enhance rumen development in neonatal ruminants
- Increase ruminal organic matter & fiber digestibility
- Increase the level and efficiency of animal performance
- Improve the efficiency of ruminal nitrogen utilization
- Be cost effective and

approved by legislative authorities

A. Probiotics

A live microbial feed supplement, which beneficially affects the host animals by improving its intestinal microbial balance. These are Direct fed microbes (DFM)

FDA defines DFM as a source of live naturally occurring microorganisms and this includes bacteria and fungi/yeast

B. Ionophores

Ionophores are organic compounds mainly from *Streptomyces* spp. that facilitate selective transportation of ions across the outer cell membrane.

E.g. Monensin (widely used ionophore as 'Rumensin'), Lasalocid, Tetronasin, Nigericin, Salinomycin, Lysocecellin, Narasin, Laidlomycin and Valynomycin

Ionophores are approved in several countries including Australia, Argentina, New Zealand, and South Africa and USA

Effect of ionophores on rumen end products

Ionophores favor propionate production. The associated decrease in production of methane that conserves energy in the ruminants. Ionophores inhibit gram-positive bacteria. They cause decrease in hydrogen and formate, a precursor of methane.

Organic acids

Commonly used organic acids are Fumarate, Malate and Aspartate. They stimulate propionate production in the rumen by acting as an H₂ sink, thereby reducing the amount of CH₄.

Essential oils

Essential oils are plant secondary metabolites, volatile components and aromatic lipophilic compounds with very strong antimicrobial properties, which inhibit the growth and survival of most microorganisms in rumen. They help to modulate cellular targets particularly by interacting with processes associated with the cell membrane such as ion gradients, protein translocation, phosphorylation, ATP production. Like monensin, selectively inhibit gram-positive bacteria as like monensin.

C. Exogenous fibrolytic enzymes

Commercial mixtures of cellulase and hemicellulase enzymes with varying endoglucanase, exoglucanase, xylanase, protease, β -glucosidase activities have shown promise at hydrolyzing plant cell walls. Enzymes can improve fibre digestibility and animal productivity. Further, lower the acetate: propionate ratio in the rumen and ultimately reducing CH₄ production.

D. Fat supplementation

Fat supplementation increases



the dietary energy content. Among fatty acids, the medium-chain C8:C14 from coconut or palm oil is the most effective in CH₄ mitigation. Furthermore, fats are not metabolized in the rumen and therefore do not contribute to methanogenesis.

2. Defaunation

The process of making the rumen of animals free of rumen protozoa is called defaunation and the animal is called defaunated animal. Rumen protozoa elimination by defaunation reduces the ruminal methane production and increases protein outflow in the intestine, resulting in improved growth and feed conversion efficiency of the animals. Defaunation increases the number of amylolytic bacteria.

Methods of defaunation

- I Isolation of newborn animals:
- Separation of newborn animals from their dams after birth and preventing them from any contact with the adult ruminant animals.
 - The newborn animals should be separated 2 to 3 days after birth.
- II. Chemical treatment
- Copper sulphate
 - Manoxol
 - Sodium lauryl sulphate
- III. Dietary manipulation
- Offering high-energy feed

(especially cereal grains like barley, maize) to the starved (for 24 hours) animals creates acidic condition in the rumen and rumen pH fall below 5.0. Ciliate protozoa are very much sensitive to rumen pH below 5.0. This fall in rumen pH eliminates the ciliate protozoa and the animal become defaunated.

3. Plant extracts

The antimicrobial activity of plant extracts - Secondary plant metabolites (saponins, tannins, Anthraquinone and Sinigrin) is prominent. Plants exhibiting anti-methanogenic activity include Equisetum arvense, Lotus corniculatus, Rheum palmatum, Salvia officinalis, Sapindus saponaria, Uncaria gambir and Yucca schidigera. Major commercial source of saponins- Yucca schidiger

Condensed tannins

Development of forages with higher levels of tannins, such as clover and other legumes, including trefoil, vetch, Sulla and chicory promotes CH₄ mitigation (upto 55%). Condensed tannins can bind protein by hydrogen bonding at near neutral pH (pH 6.0 to 7.0) in the rumen to form CT-protein complexes, and then dissociate and release bound protein at pH less than 3.5 as they enter the abomasum and small intestine. VFA production increases and there is shift from acetate to propionate production.

Feeds supplemented with tannins or tannin rich forages, which bind proteases and thus prevent proteolysis. Methanol extract of Harad (Terminalia chebula) containing tannin decreased methane production in vitro by 95% when given at the level of 0.25ml/30ml. But the Limitations Is it Impede forage digestibility and animal productivity when fed at a higher concentration.

Saponins

Saponins are naturally occurring surface-active glycosides that are found in a wide variety of cultivated and wild plant species. They are antiprotozoal at lower concentrations. At higher concentrations can suppress Methanogens.

Conclusions

- Rumen should be manipulated essentially by altering the composition of rumen microflora, feeding local plants or tree leaves to defaunate the animals for improving its productivity.
- Genetic manipulation of rumen microorganism for efficient ruminal fermentative digestion has an enormous biotechnological potential.
- However in India, more emphasis should be given for manipulating the rumen to increase cellulolytic activity for efficient utilization of low grade

Brainwired: Re-Imagine Agritech



company in 2018. Their background in agriculture prompted them to see the value of technological advancements in agriculture and livestock breeding today, and thus the idea for this business venture was born. A dairy farm owned by the duo's grandparents was originally the source of inspiration for starting this venture.

