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Vol.18 | No. 12 | December - 2021



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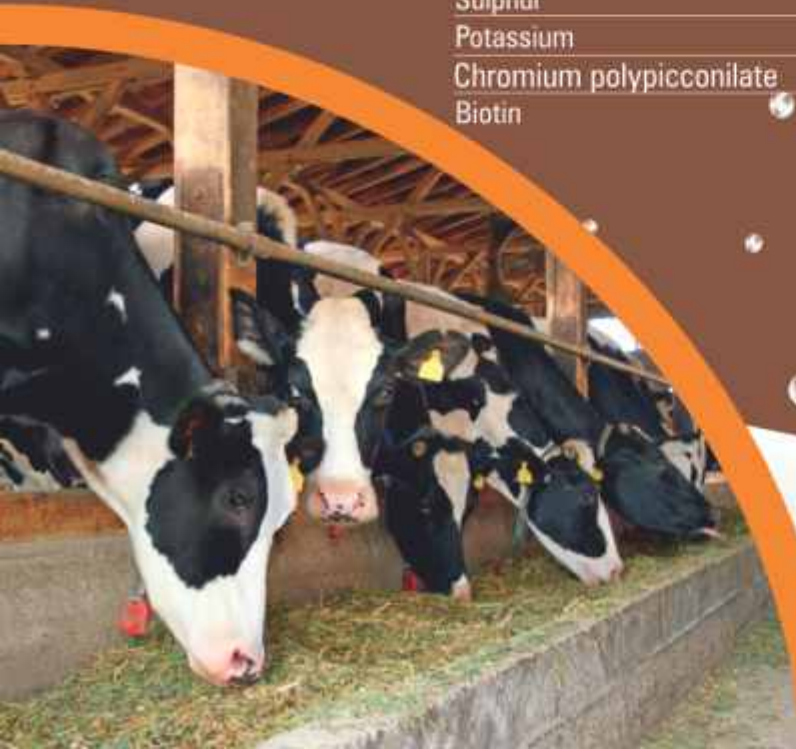
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From the Pen of Chief Editor



Dairy Industry Outlook

India is the leading producer and consumer of milk across the globe. The Indian dairy sector is divided into the organized and mostly unorganized (75%). There is a need for investment, especially for the small and marginal dairy farmers to catalyze Indian dairy production and exports. The Indian dairy market stood at a value of around INR 11356.6 Billion in 2020. Further, the market is expected to grow at a CAGR of 15.4% over the forecast period of

2021-2026.

Dairy is an enterprise that involves the production of various dairy products such as milk, cheese, and butter, among others.

The cultural and social significance of milk and dairy products in major parts of the country is aiding the market growth. The introduction of various favorable government initiatives to increase the production of dairy by artificial insemination is also propelling the market growth. The integration of several technological innovations such as Automatic Milk Collection Station and Bulk Milk Cooling Units in animal husbandry to aid hygienic milk production and promote import and export activities is anticipated to boost the industry growth. Moreover, the digitization of milk production, herd management, livestock insurance, fintech, and marketing by leveraging data analytics and the Internet of things (IoT) are expected to further propel market growth. The rising demand for packaged dairy products and value-added products (VAP) such as ghee, curd, butter, and cheese, among others, in the domestic households, restaurants, and hotels, is expected to bolster the growth of the dairy industry in India. In addition, the growing disposable income and evolving dietary preferences are increasing the demand for probiotic products such as yoghurts, hence providing further impetus to the growth of the market for dairy in India.

Milk Protein Concentrate Market is quickly reaching its pre-COVID levels and a healthy growth rate is expected over the forecast period driven by the V-shaped recovery in most of the developing nations.

Lockdowns across the globe in 2020 and continuing restrictions in 2021 disrupted the supply chain posing challenges for manufactures in the Milk Protein Concentrate Market. The COVID-19 pandemic had a significant impact on the regional and country-level Colostrum markets worldwide. The Indian veterinary artificial insemination market size is expected to reach USD 252.4 million by 2028. Increasing demand for milk and the growing number of semen stations in the country are the factors propelling the growth. The Government of India has introduced various schemes and initiatives aimed at the development of the dairy sector in the country. On the other hand, private participation in the Indian dairy sector has also increased over the past few years.

Vishal

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Registered as Newspaper by Register of Newspaper for India : **RNI No. HARBIL/2004/22481**

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Publication of news, views and information is in the interest of positive Dairy industrial development in India. It does not imply publisher's endorsement. Unpublished material of industrial interest, not submitted elsewhere, is invited.

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Publisher, Printer : **Mr. Vishal Gupta** on Behalf of **Pixie Consulting Solutions Ltd.** Karnal.

Printed at : Jaiswal Printing Press, Jain Market, Railway Road Karnal.