WeStock's mission was to enhance livestock productivity and engage in technology-driven livestock farming. They strived to promote livestock health by continuously monitoring their animals and alerting farmers if any abnormalities occurred. Brainwired has invested in high-end technology wherein WeStock uses IoT ear tag and a unique ML algorithm to identify sick and pregnant livestock and alert farmers in an emergency. It tracked day-to-day movements of the livestock inclusively walking pattern, Grazing

Brainwired, the agritech startup under the flagship of Drakon Innovation Private Limited, was first started in Kochi. This Artificial Intelligence agritech has cracked the code and has developed the first livestock health monitoring system. Shreeshankar Nair and Romeo Jerard, the two co-founders of Brainwired, came forward to develop further a livestock health monitoring and tracking system called WeStock.

Shreeshankar Nair, the CEO, and Co-founder of Brainwired, along with Romeo Jerard, the Co-founder, and COO of Brainwired, have successfully navigated the

market by meeting the needs of both full-time and part-time farmers with a comprehensive one-stop solution for managing livestock health.

The duo's startup has also been recognized and rewarded by Maharashtra state Government society. Recently, they appeared on Shark Tank India and backed a handsome investment of 60 Lacks at a 10% stake from market sharks, including Peyush Bansal, Aman Gupta, Namitha Thapar, and Ashneer Grover.

Co-founders recognized the importance of maintaining and managing livestock's health and thus were motivated to form the



pattern, Body temperature, eating routine, and Drooping of the head. The most intriguing feature is that it can be adapted to multiple livestock species.

The "Made in India tag" backed by successful investors like Huddle, India Accelerator, Agility Venture Partner, Mumbai Angels Network, and many others have created a doorway for WeStock to outreach its technology to millions of farmers. Along with affordability, the build-in customizable technology has led to the promotion and development of technology amongst livestock in the whole country.

The team also consists of Praveen Ramachandran, CTO, Sajil V S, the CPO, the

most significant backbone, and the Co-founders. Their main aim is to spread happiness through technology amongst the farmer's community. This technology can provide a sustainable solution that can outstretch globally to enhance and maintain health in livestock.

Starting back in 2018, year by year, Brainwired has been gaining a competitive edge due to its USP. More and more people are investing in this innovative

and unique business, and the customer base has also widely expanded even when the country was facing the threats of pandemics. The startup is currently employing about 12 to 15 employees, and they seek at broadening and diversifying their business globally.

Brainwired has currently raised a total of _____ funds through their technology-oriented health model through pre-seeding funding and is aiming to take over the agritech market by storm through its innovative IoT based ear tags. The upward trend has resulted in selling more than 2500 IoT ear tags across more than 4 cities and now aims to ensure spreading its innovation



Prevention & care of the udder cleft in dairy cows with Intra Repiderma

Intra Repiderma – the green standard



Gerwen Lammers,
PhD



Jessie Hesseling,
DVM Master student

Release date: October 12 2020

Intracare B.V., Veghel, The Netherlands

Udder cleft issues like udder cleft dermatitis or foul udder are often located between the front teats and at the transition of the front quarters and the abdominal wall. Although this condition is well known in the dairy industry, not much research has been performed. Udder cleft skin problems are mostly diagnosed during milking or hoof trimming and is more frequently seen in older cows regardless of stage of lactation.



The consequences of udder skin issues are impaired animal welfare, reduced milk production and affected milk quality. Also, it can lead to premature culling. It is seen on 80% of the Dutch dairy farms, of which herd prevalence from 22% up to 51% have been reported. The number of udder skin issues on a farm is often underestimated. A high milk yield, digital dermatitis (DD), mange, mastitis and the conformation of the udder are suggested as risk factors.

Current prevention options are limited

Scientific research into treatment options for udder cleft problems in dairy cows is limited. Nevertheless, several scientific studies on the treatment of the bovine hoof and skin disorder DD have been published. Treatment with Intra Hoof-fit Gel, Intra Repiderma and Spray from Intracare has been proven successful several times, reporting a success rate of acute DD-lesions of 92.0, 86.8 and 79.0% (Holzhauer, 2011; Dotinga, 2017; Jacobs, 2018, respectively). As these products showed effectiveness on hoof and skin issues, they were considered to also have potential for the treatment of udder cleft skin issues, also taking into consideration that a spray is easy to use, even upside down.

Farm and study characteristics

The study was carried out on a Dutch dairy farm with approximately 250 pure Holstein Frisian cows located in the south of The Netherlands. The study was performed from April to June 2020 and lasted 12 weeks. The cows were housed indoors in cubicles the whole year round. First- and second parity cows were housed separately from the older cows. The cubicles were covered with mattresses, lime powder and sawdust and cleaned out twice a day. Cows were milked twice a day in a conventional milking parlor. The average production level was 11,000 kg of milk/cow-year and the bulk milk somatic cell count varied between 95,000 and 162,000 cells/mL in the last 12 months.

Classification

The study was focused on score 0: a healthy udder and score 1: a mild UCD-lesion with erythema, transudate, crust or scabs and intact skin. All lactating cows were



examined weekly for the presence and severity of these issues. The examination was performed in the milking parlor during milking, using a telescopic inspection mirror with lighting (Figure 1A). All data was collected by the same researcher (Jessie Hesseling, veterinarian in training at University of Utrecht) during the entire study period of 12 weeks, avoiding any inter-observer variation. The udder area was first carefully cleaned and dried with a towel, then covered with Intra Repiderma (Figure 1B). Cows with score 1 were treated every other day (Figure 1C). New cases found during the study period were included in the protocol as described above.



Figure 1. (A) The examination of the udders was done during milking in the milking parlor, using a telescopic inspection mirror with lighting. (B) Application of Intra Repiderma. (C) Example of a recovered udder cleft.

Assessment of improvement and recovery

The data was analyzed for the time in weeks to first improvement and recovery. At the start of the study, 42 cows of 262 examined cows had udder cleft issues and were thus selected. During the study period of 12 weeks, the average incidence decreased from 17.8% to 9.6% on this professional farm.

During the study, 22 cases were assessed at least six times and included in the analysis to determine the time to first improvement (from score 1 to 0) and time to full recovery (*Table 1*).

UCD-score	No. of animals	Improved % (n)	Median time to first improvement (weeks)	Recovered % (n)	Median time to full recovery (weeks)
1	22	81.8 % (18)	4	81.8 % (18)	4

Table 1. Number of animals and time to first improvement and recovery of udder cleft after using Intra Repiderma on mild score 1 udder cleft issues.

Of the 22 animals with UCD-score 1, 18 (81.8%) animals experienced complete recovery (score 0) of the udder skin, with a median time to this observation of 4 weeks (range 1-11 weeks). One spray can of Intra Repiderma is needed per 4 cows for an average of 4 weeks of use according to the protocol.

Early detection and prevention are of utmost importance

This is the first large-scale study that demonstrates the positive effect of the non-antibiotic Intra Repiderma spray on mild udder skin issues. Spraying of the mild udder skin cases (score 1) every 2 days resulted in 81.8% full skin recovery with a median time for recovery of 4 weeks.

Our results also emphasise that early detection is key to a good outcome. The udder cleft incidence on a farm is often underestimated, particularly on farms with a milking robot. Therefore, it is strongly recommended to regularly check the udders of all animals using a telescopic inspection mirror. Clean and dry any affected skin and evenly cover with Intra Repiderma spray from a distance of ± 15 cm at least every other day until completely normal.



Watch the informative [video](#) on our Youtube channel

References of the full study of Jessie Hesseling are available upon request



BENEFICIAL EFFECTS OF BUTYRATE FOR CALVES



Feeding butyrate to calves accelerates the natural development of their gastrointestinal tract. Colostrum and milk provide considerably high dosages of butyrate to suckling calves, with butyrate concentrations of approximately 1 to 2% on a dry matter base. For calves fed calf milk replacers, it is advisable to include butyrate as well, to promote gastrointestinal development. Not only in the milk replacers butyrate supplementation is suitable. Also in solid feed for calves, butyrate acts beneficial for ruminal and/or intestinal development and addition of a butyrate source to a starter concentrate can improve calves health and performance.

The challenge of a good development

The development of the gastrointestinal tract is an important challenge of early life. Anatomy and physiology change considerably on a very short period of time. Starting from single stomach digestion in the abomasum, within a few weeks calves need to develop four functional stomachs. Both function and structure need to change as the calf grows. Butyrate is important to support in the development of the different epithelia from the rumen, the abomasum and the intestines.

During rumen development not only size needs to increase, also growth of papillae is required to develop a high surface area for absorption. This will be important for absorption of nutrients and for feed efficiency.

Once the functional rumen is fully developed, ruminal microbial population will generate high concentrations of volatile fatty acids (VFA): acetate, propionate and butyrate. In cows and fully matured

ruminants, the natural butyrate produced by microbial fermentation of carbohydrates will further support the epithelial structure. A well-developed rumen contributes to a high milk production, as an optimal absorption of VFA is essential to meet the high energy requirements for production.

Supplementation of butyrate

Raising replacement heifers accounts for about 15 to 20% of expenses on a dairy farm. A good rumen development is necessary to support growth performance and feed efficiency, which can reduce the cost of replacement heifers.

For the young calves, additional butyrate will improve the development of their gastrointestinal tract and promote secretion of enzymes leading to improved digestibility of fat, lactose and protein. Adding butyrate to their diet, improves feed efficiency and growth, which is also essential for later performance. Next to that, antimicrobial effects of butyrate against different pathogens are widely reported and butyrate use also tends to lower the incidence of diarrhea (scours).

The impact of butyrate on the calf can vary depending on the source of dietary butyrate being used (Figure 1). When butyrate is supplemented in **liquid feed**, which generally bypasses the rumen via the esophageal reflex, butyrate predominately affects the abomasum and small intestine. If butyrate is added to **solid feed**, it primarily affects the rumen, unless it is protected by micro-encapsulation providing a slow-release further in the intestinal tract, in the abomasum and intestines.

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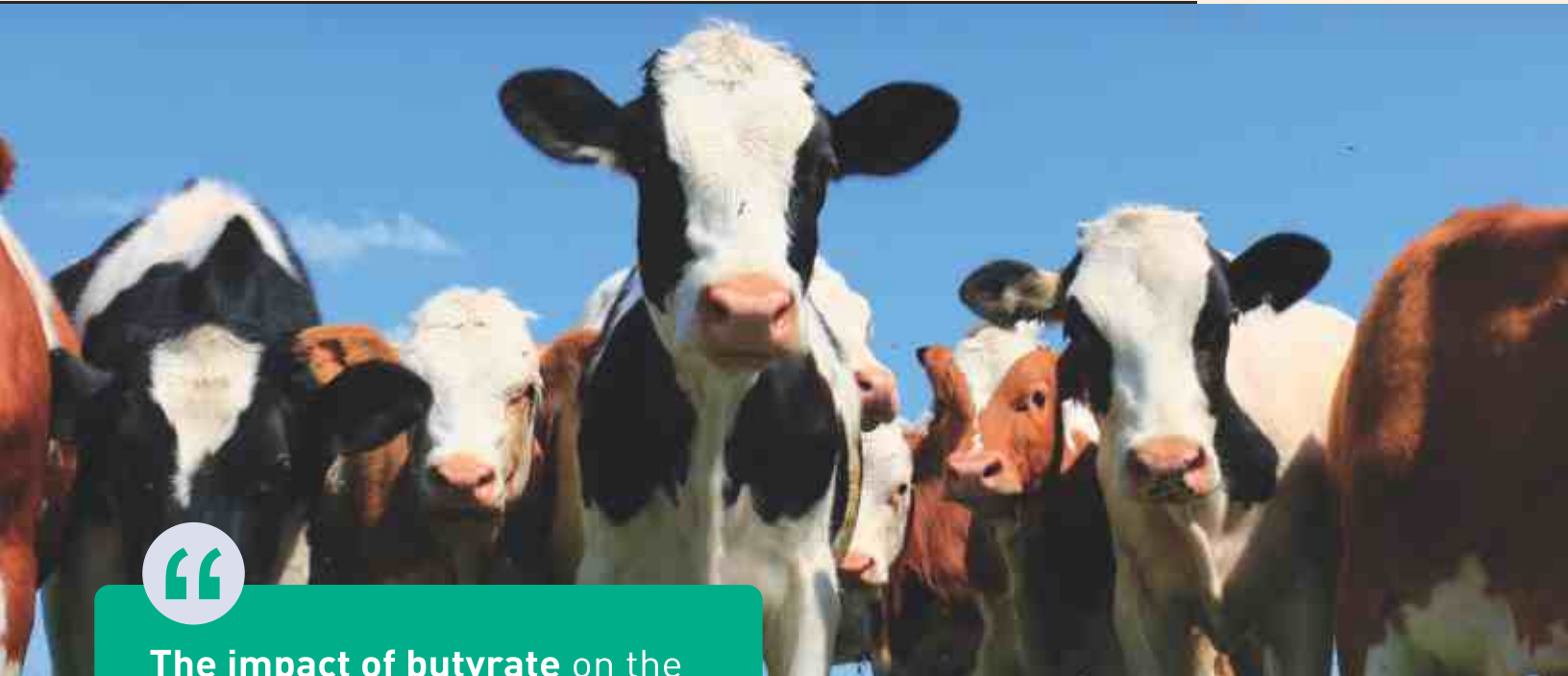
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The impact of butyrate on the calf can vary depending on the source of **dietary butyrate** being used