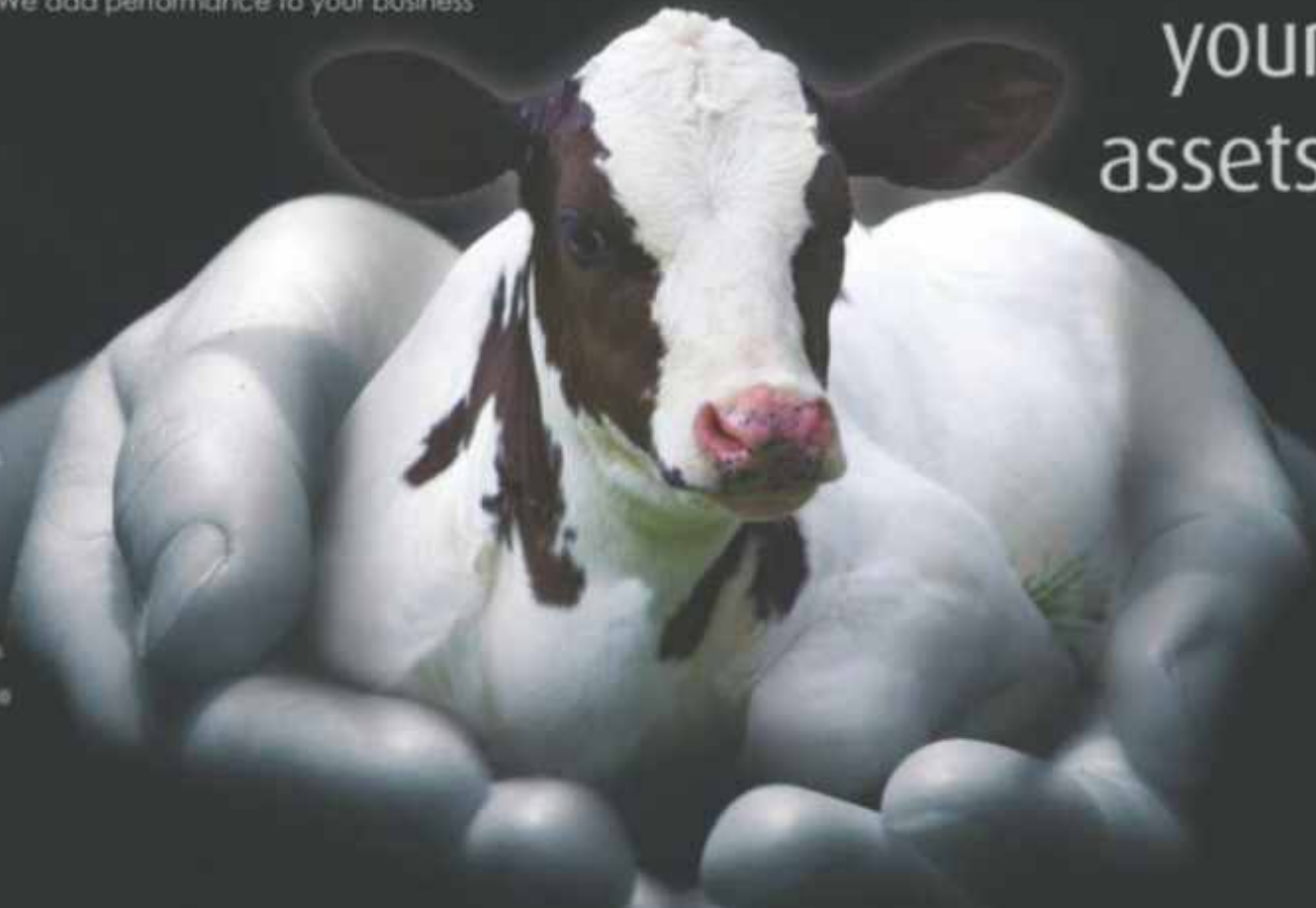
Published at : C/o OmAng Hotel, Namaste Chowk, Near Janta Petrol Pump, KARNAL - 132001 (Haryana) INDIA

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CHR. HANSEN SILAGE INOCULANT STABILITY

Dr. Keith A. Bryan, Technical Services Specialist,
Dairy & Silage, Chr. Hansen



Introduction

The application of live, viable lactic acid bacteria (LAB) to forages in the form of bacterial silage inoculants is paramount to driving fermentation toward a variety of desired endpoints. Some of the key factors that impact viability of bacteria for silage inoculants are: genus, species and strain, fermentation quality controls and stabilization methods, packaging, moisture and moisture control measures, temperature (especially heat) and storage conditions. Obviously, the two most important factors impacting shelf-life viability post-production and packaging are moisture and temperature.

Manufacturers of science-based, research-proven live, viable microbial products, like Chr. Hansen, rely on extensive technical diligence, process controls and patented technologies (e.g. U.S. patents 4,956,295 and 4,972,763)

to ensure that bacteria used for a variety of applications, including silage inoculants, remain viable throughout their declared shelf-life or 'Best Used By' (BUB) date. One such example is the use of moisture scavenging products to minimize the detrimental impact of water activity on reducing shelf-life of bacterial silage inoculants. Although we can't control storage temperature of our silage inoculants once they leave our production and storage facilities, we always strongly suggest that Chr. Hansen silage inoculants should ideally be stored in a cool, dry place away from direct sunlight. As dry, free-flowing powders, in their original containers, these inoculants will remain viable for several years and often have a label guarantee of 24 months; however, once exposed to the atmosphere or rehydrated their viability is highly variable.

For a variety of reasons, circumstances occur where distributors, dealers and end-users have Chr. Hansen silage inoculants that approach or pass their stated shelf-life dates. Also, potentially adverse storage conditions or compromised packaging may lead to questions of viability. Thus, the questions arise, "Is this inoculant still viable? Does it still meet or exceed label guarantee?" The purpose of this technical bulletin is to share historical experiences related to Chr. Hansen silage inoculants that approached or had passed their shelf-life dates, as well as a few instances where storage or packaging was less than ideal.

Both BIOMAX® and SILOSOLVE® products were evaluated and included at least two (2) samples among seven (7) different products.

During the 4-year period from June 2016 to June 2020, a total of 29

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Technical Service Requests (TSR) were performed to enumerate viable bacteria (total cell count) and water activity (aw). The 29 TSR included the following product mix: BIOMAX® (n=14), SILOSOLVE® (n=15) branded products, specifically: SILOSOLVE® AS (n=2), SILOSOLVE® MC (n=6) and SILOSOLVE® FC (n=7).

The vast majority of samples were evaluated after BUB date (69%) or for being exposed to a warm storage environment (>77°F; 21%) prior to BUB date.

Three primary reasons were provided for performing the 29 TSR. A 'warm environment' was interpreted to mean any storage conditions where temperatures exceeded 77°F for any length of time, including multiple days. Twenty samples were evaluated that were beyond BUB date by an average of 294 days (~9.8 months). Six samples were stored in warm environments (>77°F) and were evaluated before BUB date by an average of 380 days (~12.6 months). Two samples experienced 'swelling' or gas buildup in the canister causing distention of the foil seal, and were evaluated before BUB date an average of 265 days (~8.8 months). Finally, one sample was evaluated for viability 228 days before BUB for unstated reasons.

Water activity (aw), when evaluated, remained below 0.075 for all samples and averaged 0.050 for the 16 samples tested.

As stated previously, the two most significant environmental conditions detrimental to long-

term shelf-life stability for microbial products are elevated ambient temperatures and water activity (moisture). Prudent evaluation of water activity upon sample submission facilitates the exclusion of this factor if bacterial counts are sub-optimal and water activity is minimal or below the acceptable threshold for the organism. Most bacteria, including lactic acid bacteria used in silage inoculants, require an aw >0.910 to grow or an aw <0.090 to prevent bacterial growth in a stabilized form. Optimal shelf-life stability is attained when water activity remains less than 0.150.

All samples evaluated before their BUB date exceeded label guarantee, regardless of reason for evaluation.

The nine samples evaluated before their BUB dates (~337 days post-manufacture) significantly exceeded total viable cell counts relative to label guarantee. Additionally, the six canisters evaluated before their BUB dates and stored in warm environments (~380 days post-manufacture) significantly exceeded total viable cell counts relative to label guarantee.

The vast majority of samples (20 out of 23, ~87%) exceeded label guarantee when evaluated after their BUB date.

Of the 23 samples evaluated after BUB, 20 exceeded label guarantee at an average of 294 days (~9.8 months) post-BUB. The three samples that failed to meet stated label guarantee at BUB, were an average of 655 days post-BUB (range 598-743; >21 months). This

means that these three samples were >45 months post-production. No additional details were provided for these samples relative to temperature ranges, humidity or storage location.

Conclusion

In-house quality control and quality assurance measures can only ensure live, viable microbial products reach the field. Label directions indicate the ideal conditions for storage and use of products, but they cannot always be met. Product samples secured from the field can provide insights into product viability when handling, storage and use directions are not adhered to. Hopefully, these data shed some light on the robust measures that Chr. Hansen employs to provide the highest quality microbial products that conform to, and often exceed, their stated label guarantees.

Of note, Chr. Hansen silage inoculants, exposed to moderate periods of storage that are outside of optimal conditions, do not warrant analysis, as shelf-life and product performance are not affected.

Practically speaking, all silage inoculants should be stored in a cool, dry place away from direct sunlight.

Chr. Hansen branded silage inoculants, SILOSOLVE® and BIOMAX®, should be handled and stored according to label directions. Specifically, shelf life is 24 months at room temperature (<77°F).

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Concerned Feeding And Milking Behavioral Aspects In Dairy Cattle And Its Implications



Deepandita Barman

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Introduction

Cattle are highly social herd animals and engage in complex interactions to communicate dominance, subordination and peer bonding within the group. Herds have a strict (predominantly) linear hierarchical structure with the most dominant animal at the top and the most subordinate animal at the bottom. Social rank is largely predicted by age and body weight / size. Older animals have more experience and are thus better placed to compete and larger animals are more capable of physically domineering their smaller herd mates. When individuals first meet they "fight" to establish rank. Once hierarchical structure within a group is established, negative interactions become less common except when animals compete for a limited resource e.g. access to feed, preferred lying areas, access to the milking parlour etc, or when closely ranked animals seek to re-establish or alter the dominance order.

Feeding and Milking Behavioural aspects for production:

Feeding behavior: they adapt their feeding speed according to the feeding system (Wierenga and Hopster 1991).

If dry matter intake and thus yield is to be maximized across the whole herd it is important that the impacts of social hierarchy are considered at the farm level. It does not matter how carefully formulated a diet is or what dry matter intake predictions have been calculated if other external factors reduce the intakes which animals actually achieve.

When individuals enter or re-enter an established group they must establish their social rank within the herd. This can only be achieved by interacting with all the animals they meet. Hence it often takes a number of days or even weeks for animals to establish themselves following introduction to the herd. Even in herds with a stable hierarchy, social rank remains important when limited and / or valued resources such as feed or access to feed are considered (e.g. cows of lower social rank were displaced from the feed bunk more often, particularly at high stocking rates (Huzzey et al., 2006) and high ranking cows spend more time at the feeder following the provision of fresh food (Val-Laillet et al., 2008).

Holstein cows that were fence-line fed a TMR of corn silage and concentrates ate 26% longer following feeding than the same size group eating from bunks

around which they traveled. Cows eating with their heads in the downward position produce 17% more saliva, which directly affects rumen function, than cows eating with heads held horizontally. When fed in shallow, elevated bunks, 10% of cows exhibited year-round rooting, sorting, feed tossing behavior, and feed wastage (0 to 5%). Groups fed at ground level or in headlocks showed little or no feed tossing behavior (Albright, 1993). Feeding behaviour can be described using several measures, including the number and duration of meals, as well as intake and feeding rate. Competition at the feed bunk can affect feeding behaviour, increasing the feeding rate and reducing intake, especially for subordinate animals. Feeding behaviour changes in the days before calving, and these changes





are greatest among cows at greatest risk of succumbing to disease in the early post partum period (Von Keyserlingk and Weary, 2010). The frequency distribution is clearly bimodal, with the intersection between the two peaks occurring at about 25 min. This break point can be used to define within-meal intervals (represented by the peak on the left with a maximum at about 0.5 min), and between meal intervals (the peak on the right of the graph with a maximum at about 180 min). According to this approach an interval of less than the break point (called "meal criterion") can be defined as within a meal (Tolkamp et al., 2000). Two feeding events separated by a break of only 10 min would be considered by this definition as being part of the same meal, but if the cow returned to the feeder after a break of 50 min we would consider this event to be part of a new meal (DeVries et al. 2003a, 2009). Mean time for concentrate mixture intake was less ($P < 0.05$) in docile buffaloes in comparison to nervous buffaloes (6.67 vs. 8.62 min.) in lactating Murrah buffaloes (Singh et al., 2016). Grant and Albright (2001) report that there is unlikely to be a measurable reduction in DMI providing a minimum of 0.51m of bunk space is provided. Increasing bunk space above 0.5m may not have significant effects on DMI, doubling the amount of feeding space per cow from 0.5m to 1.0m resulted in a 57% reduction in aggressive interactions and allowed cows to increase their



feeding activity during the period following the provision of fresh food (DeVries et al., 2004). Cows were displaced more frequently from a post and rail feed barrier, compared to a barrier composed of headlocks (Huzzey et al., 2006). When cows lay down during rumination, they prefer to lie on their left side. The rumen is positioned on the left side and therefore the rumination will be the most effective (Grant et al., 1990).

Milking behaviour: The water buffalo is the second most important species in the world in terms of milk production, after dairy cows (Coroian et al. 2013) and produces the highest quality milk of any domestic animal (Senosy and Hussein 2013). The total milking time was significantly more ($P < 0.05$) in nervous buffaloes as compared to docile buffaloes; the respective values were 26.3 and 15.65 minutes (Singh et al., 2016). Buffaloes are very sensitive to milking environment than the

cows and a slight change in milking operation lead in little let-down of milk (Thomas et al., 2005). Less milking temperament significantly increases ($P < 0.05$) milk yield in buffaloes (Ramasamy and Singh, 2004). The docile buffaloes had a higher rate of concentrate intake, shorter let-down time, slightly longer milking time, higher daily milk yield, higher milk flow rate and higher milk fat than the other groups of buffalo (Nayak and Mishra, 1984, Gupta et al., 1985).

Conclusions

Behaviour is best expressed by animals in range condition. More scope of expression in loose housing system than stanchion system. Observing cow behavior can be utilized as an important tool for management of dairy farm. Animal suffering/ problems can easily be identified by observing their behaviour. Controlling social dominance in animals will help in better management of a dairy farm.



Rules For Transportation of Livestock In India

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Jinu Manoj

The Prevention of Cruelty to Animals Act, 1960 ensures that all animals are treated with compassion and dignity and are not meted out with unspeakable cruelty. While transporting animals, the top most priority shall be the animal's well being and health. This varies from species to species and should essentially be thought of prior to movement. The mode of transport shall be duly identified and a reconnaissance shall be done well in advance and preparations accordingly made. It is mandatory for the driver or the team undertaking the transportation to familiarise themselves with the route that will be taken while transporting the animals. Stops in between should be pre-planned and identified well in advance to minimize the time of transport. The cages, if any, should be kept in the vehicle in such a way that animal always faces the direction in which the vehicle is moving.