Available sources of butyrate for calves

Different sources of butyrate are available on the market. Some contain butyrate in the form of glycerides or in the form of a calcium or sodium salt. Sodium butyrate can moreover be micro-encapsulated to obtain a gradual delivery over the digestive tract. Free available butyrate will be easily absorbed and metabolized. To provide butyrate at lower intestinal spots in small or even large intestine, a high-quality micro-encapsulated product with sustained release is essential. This targeted release over the entire intestinal tract is suitable for solid feed application. For the use in calf milk replacers or when especially development of the rumen is targeted, a more readily available source of butyrate will be suitable, such as pure sodium butyrate.

Development of abomasum and intestines will also influence ruminal development and vice versa. Consequently, both micro-encapsulated and unprotected products will have beneficial impact on growth and animal performance (Figure 1).

Conclusion

In conclusion, the use of butyrate in calves acts beneficial to accelerate rumen development and to improve enzyme secretion and digestibility. It can be observed that supplementation enhances growth, reduces incidence of scours and boosts calf performance. Therefore, butyrate supplementation is beneficial to optimize the raise of replacement heifers.

For more technical information contact maele@orffa.com

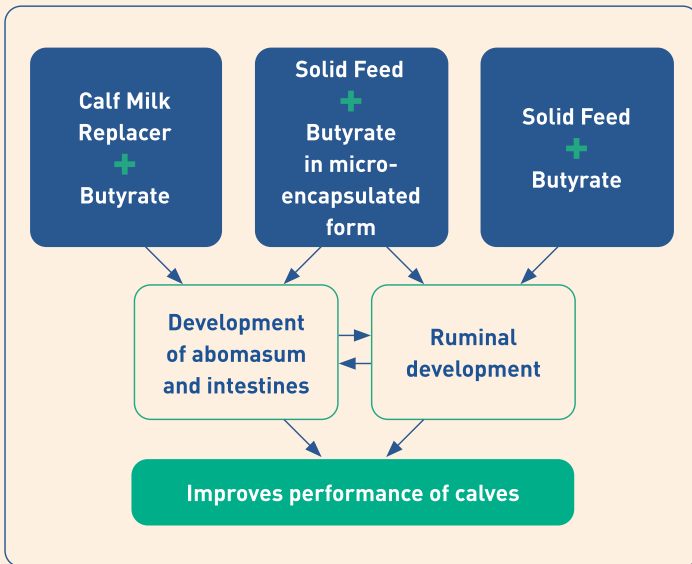


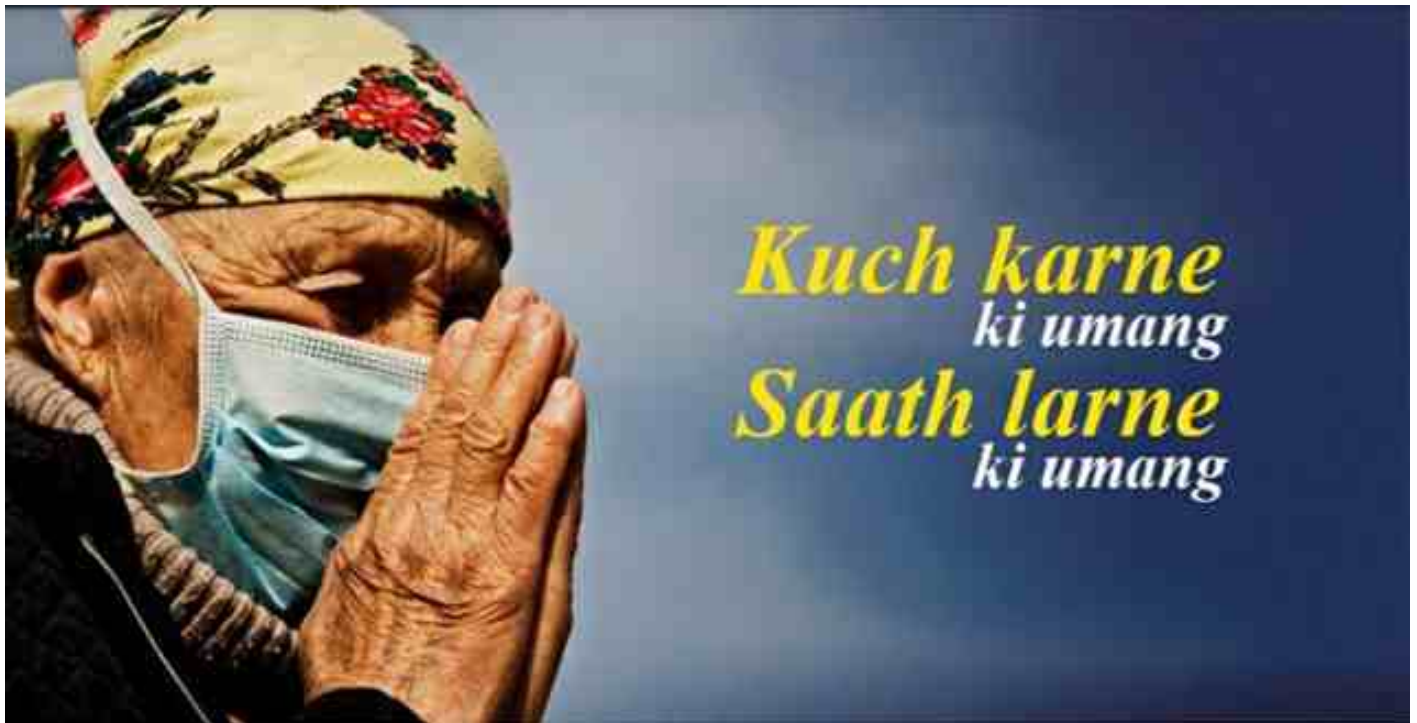
Figure 1: The application of butyrate sources in calves