According to the Transport of Animals Rules, 1978, cattle transported by rail or road must be accompanied by a veterinary certificate that they are fit to travel and by first-aid equipment. Average space per animal should not be less than 2 square metres and ropes and platforms should be used for loading. They should be properly fed and given water first. Other provisions of the Transport of Animal Rules ensures water and food should be made available for the whole journey. When cattle are transported by rail, there is a maximum number allowed in each wagon and each wagon should have at least one attendant. There should be padding on the floor and adequate ventilation. When cattle are transported by road, specially fitted goods vehicles should be used or ordinary vehicles should be provided with anti-slipping material, and there should be an attendant. No more than six cattle can be carried in one vehicle.

Transport of Animals (Amendment) Rules, 2001 state that a valid certificate issued by an officer or any person or Animal Welfare Organisation authorised by the AWBI or Central Government needs to be obtained before transporting an animal to ensure that all relevant requirements have been met. If these conditions are not met, any permit will be cancelled and the police must stop further transport. The animals will be given to the authorised Animal Welfare Organisation if available until further decisions are made by the authorities.

The Prevention of Cruelty to Animals (Transport of Animals on Foot) Rules, 2001 apply to transport of animals on foot when the distance from the boundary of village or town or city of the origin of such transport to the last destination is 5 km or more than 5 km. The rules state that every animal must be healthy and in good condition and a veterinary certificate is needed for each animal. Veterinary first aid equipment must also be provided for the journey. New born animals, diseased, blind, emaciated, lame, fatigued animals and animals that have given birth during the preceding 72 hours or likely to give birth during transport should not be transported on foot.

Arrangements should be made for watering and feeding the animals during transport. Nobody is allowed to use whips, sticks, etc. or apply any substance on their bodies to make the animals walk faster. If an animal has to be tied, a cushioned rope should be used. If two animals are tied together (more than two animals cannot be tied together) the space between them should be at least two feet. Furthermore, Animals cannot be transported before sunrise or after sunset. Limits have also been set for transport on foot. Animals should not be made to walk

in adverse weather conditions such as heavy rain, thunderstorms and extremely dry or sultry conditions.

According to Section 11 of the Prevention of Cruelty against Animals Act, 1960 transporting of any animal in any manner that will cause him/her needless sufferings is prohibited. This includes loading of cows into trucks without ramps, forcing animals to travel long distances on feet, overcrowding animals in a vehicle as well as tying pigs around a scooter or a cycle.

The eleventh amendment to rules under the Motor Vehicles Act, 1988 deals specifically with the transportation of livestock meant for slaughter and seek to curb their mistreatment. Vehicles meant for transporting livestock are to be permanently partitioned to allow individual carriage of animals and prevent overloading. The amendment further specifies that the size of partitions should not be less than 2 sq. m for cows and buffaloes, 2.25 sq. m for horses and mares, 0.3 sq. m for sheep and goats, 0.6 sq. m for pigs and 40 sq. cm for poultry. Vehicles without special licences issued by the regional transport officer will not be allowed to ply on roads. The circular also notifies that vehicles meant for carrying livestock will not be permitted to carry any other cargo. This rule come four years after the Food Safety Act, 2011, which laid down conditions under which animals meant for consumption were to be kept and transported. The Act had also noted that unnecessary stress during transportation affects the quality of meat, apart from being inhuman. The chances of animals contracting infections and diseases increase during periods of long travel in highly constrained spaces.



Significance of Vaccination In Livestock – A One Health Perspective

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Ramya K

Food security for the swelling human populations needs to be addressed by enhancing and adapting the novel advancements in technology of food and feed production in vogue. About 60 percent of dietary protein is from animal products in developed countries, compared to only 22 percent in developing countries and there is substantial room for expansion of livestock production. Apart from the food security, the economy of the developing countries is greatly influenced by the livestock sector. The livestock and poultry farming these days became an intensive venture is often challenged by range of diseases predominantly of infectious diseases. The sad truth is most of the livestock diseases are vaccine preventable. Large scale livestock farmers/ rearers aiming for export of their products to the developed nations need to meet out the quality standards claimed by the importer. The animal products intended for export are expected to be disease free. The incidence of a disease can be reduced and subsequently eliminated from the population by regular and proper vaccination. Considering the economics and environmental impact of infectious diseases, it is always superior to prevent disease rather than having to resort to treatment and further consequences

Implications of Vaccination

Vaccination of animals against infectious diseases not only prevent the incidence of disease and the economic losses due to loss of animals, cost of treatment, livelihood in case of small and marginal livestock farmers, loss of productivity in terms of reduced animal growth, drop in milk production,

zoonotic transmission, wastage of animal proteins and the international trade even if there are traces of disease incidence. Vaccination exposes the animals to either an inactivated or non-virulent (non-infective) or a subunit of the pathogen (immunogenic components) and confers protection from the disease agent before the animal is exposed to a natural infection. Vaccination induces antibody production and/or cellular mediated resistance in the animal against disease or infection. Hence, vaccination mimics an infection, the body and its defensive system will "remember" the identity of the invading organisms. On exposure to the infective pathogen, the animal is ready to fight it and will not fall ill and suffer. Vaccination not only protects the individual vaccinated animal, it also helps to protect the population from the disease by inducing "herd immunity". Vaccines stimulate the body to produce its own defence against infection.

Disregarding Vaccination and its impact

The vaccine preventable diseases are often overlooked by the farmers until there is an outbreak of the disease resulting in the loss of production or the animal itself. In the event of an outbreak, the veterinarians are compelled to reach out to the antibiotics to contain the spread of the disease or to deal with the secondary bacterial infections to save the diseased animal. Statistics show that the consumption of antibiotics in animal husbandry is much higher than the human medicine. The consumption of antibiotics is projected to increase by 6 % by 2030.

First and foremost; it results in the unnecessary exposure of the infected animals to antibiotics. Secondly, antibiotics used as ancillary therapy interact with the microbiome of the diseased animals leading to the emergence of antibiotic resistance in them. Thirdly, the antibiotic residues present in the products of the treated animals like milk, meat, egg, etc. reaches the end users who are exposed unknowingly. Additionally, 40-90% of the antibiotics used to treat animals are also shed in their excretions and secretions as parent compound in their native form (depends on the class of antibiotics) eventually reaching the environment and contaminating soil and water bodies. Besides, manure from these farms having antibiotics/ residues or the antimicrobial resistance carrying microbes (AMR microbes) when applied as fertilizers or irrigation of crops with waste water enters the agro ecosystem and ultimately the food chain. Hence, the unnecessary usage of antibiotics to control the vaccine preventable diseases intensifies the emergence and dissemination of antimicrobial resistance in the microbial community present in the shared ecosystem of humans, animals and environment.

With the intention of reducing and consequent elimination of AMR microbes in the ecosystem, awareness on the importance of vaccination and the penalties related to ignorance of vaccination from the public health perspective should be created through various mass media platforms like local FM, self-help groups and through animal husbandry departments periodically. In addition to vaccination, good husbandry practices like cleaning, disinfection including efficient bio-security measures are the most significant factor in the prevention of diseases in livestock.

Extermination of Parasitic Insects on Milch Animals



Sachin Dongare



Indrayani Gawas

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Introduction

Parasitic insects on milch animals causes lot of damage to livestock farmers. Although insects do not seem to be harmful, they can indirectly be a nuisance to animals and insects can transmit many diseases to animals and even weaken their immune system. Also, anaemia can be caused by a deficiency of red blood cells (RBCs) in animals. Therefore, it is very important to control parasitic insects on the body of animals.

Normally drugs which are used to control parasites are toxic. They can cause poisoning. These drugs are mixed with water and sprayed on the body of the animal for controlling different types of parasites (lice, mites, fleas, flies, ticks, etc.).

Precautions to be taken while using this medicine:

1. Drugs should not be allowed to come in contact with wounds, mouths or open areas.
2. Watering the animals before using the medicine.
3. Keep the animals in the shade while applying the medicine.
4. Use the medicine after resting the animal for at least one to two hours after bringing it out of the sun or after hard work.
5. The spray period between the two drugs should be at least one week apart.

The most important of the parasitic insects in cows and buffaloes is Ticks.

Tropical or subtropical climate like India is conducive for ticks to grow almost all year round. Various studies has found that about 80% of the animals in the world are affected by ticks and the economic loss is very high.

Mostly outbreaks appear to be exacerbated during March-April to August-September. There are many species of Ticks in India. It is found that *Hyalomma* sp. and *Boophilus* sp. Commonly affect milch animals and reduces the ability of animals to work. It can paralyze animals, cause anemia, and sometimes increase the mortality rate in animals.

For controlling ticks, One should have full information on its life cycle, ticks take birth from eggs. After hatching, the young one absorbed blood and adult ticks is formed. Adult ticks need to absorb blood before reproduction. Ticks are mainly attached to the body parts of animals which are not easily cleaned by the animals. E.g., On the head, neck, ears, under the tail, on the inside of the thighs, near the anus and on the groin.

For the eradication of ticks, it is necessary to clean the body of animal as well as fill the grooves, cervices, incisions etc. present in the animal sheds.

Elimination of ticks from animals

Previously drugs like BHC or DDT were used for ticks' eradication but these drugs have been found residual effect in animals and depict adverse effects on human race. Because, those drugs

enter the human body through consumption of milk and meat. Organophosphates, Carbamates, Synthetic pyrethroid's, Acaricides etc. are currently available in the market for the elimination of external parasites from the body of animals.

Sr. No.	Name	Quantity	Used Against
1.	Diazion	3 ml /L Water	lice, mites, fleas,
2.	Coumophos	1 g / L Water	flies, ticks, etc.
3.	Fenvalerate	2 ml /L Water	
4.	Cypermethrin	1 g / L Water	
5.	Amitraz	2 ml /L Water	lice, mites and ticks

At present Ayurvedic medicines are also available in the market which can be used effectively for the eradication of external parasite from which there is no possibility of poisoning. E.g., extracts obtained from eucalyptus.

Elimination of ticks in the vicinity of the barn:

Acaricides and weedicides should be sprayed on the ground, walls, in the barn and on the grazing area around the barn to control the external parasites and weeds respectively in the vicinity of the barn. To do this, choose the time after the rains have stopped. After spraying, a period of about 10 days should be allowed and only after that feed the animals in the barn. The following drugs should be used for this.

Sr. No.	Name	Quantity	
		On the ground (%)	On the wall (%)
1.	Melathion	1.5 - 2.0	0.75 - 1.0
2.	Bitox	2.0 - 2.5	1.5
3.	Cypermethrin	1.5 - 2.0	1.0

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Introduction

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There are two ways to consume or use Nesure Bypass Protein in animal stomach. RDP (Rumen Degradable Protein) and UDP (undegradable Dietary Protein).

What is Nesure Bypass Protein?

Protein that is not degraded in Rumen, which is then digested in abomasum & small intestine and absorbed as amino acids in the small intestine.

How Nesure Bypass Protein is Best ?

Since it provides amino acids (Building Blocks of Protein) in a ratio that when combined with microbial protein and other Nesure Bypass Protein are the most similar to the ratio of milk.

Feeding Recommendation:

Mix "Nesure bypass protein" thoroughly with other feed ingredients.
Mix "Nesure Bypass Protein" thoroughly with other feed ingredients (i.e. Homogeneous mixing) more than 7% for better results depends upon animal capacity of milk. The best way is to consult with your Nutritionist.

BENEFITS

- ◆ Need for medium and high lactating and growing animals mainly in early lactation .
- ◆ Increase in Milk Production by 10 % to 15 % .
- ◆ Reduce milk production cost .
- ◆ Low Methane emission .
- ◆ Decrease ammonia level in faces which improve health of animal & eco friendly as pollution point of view .
- ◆ Better cell synthesis after broken cells .
- ◆ Stabilization stress of animals during ration processed in stomach of animal .
- ◆ An increase in growth rate by 30 % to 40 % .
- ◆ Because of the faster growth rate, calves attain early maturity leading to an early age at first calving .
- ◆ In young bulls , by-pass protein feeding resulted in increased libido and better semen quality .
- ◆ Improvement in SNF (Solid but not fat) and Fat per cent .
- ◆ Better resistance against diseases .
- ◆ Help to control salmonella and reduce mould growth when used with cattle feed .
- ◆ Improved reproduction efficiency .

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Prospects of Exogenous Fibrolytic Enzymes in Dairy Nutrition

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M.S. Mahesh

Background

Balanced nutrition that is adequate in major and minor nutrients has been recognised as one of the key drivers of profitability in dairying. While forages (green, dry and preserved, etc.) and concentrates (compound feed, home-mixed feed, etc.) constitute the major proportion of dry matter consumed by dairy animals, additives and supplements do play a pivotal role in complementing basal diet to augment production performance and profitability. Dairy cattle and buffaloes could receive such additives and supplements either through on-top application at farms or through the compound feed. Mineral-vitamins, yeast products, fats, amino acids, non-protein nitrogen (NPN), encapsulated nutrients, mycotoxin binders/adsorbents (anti-caking substances), phytogenics, etc. are very well recognised and accepted worldwide for use in dairy nutrition. However, of late, there has been an increased interest among researchers and dairy practitioners in the use of enzymes aiming at enhancing the digestibility of basal ration, thereby possibly influencing milk performance. To this end, the present article discusses some of these findings from scientific research on the prospects of exogenous fibrolytic enzymes (EFE) supplementation in dairy ruminant production.