Umang Dairies- Assisting The Community



Corporate Social Responsibility constitutes a Heart of Umang dairies. The vision of Umang Dairy is to be a leading dairy company in the private sector and to remain committed to the advancement of society and the environment through CSR.



Umang Dairies, one of the foremost advocates in the community for wide-ranging development and welfare, contributes to various domains, including education, preventative health care, livelihood interventions, and environmental sustainability. Several Umang dairies' projects have focused on healthcare, education, livelihood development, and rural development.

Umang Dairies have been active towards the subsisting issues. During the year 2021-22, they have mainly focused on achieving a more empowered society with integrated

growth in the Dairy sector. Their main CSR areas included livelihood promotions and women empowerment.

One of the CSR projects conducted by Umang was doubling farmers' income by establishing a sustainable Dairy value chain. This not only helped farmers in increasing their dairy income but also created a medium for growth in dairy produce, agriculture, and poultry. The main activities constituted under this project were forming and strengthening Farmer Producer Organisations by federating existing Dairy interest

groups. Additionally, it included the establishment of input support linkages that helped provide seed, fertilizers, animal feed, and bio-pesticides to the farmers.

This livelihood promotion activity also included training farmers and capacity building on modern practices for dairy farming, agriculture practices, and organic cultivation. This helped farmers and dairy producers to understand contemporary mechanisms and accelerate the produce. The activity also focused on linking existing schemes of Government and non-government bodies for resource



maximization. This indirectly led to vast market expansion, thereby increasing sales and maximization of profit.

Another project undertaken by Umang included Increasing Women Contribution to National GDP through promoting Dairy Interest Groups and directly linking them with the dairy value chain. Their more focus included activities for forming and strengthening Dairy Interest Groups.

Distribution of food, drinking water, safety kits for frontline workers of the sanitation and health department are the measures the company has been spending its funds on. The organization also has

set up many isolation camps for covid patients in many regions. With the help of NGOs, they have been supporting government officials, police departments, and government hospital workers by providing packed food, drinking water, and safety kits. Their support to the district health department provides ambulance, safety materials, masks, soaps, and hand gloves to sanitary workers in municipal corporations. Their isolation camps are well equipped with curtains, partitions, and isolation beds at primary health care centers. They have helped more than 2000 migrant laborers by providing food, water, sanitisers, masks, and even dry ration.

Their CSR activities are not only restricted to COVID relief but are diversified. Umang dairies have set up two adult literacy centers where 60 women were enrolled. They have also successfully organized one-day training for the bankers in collaboration with NABARD. In his address, Mr.Rohit Srivastava, DDM NABARD, suggested bankers support bank account opening and credit card linkage process of SHGs. Moreover, Umang dairies also have been performing various awareness programs related to government schemes. The CSR of Umang dairies is an appropriate stencil that other organizations must follow to return to the community.



Gyandhara Announces The Launch of A New Range of Cattle Feed Product- Buffalo Special

Sandila, Uttar Pradesh, Feb.04.2022-

Gyandhara has launched their new product specially designed for Buffalo.

Gyandhara has introduced a new product for Buffalos as they found a rising need of treating buffalos as a different breed and fulfill their high nutrient requirements.

Buffalos contributes 70% milk produced in Uttar Pradesh. They need extra energy to maintain the high fat & SNF as Buffalo has high fat and SNF, Disease resistance and has the ability to survive in extreme climatic conditions.

Feeding is the most important factor for increasing and sustaining the milk yield. Sufficient amount of energy, protein, minerals and water must be provided in order to achieve maximum yield, Thus Gyandhara is coming up with Buffalo Special which is high in Fat & SNF rich in protein and, calcium, phosphorus and other beneficial minerals and nutrients that helps the achieve following:

- High milk yield and longer lactation
- Balanced Vitamins & Minerals
- Helps in increasing high fat & SNF
- Helps in improving digestion & Rumen Health



Product Name:
Buffalo Special

Packing:
50kg

Product Feature:
**Cattle Feed with
23% Protein & 6% Fat**



New Chief Marketing Officer on Britannia's Bench



Britannia industries, having the most diverse base in the market for bakery products, have announced the appointment of a new chief marketing officer. The multi-million company has appointed Amit Doshi to replace Vinay Subramanyam as its Chief marketing officer, who will be a part of the company from 17th January 2021.

Amit Doshi has previously worked for Britannia as well. He was also working as Marketing Director at renowned IT and tech company Lenovo (India and South Asia).

Britannia is optimistic that having Doshi on board will benefit the company to its fullest. Additionally, The Managing Director of Britannia, Varun Berry, commented, "I am happy to welcome Amit back to the Britannia family. Amit's cross-sectoral marketing experience will be valuable in taking our innovation mind-set to the next level and building consumer delight."

Britannia Industries has taken a market lead in past years and with a turnover of more than Rs. 11,000 and a presence in over more than 80 countries and is expecting to diversify and expand its contributions in the market. Good Day, Tiger, NutriChoice, Milk Bikis, Marie Gold, and Little Hearts are Britannia's popular and well-known brands.



Amit Doshi

Union Budget 2022-23 Proffers Thrust to Ministry of Fisheries, Animal Husbandry, and Dairying

Press Release

Union Budget for the FY22 presented by Union Finance Minister Smt. Nirmala Sitaraman has allocated Rs 6,407.31 crore for the Ministry of Fisheries, Animal Husbandry, and Dairying. The budget allocation for the Ministry of Fisheries, Animal Husbandry, and Dairying have been increased by 44 percent.

Shri Atul Chaturvedi, Secretary for the Department of Animal Husbandry & Dairy said, "In 2022-23, the budget for livestock has been increased by 40%, and central sector schemes have been increased by 48%, indicating the government's commitment to the growth of livestock and dairy farmers under the leadership of Prime Minister Narendra Modi".

Shri Atul Chaturvedi has highlighted the fact that the reduced alternate minimum tax and surcharge reduction for cooperative societies will benefit thousands of dairy cooperatives in India, which will result in higher income for



the country's 8 crore dairy farmers.

An increase of 20% in the budget in 2022-23 for Rashtriya Gokul Mission and National Program for Dairy Development will increase the productivity of the indigenous bovine population and quality milk production, benefitting 8 crore dairy farmers.

He underlined that the implementation of the One Health Mission with almost 60% enhancement in fund allocation for Livestock Health and Disease Control for 2022-23 over the previous year will ensure healthier livestock and a healthier India.

Danisco Animal Nutrition Further Expands Portfolio in Ruminants



NEW YORK – Danisco Animal Nutrition, a business unit of IFF's Health & Biosciences division, has announced new developments to its ruminant portfolio. As part of their ongoing commitment to expand nutritional health solutions for ruminant farmers and increase market reach, the business will launch Bovizyme™ GA enzyme in the U.S. and two Omni-Bos® probiotics in the Middle East.

Bovizyme™ GA is an enzyme solution that improves starch digestion efficiency for non-steam flake feed yards. Selected from hundreds of potential candidates for its ability to work well in the rumen, this highly effective product results in improved feed efficiency through increased bodyweight gain and lower feed intake.

"We know that cattle don't digest all of the starch they consume, especially if the producer does not steam flake the grains. Bovizyme™ GA is a stable, easy to apply enzyme additive that optimizes cattle starch digestion in the right place,

at the right time, with the right results," says Hamish Irving, global marketing director, Animal Nutrition.

The focus of Danisco Animal Nutrition on the global ruminant market is further strengthened by its successful launch of Omni-Bos® P169 and Omni-Bos® CB in Egypt and Jordan. Supported by a strong track record of successful application in the U.S. and Australia, both probiotics are now available to farmers in these markets for the first time.

Omni-Bos® P169 contains a patented probiotic strain of Propionibacterium, a natural inhabitant of the rumen. The Propionibacterium strain is scientifically selected from over 100 isolates for its superior propionate-producing ability. Backed by research demonstrating its positive effect on consistent propionate production, Omni-Bos® P169 improves energy balance in dairy cows which, in turn, enhances milk production and improves efficiency.

Developed for use in calf milk replacer and calf electrolytes, Omni-Bos® CB

contains a blend of three scientifically selected Bacillus probiotic strains. The natural spore forming capability of the Bacillus probiotic strains support the growth of beneficial bacteria and provide excellent stability and healthy gut status during weaning process. Omni-Bos® CB is also compatible with other commonly used additives in calf milk replacers, has a long shelf-life and is heat stable at temperatures up to 180 F (82 C).

"The Middle East has a robust ruminant industry and there is strong demand for proven, nutritional health solutions. The launch of Omni-Bos® P169 and Omni-Bos® CB allows us to respond to the specific needs of our customers in the region and to implement nutritional feed strategies that will work harder for them than ever before," explains Hamish.

The Danisco Animal Nutrition portfolio for ruminant nutritional health solutions now includes Bovizyme™ GA, Omni-Bos® P169, Omni-Bos® CB and Betafin® natural betaine.



Editorial Calendar 2022

No.	Publishing Month	Article Deadline	Advertising Deadline	Focus
1	January	30-Dec-21	3-Jan-22	Disease Prevention
2	February	30-Jan-22	3-Feb-22	Herd Management
3	March	30- Feb- 22	3-Mar-22	Heat Stress
4	April	30-Mar-22	3-Apr-22	Cold Chain Management
5	May	30-Apr-22	3-May-22	Nutrition
6	June	30-May-22	3-Jun-22	Environmental Control System
7	July	30-Jun-22	3-Jul-22	Calf & Heifer Management
8	August	30-Jul-22	3-Aug-22	Processing
9	September	30-Aug-22	3-Sep-22	Milking Practices
10	October	30-Sep-22	3-Oct-22	Feed & Fodder Management
11	November	30-Oct-22	3-Nov-22	Winter Management
12	December	30-Nov-22	3-Dec-22	Methane Emission

We are Honored to Have The Three Stalwarts of Animal Husbandry

Dr. MotiLal Madan, Dr. Sosamma Iype, Dr. Subbhanna Ayyappan receiving the **PADMA SHRI** this year

Congratulations to all of them



The Government of India has announced the Padma Awards on the Republic day eve as per convention. Animal Husbandry industry bestowed with the Padma Shri award are Dr. MotiLal Madan, Dr. Sosamma Iype, Dr. Subbhanna Ayyappan.