Enzymes in animal nutrition

Traditionally, the monogastric animal industry (poultry, pigs, and aquaculture) used a variety of enzymes such as carbohydrases, proteases, phytases, etc. to improve nutrient utilisation and/or minimising the adverse effects of anti-nutritional factors from diverse feed resources used in the compound feed. Beneficially, it could also minimise the possible unwanted environmental nutrient excretions.

On the other hand, ruminants are bestowed with the unique system of anaerobic digestion of complex plant fibrous materials through fermentative digestion by rumen microbial consortium comprising of bacteria, protozoa, and fungi. Hence, it was believed that ruminants might not need any extraneous supplementation of enzymes. Nonetheless, a multitude of research from across the globe on EFE shows some encouraging results, whilst also with some degrees of uncertainty.

As it is well known that forage fibre is predominantly composed of cell wall carbohydrates such as cellulose and hemicellulose that are bound by phenolic polymer lignin. This lignification makes forages difficult to digest by ruminal microbial enzymes (cellulases). Adding to this, in high-yielding

cows with a greater dry matter intake (DMI) and a faster rate of passage across gastrointestinal tract (GIT), there appears insufficient contact time between enzymes and feed particles. Thus, with the use of fibrolytic enzymes, it could be theorised that the digestibility of complex carbohydrates is potentially augmented, which may have beneficial effects on milk performance.

How fibre digestion influences the performance of dairy ruminants?

In nutritional terms, fibre in the ruminant diet is expressed as neutral detergent fibre (NDF; cellulose, hemicellulose, and lignin) and acid detergent fibre (ADF; cellulose and lignin). It has been established that every unit increase in digestibility of NDF could translate to an additional milk response of 250 g. Thus, it can be theoretically stated that if enzyme application could bring a 4% unit increase in NDF digestion, a corresponding increase of 1 kg milk could be achieved depending on basal diet, among other factors.

Key findings from scientific papers

Although there are different categories of enzymes like amylolytic (digesting starch), proteolytic (degrading protein)

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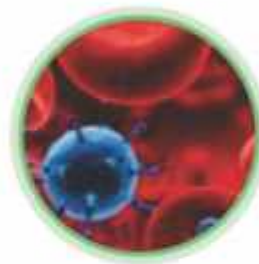
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besides EFE, these lie outside the scope of the present article. Hence, studies focusing exclusively on EFE are summarised below:

1. In vitro experiment

It was found that when sorghum stover was treated with a combination of cellulase and xylanase, the DM digestibility increased from 23.5% to 32.4%, illustrating the benefits of EFE. It was also observed in this study that the efficacy of EFE was found greater when used in combination rather than when treated with a single enzyme (Bhasker et al., 2012).

2. Field trial in dairy cows

An on-farm trial done at the northern part of India utilising 12 crossbred cows (~milk yield: 14 kg/d) in their early-to-midlactation fed with a diet having the forage-to-concentrate ratio of 55:45 were divided into 2 groups of control and treatment. The EFE (a multi-enzyme preparation) was supplemented at 4 g/cow/day in the treatment group along with 80 g of NPN in both the groups. Results revealed—with EFE supplementation—a better milk composition (fat and solid-not-fat) leading to higher revenue generation from the sale of milk on applying 2-axis farm-gate milk pricing. Not surprisingly, this field demonstration found a return on investment (ROI) of 8.3:1 with the use of EFE (Sharma et al., 2021).

3. Effect on feed efficiency

The Canadian researchers studied the effect of feed efficiency, defined as the ratio of milk to that of DMI, in high yielding (milk yield: ~38 kg/d) Holstein cows with DMI of ~23 kg/d. It was observed that cows

receiving EFE supplement registered 30% increase in efficiency of converting ingested feed nutrients into milk (Holtshausen et al., 2011). In this way, EFE may prove beneficial in improving feeding economics and thus bottom-line farm profitability.

4. Experiments in dairy buffaloes

A controlled experiment conducted at ICAR – National Dairy Research Institute, Karnal showed a milk increment of 1.2 kg in Murrah buffaloes supplemented with a combination of cellulase and xylanase. The result was attributed to ~4% improvement in the digestibility of NDF in the basal diet without influencing DMI (~12 kg/d; Shelke et al., 2010).

Most recently, Egyptian researchers supplemented Penicillium-derived cellulase to dairy buffaloes and obtained milk improvements to the extent of ~1 kg/d with an approximately 5% increase in NDF digestibility (Azzaz et al., 2021).

5. Application of EFE during ensiling

In an interesting study, lignocellulosic agro by-products such as wheat straw, corn stalks, and cane bagasse were ensiled separately with or without the addition of EFE cocktail. In vitro evaluation of these ensiled feeds showed better gas production and thus organic matter digestion upon the use of EFE. This shows the potential of EFE in unlocking the energy potential of agricultural by-products (Kholif et al., 2017).

6. Results on meta-analysis of EFE

When several controlled experimental data were collated

and re-analysed through a meta-analytic approach, the results become more concise, concrete, and clear. A data set involving 74 experiments and 586 records worldwide revealed that EFE supplementation could result in a milk yield improvement of 1.96 kg/d along with milk protein and fat by 99.4 and 83 g/d, respectively (Tirado-González et al., 2017). This conclusively deduced the merit of EFE in improving lactational performance in dairy animals.

Selection criteria for EFE for dairy

Following are some of the factors that would be handy to consider while choosing EFE products for ruminants:

- pH stability in the rumen (~6.5)
- Thermostability (when intended for use by feed millers manufacturing steamed pellets)
- Multi-enzyme preparation over single enzyme
- Enzyme concentration (enzyme units?)
- Efficacy at in vivo/on-farm conditions
- Demonstration of practically feasible cost-benefit ratio (i.e., ROI)

Conclusion

Enzyme technology appears valuable to leverage greater benefits by unlocking the nutritional potential of feeds and thus improving performance plus economic gain in dairy animals. This can be of relevance to use by both compound feed manufacturers as well as dairy farmers under the situation when merits of enzyme application outweigh its inclusion cost.