Dr. MotiLal Madan, the creator of the first IVF buffalo calf has been honored with the Padma Shri Award. A

professional veterinarian with a total experience of over 50 years in the National Agricultural Research System (NARS) in India and other developing countries in the areas of Research, Teaching, Extension, Research Management, and Infrastructure Development in the broad fields of Agriculture, Livestock, Veterinary, and Agricultural Production Systems.

Dr. Motilal was born in the year 1939 in Srinagar. After completing his schooling, he obtained his BVSc & AH degree from Punjab College of Veterinary Science & Animal Husbandry, after which he obtained his Master's degree from National Dairy Research Institute, and after which he went to America to study Ph.D.

For much successful research done for animals, Dr. MotiLal has got a different and unique identity not only in India but around the world. Dr. MotiLal's work can be understood from the fact that he is now being called the clone maker of animals. During his services at the National Dairy Research Institute, Karnal, Haryana, he successfully tested the IVF technique on animals and gave birth to 10 calves within a year from a single buffalo.

Dr Madan has published 432 research articles and policy papers in international and national reference journals, including 226 original research papers.



Dr. Sosamma Iype, a retired Veterinary Professor & Researcher of Animal Breeding & Genetics from Kerala Veterinary and Animal Science University, Mannuthy, Trichur.

Dr. Iype, who is known as "Vechur 's Amma", saved the rare breed of Vechur cow from the brink of extinction and put up tremendous efforts to increase its population. In 1989, she set up an organization named Vechur Conservation Unit, which looks after the Vechur breed of Kerala. This unit has been looking after the conservation of not just Vechur cows

but all other indigenous breeds of Kerala too.

She initiated research in Progeny testing of Dairy bulls with farmers' cows in Kerala and developed prediction factors for 305 -day milk yield using single-day test records.

Vechur cow, an indigenous cattle breed of Kerala, is the smallest breed in the world. Vechur cow yields the maximum milk in the world for a cow of its size.



Dr. S. Ayyappan has been conferred Padma Shri for his significant contributions to science &

engineering, particularly in the field of Agriculture and Farming. Dr. Ayyappan is a former secretary in the Department of agricultural research and education and director-general of the Indian Council of Agricultural Research and currently serving as chairman of the Karnataka Science and Technology Academy (KSTA)

Dr. Subbhanna Ayyappan (67) is a crop and environment scientist who has obtained his bachelor's and master's degrees in fish production and management from the College of Fisheries, Mangalore, and his Ph.D. from Bangalore University.

His research fields included fisheries, freshwater aquaculture, and aquatic



Andhra Government-Amul Collaboration For Milk Delivery In Anganwadis



The government of Andhra Pradesh has collaborated with Amul for delivering milk and Balamrutham, a weaning food for providing supplementary nutrition for children in state Anganwadicenters. This noble initiative by the Andhra Pradesh government focused on delivering fresh milk from Amul to the Anganwadicenters.

The state has also signed a Memorandum of Understanding with Amul on 28th January 2022 in the presence of honorable chief minister YS Jagan Mohan Reddy. In addition, the chief minister said a comprehensive scheme is also being implemented in the Anantpur district covering over 85 villages as part of the Jagananna Pala Velluva scheme.

Moreover, this scheme will be beneficial to the local farmers because the increased profits will increase their morale and their production. Through Amul, not only will this scheme localize the production of milk, but it will also cater to the milk chilling facilities.

The Andhra Government has previously allocated 500 Cr Rupees for

milk and 265 Cr Rupees for infant mortality in over 55,607 Anganwadi'scentres which have served more than 22 lakhs children and more than 7 lakhs pregnant mothers.

Andhra Pradesh Government intends to fulfil its goal of increasing accessibility to every Anganwadi centre by implementing this ambitious project, which will promote maximum health benefits to children and pregnantwomen.

Mooofarms Raised Hefty Money From Market Players

Mooofarm, an agritechstartup, has stepped into the game of fundraising and backed a hefty amount of \$2.1m in the seed round. The funding was availed to Mooofarm by Accel India with participation from international players, namely Navus Venture and Rockstart, an early-stage investor. Navus

Venture and Rockstart have been working with Mooofarms since 2020 and have acknowledged its upward trend, thereby rooting for its promising growth.

With the funding availed, Mooofarm aims at building a sustainable food system by offering technical solutions for 100 million dairy farmers. Mooofarms have provided a one-stop solution app for dairy farmers, including connecting them with Expert Veterinarians, cattle trade, Livestock Management, tools and inventory management, and instant access to credit and finance.

The investor recognized their live vision and together co-invested in their dream. The whole Mooofarm team, including Param Singh, the co-founder and CEO, Aashna Singh, Co-Founder and COO, Jitesh Arora, Co-Founder and CTO, and lastly Abhijeet Mittal, Co-Founder, and CPO, have realized the need for smart Agritech in the country in this dynamic era, thereby helping farmers throughout the country.

Mooofarm App is available on Google Playstore and has over 1 million downloads, encouraging farmers every day by providingend-to-end solutions.



Estimated growth in dairy export in the year 2023



The export of dairy has been significantly increasing year by year, and the next decade seems to have a promising growth of dairy exports. In their latest report, Wazir Advisors, an independent consulting player, has provided how India has been uniquely positioned to acquire market capitalization in linking the dairy network worldwide.

There is a sturdy decline in dairy production in the international market of the US, Canada, and New Zealand, which has given rise to the demand for dairy. Understanding the market play, India has an enormous export opportunity and a bigger chance to capture the world market.

India, the largest world's milk producer, produced and delivered an all-time high of 198.4 million tonnes of milk in 2019-2020, with a per capita milk availability rising to 407 grams per day. The report stated that India would have a significant position for the next ten years, production and growth.

It is also estimated that global per capita consumption of dairy products is expected to rise by 1% per year.

According to the report, Europe is currently the largest market for processed dairy products, followed by the United States. India will have a

insights on one of the significant challenges the brand faced in these dynamic times. He stated that the biggest challenge is remaining relevant with consumers and staying true to the brand goal when it was conceived.

According to him, "With every new generation, we have to learn to speak their language and remain relevant to them. Brand means different things to different generations."

He further added, "The way I remember Mother Dairy when I was young is very different from how my kids see it. It is important to know the younger generation and talk in their language to remain relevant to them."

People are now concentrating on their health, and the milk market has been experiencing an upward trend in health-conscious food. The director has acknowledged that factor and has concentrated the R & D into providing and giving various health options, including toned milk.

Furthermore, he stated, "The core brand positioning is quality, trust, and innovation. Our product portfolio has grown such that today we have

huge advantage in supplying these processed dairy product market holders.

Challenge for mother dairy to align with past goals

The managing director of Mother Dairy, Manish Bandlish has shared his



offerings from breakfast to dinner, and consumers look to us for quality dairy products that are central to their daily diet.”

National startup award winner 2021: stellapps



Stellapps Technologies, a startup involved in providing a one-stop daily supply chain digital app in the Animal Husbandry sector, has won "National Startup Award 2021." Stellapps Technologies is one of its kind, and its main aim involves digitalizing the dairy sector in India.

The National Startup Awards 2021 recognized 46 start-ups, including 1 incubator and 1 accelerator, including Stellapps. Piyush Goyal, Union Minister of Commerce & Industry, gave a virtual ceremony honoring the dairy tech start-up.

As part of the National Startup Awards program, one of the primary objectives is to recognize and reward entrepreneurial innovation that contributes to the nation's economic development and technological advancement. The Department for Promotion of Industry and Internal Trade (DPIIT) envisioned appreciating and recognizing the efforts of start-up companies, supporting and promoting them, and impacting

economic growth through employment generation or wealth creation, demonstrating measurable social impact.

Stellapps Technologies has bagged a handsome amount of Rs. 5 lakhs as a part of the award. Their primary focus is on data acquisition, machine learning, and building a high-end

technology-oriented Application to digitalize the dairy supply chain. This will directly strengthen the dairy farming process and increase yield per animal.

Vijaya dairy experiences a price hike



The rising inflation has also affected the Dairy Industry. Vijaya Dairy has also increased its prices wherein the price for Toned milk has gone up by Rs. 2 and the price for whole milk is up by Rs.4.

The increased cost has been brought into the picture effective from 1st January 2022 in Telangana. A litre of toned milk packet has gone up by ₹2 to ₹49 from ₹47, while the price of whole milk has gone up by ₹4 to ₹66 from ₹64. The Telangana State Dairy Development Cooperative Federation Limited said the six-litre pack of toned milk would now cost ₹288, up by ₹12 from ₹276.

Telangana State Dairy Development Cooperation Federation has increased the Vijaya Dairy milk prices. In response to the increase in prices, the general manager of Telangana State Dairy Development Cooperation Federation, V Mallikarjuna Rao, has urged the consumers to cooperate and added that the rise in prices results from higher production costs.

The price hike in dairy has been an overlying issue, and the only solution could be to increase its production and supply to economize the cost.



March 2022

1. EuroTier Middle East

Dates: March 21- 23, 2022

Venue: Abu Dhabi, National Exhibition Centre (ADNEC),
Vereinigte Arabische Emirate

City: Abu Dhabi

Country: United Arab Emirates

Email: s.karaoglan@dlg.org

Website: www.eurotiermiddleeast.com

April 2022

1. Anuga Food Tec

Dates: April 26 -29, 2022

Venue: Cologne Trade Fair Center

City: Cologne

Country: Germany

Website: www.anugafoodtec.com

August 2022

1. ILDEX Vietnam 2022

Dates: August 3-5, 2022

Venue: SECC, HCM

City: Ho Chi Minh City

Country: Vietnam

Email: panadda@vnusiapacific.com

Website: www.ildexvietnam.com

2. Livestock Malaysia

Dates: August 10 - 12, 2022

Venue: MITC Complex

City: Melaka

Country: Malaysia

Email: livestockmalaysiamy@informa.com

Website: www.livestockmalaysia.com

3. Livestock Philippines 2022

Dates: August 24 - 26, 2022

Venue: World Trade Center

City: Pasay city

Country: Phillipines

Email: rita.lau@informa.com

Website: www.livestockphilippines.com

September 2022

1. Victam Asia 2022

Dates: September 7 - 9, 2022

Venue: IMPACT Exhibition Center

City: Bangkok

Country: Thailand

Website: www.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

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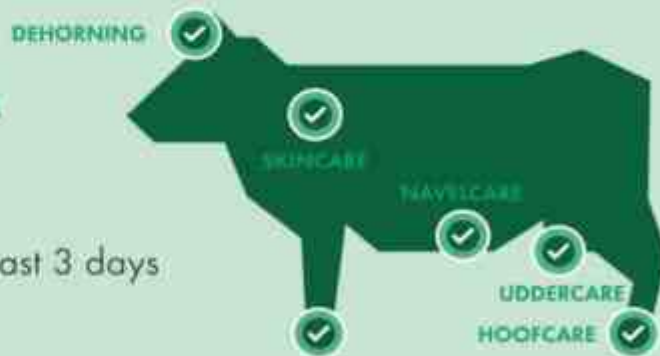
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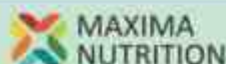
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