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DeHaat: Innovation Reaching The Grassroots

Founded by the alumni from IIT Delhi, IIT Kharagpur, IIM Ahmedabad and other top institutes – DeHaat is one of the fastest growing start-ups in Agri Tech sector and one of the very few companies providing end-to-end solutions and services to the farming community in India.

Their operations spread over last 8 years have created a phenomenal impact at grass root level and have been recognized and felicitated by NASSCOM, Forbes, ET, Niti Aayog and Bill Gates Foundation.

Shashank Kumar, the CEO and Founder of DeHaat was facilitated as the 'Most Innovative Personality for Rural Development & Agriculture' by honourable Shree Giriraj Singh at the Desh Ratna Conclave organized by India Positive, in the memory of India's first president Dr Rajendra Prasad.

Agri-tech platform DeHaat has raised

\$115 million as a part of its Series D funding round led by Belgium-based investment firm Sofina and Lightrock India. The company plans to use the proceeds from the current fundraise to expand its geographic focus, increase investment in technology infrastructure, as well as increase the spread of financial services offerings. Post this round, the company has raised close to \$157 million since its inception in 2012.

DeHaat earlier acquired Farm Guide, a B2B Software as a Service (SaaS) platform. FarmGuide was founded in 2016 by IIT Delhi alumni Nikhil Toshniwal and Ankit Gupta. The duo developed a SaaS-based platform by using satellite-based data for detecting farm boundaries and data-driven customised crop advisory services. Farm Guide's spatial technology and data science will be integrated with DeHaat's existing

platform to build a full-stack platform for agribusiness. The founding team of FarmGuide will also now be a part of DeHaat.

Dehaat model was designed to provide customized solution under one roof almost everything that too under 3-5 kms of range. Farmers can get quality of input directly from manufacturers thus reducing their input cost, they may get advisory service based on input purchased and crop they grow, they can also sell their produce directly to institutional buyers at the end of cropping season.

DeHaat model was planned to work on COCO (Company owned – company operated) based franchise model. Franchise owners are supposed to play a role more than just a distributor. People from farming community usually a local youth age of 25-40 is preferred, educated up to senior



secondary level and is comfortable using Android phone. Such youth are trained and nurtured to become microentrepreneur and makes personal touch with farmers. The microentrepreneur has to initially bring capital of 3-4 lakhs and can earn upto 12000-18000 per month by serving 600-800 farmers within the radius of 3-5kms on average working 4-5 hrs in a day.

The company, presently, has a strong foothold in eastern part of India including states of Bihar, Jharkhand. With the fundraise, the company will look to go deeper in Indian states of Uttar Pradesh, Madhya Pradesh and Rajasthan this year. The company is also looking to expand its footprint across Andhra Pradesh, Telangana and Chattisgarh.

Currently, DeHaat serves over 650,000 farmers across its platform. It has a network of 3000 franchise agents on ground acting as last mile touchpoints for its customers. The company plans to reach 2 million farmers and grow its last-mile touchpoints to 12000 franchise agents in the next 18 months.

What is DeHaat

More than 50% of India's population is dependent on agriculture for their livelihood. At 157.35 million hectares under cultivation – the second highest in the world – provides enough scope for technology to make farmers' lives easier, and increase yield and output.

DeHaat is an ICT based platform that offers end-to-end agriculture services to Indian farmers with the aim to improve the efficiencies of the agriculture value chain by bringing small farmers under one roof. It connects small farmers to their various needs – Seeds, fertilizers, equipment, crop advisory & market linkage of agri produce through a wide network of trained micro-entrepreneurs.



How does it work?

Currently, DeHaat is focusing on three major services – agricultural input, crop advisory and market linkage for farm produce.

Firstly farmers need to register to get access to a wide range of agricultural inputs (Seed, Fertilizer and Crop protection) directly from competitive sources.

After that, they get customized crop reminder call in the local language and crop monitoring support from the same DeHaat micro-entrepreneur.

Last, they sell the farm produce directly to institutional buyers. Farmers can place their various demand related Agri input, field visit or Agri output either through the toll-free number or mobile application and get last-mile services through assigned micro-entrepreneur.

Orders sent forward to DeHaat's micro entrepreneurs, and fulfilled the same day. Each DeHaat micro-entrepreneur caters to 600-800 farmers in a radius of 3-5 km.

It is one-stop solution for farmers for all their farming needs; eliminating the multiple middle men at each stage - from advising them on what to cultivate and how to cultivate in a highly customized way, analyzing right & customized set of inputs for them and making it available directly from manufacturers, farm mechanization and finally marketing their produce to fetch the best rates.

DeHaat generates its revenue from:

- a) Input analysis, planning & linkage
- b) Low cost crop advisory services: INR 200 per farmer per year
- c) Output linkage Local channel partners work on incentive-based model. While working with 450 farmers, a rural entrepreneur earns INR 5000 monthly from above mentioned services. While solving pain points of farmers, in house revenue engine & tech-based solution make the model sustainable.



Image Source: Shutterstock



Vadodara and Panchmahal - Sanitation Projects Alembic Pharmaceuticals Initiative

Alembic Pharmaceuticals under its CSR activity initiated a sanitation project by constructing household toilets (HSLs) at Sindhrot Panchayat of Vadodara and Ujeti & Panelav Panchayats of Panchmahals Districts

An important goal of their CSR program is to focus on the need for utilization of toilets and maintaining its hygiene conducted for community members. In line with this goal, they have constructed 779 household toilets (HSLs) and also distributed 779 hygiene kits to the owners of the HSL's.

To this end, they have conducted assessment surveys in the communities and 15 communities were declared Open Defecation Free (ODF). More than 3,116 lives benefitted from this project that increased the safety of women and children.

In Panchmahal, they constructed a 24ft long and 10ft deep waste weir on Dhinkwa Lake to conserve rainwater. The new waste weir constructed by

the groundwater levels and benefits more than 12,000 people residing in and around Dhinkwa village.

The Alembic CSR Foundation is doing extensive work in the districts of Panchmahals, Chhota Udepur, and Vadodara District. Alembic Pharmaceuticals initiative of sanitation project must be applauded by one and all.



Biosint Nutraceuticals Launches Various Products for the Dairy Animals

Cattle Division of **BIOSINT NUTRACEUTICALS** had a Technical Session and product launch event conducted at the TEMPLE CITY – MADURAI on 18th November 2021 at HOTEL ROYAL GRANDE, with the Madurai district Veterinary Association. The event welcome address was given by Regional Joint Director of Animal Husbandry, Madurai Dr. P Natraj Kumar.



Dr M S Saravanan from ANIMAL DISEASE INTELLIGENCE UNIT presented FOOT AND MOUTH DISEASE prevention and vaccination protocols followed by interaction with veterinarians on the experiences at the field levels.

Followed by this event BIOSINT NUTRACEUTICALS, PROPRIETOR, DR RAVI PACHAIYAPPAN, introduced the company and their products, he introduced the concept of PROBLEM SPECIFIC NUTRITIONAL SOLUTIONS how it works with their products. After the presentation

Regional Joint Director of Animal Husbandry, Madurai Dr. P Natraj Kumar Launched BIOSINT cattle division new product "KETOKON" a novel nutritional formulation for Ketosis control in dairy animals. Dr. Jeyagopi unveiled the product "RUFACC", Dr. N R Saravanan ADAH MADURAI and Dr.

Venkatasamy launched HEPA-VITA Liver Revitalizer for Cattle and Small Animals and Finally Dr. Kalieshwaran (AD) Samayanallur VH and Dr. Girija (AD) Thirumangalam VH unveiled Rumen-BUFF a unique buffer solution for dairy animals.

The meeting was well attended by more than 60 Madurai District Veterinarians, we had a greater interaction with them to identify the field problems for which BIOSINT would like to work with them to

develop cost-effective nutritional solutions. The event was followed by dinner



Boehringer Ingelheim Launches Bovikalc® Dry for Dairy Cows

The U.S. cattle team at Boehringer Ingelheim Animal Health has launched Bovikalc® Dry, an oral mineral supplement that contributes to comfort and well-being for dairy cows.

It is the first product on the market in the United States that helps decrease milk production in cows during “dry off,” a period of 45 to 60 days before a cow delivers its next calf.

This time of rest, when a cow is not being milked, allows for final fetal growth and rejuvenation of milk-producing cells. Bovikalc® Dry helps prevent milk accumulation and udder swelling with the goal of a more comfortable dry-off experience.

“Boehringer Ingelheim is dedicated to enhancing the well-being of animals, and Bovikalc® Dry is a great example of that commitment,” said Jeff Estabrooks,



head of the U.S. cattle business for Boehringer Ingelheim Animal Health. “It’s also an example of our determination to deliver innovative solutions to meet the needs of our customers.”

The cattle team introduced Bovikalc® Dry at the World Dairy Expo in the fall of 2021 in Madison, Wisc.

Nationwide AHDF KCC Campaign Launched For Providing Kisan Credit Card Facility To All Eligible Animal Husbandry, dairy And Fishery Farmers

As part of Aazadi Ka Amrit Mahostav, Nationwide AHDF KCC campaign officially launched by FAHD Minister Shri Parshottam Rupala today through virtual mode.

In order to expand the benefit of Kisan Credit Card to all eligible animal husbandry, dairy and fishery farmers in the country, this department, in association with the Department of Fisheries (DOF) and the Department of Financial Services (DFS), is organizing a “Nationwide AHDF KCC Campaign” from 15th November 2021 to 15th February 2022. The circular conveying the detailed guidelines for organizing this campaign has been issued to States on 10.11.2021. The necessary instructions to banks as well as State Government have

also been issued by D/o Financial Services.

Livestock sector is crucial to the Indian economy today, comprising one third of the agriculture and allied sector GVA and having over 8% CAGR. At the same time, Animal Husbandry, Dairying and Fisheries activities play a significant role in generating farmer income, particularly among the landless, small and marginal farmers and women, besides providing cheap and nutritious food to millions of people. It is need of the hour to provide reverential recognition to landless, small and marginal farmers and women involved in Animal Husbandry activities in the country and meet their institutional credit requirement for working capital needs through KCC so as to

tap the potential of the sector and increase employment generation and income.

A Special Drive was organized last year, from 1st June 2020 to 31st December 2020, by the Department of Animal Husbandry and Dairying in association with Department of Financial Services, for providing AHDF KCC to eligible dairy farmers of Milk Cooperatives and Milk Producer Companies. As an outcome over 14 lakh fresh AHDF KCC has been sanctioned. However, since there are nearly 10 crore AHD farmers across the country, there is ample scope for expansion of this exercise beyond dairy cooperatives to cover other eligible dairy farmers as well as other animal husbandry activities.



RDAR announces \$110,291 Investment in CBS Bio Platforms to enable Alberta to lead the development of enhanced and sustainable feed

Alberta-based CBS Bio Platforms will develop 'superior' plant-based proteins and extracts to enhance performance of swine and poultry feeds.

Results Driven Agriculture Research (RDAR) has announced a \$110,291 Investment in CBS Bio Platforms to enable Alberta to lead the development of enhanced and sustainable feed. Industry-leading outcomes from this research project will strengthen Alberta's reputation as a centre for world-class, livestock production.

RDAR funding will drive research led by CBS Bio Platforms, a leading international feed technology company headquartered in Calgary, to develop novel processes that release previously inaccessible plant components and makes them usable in poultry and swine diets.

Rob Patterson, CBS Bio Platforms Technical Director, "The impacts of success for this project will be far-reaching for swine and poultry producers.

Protein is a major variable expense for producers, and CBS is developing novel technologies, such as feed-derived prebiotics, to be used to maximize feed performance and replace antibiotic growth promoters."

Positive research results will deliver producer benefits at the farm gate by reducing the feed cost and increasing quality. By improving feed's overall economics and sustainability, this research will unlock hard-to-capture value in feed inputs. This research will broaden the toolbox of beneficial and affordable plant protein sources, diversify the options for alternatives to antimicrobial use and help meet the new market legislation and consumer preferences for poultry and swine products.

Nate Horner, Minister of Agriculture, Forestry and Rural Economic Development, "Innovation in animal feed

represents a great area of opportunity for Alberta's economy and to help our livestock producers maximize benefits and increase profitability. This industry-directed investment from RDAR towards made-in-Alberta solutions will accelerate our progress to capture this potential – supporting a strong future that expands the boundaries of Alberta's agriculture success."

Positive research outcomes will also help reduce agriculture's environmental footprint.

Clinton Dobson, RDAR Director of Research, "This research will help our industry emerge as a leader in shaping and adopting the feed of the future, bringing efficiencies and other advantages that keep more dollars at the farm gate and strengthen the overall competitiveness of the sector."

DSM scales up the production of Bovaer® to reduce methane emissions

#WeMakeItPossible



DSM Announces New Production Site for Bovaer® in Dalry, Scotland

Royal DSM, a global purpose-led science-based company active in Health, Nutrition and Bioscience, announces at COP26 in Glasgow that it is planning to realize large scale production capacity for its novel methane-reducing feed additive for ruminants, Bovaer® with a new plant at its existing site in Dalry, Scotland, supported by Scottish Enterprise. As emphasized by the First Minister of Scotland at the announcement, Scotland offers a welcoming and supportive environment for innovation and production,

and is leading the way for a net zero future.

Reducing methane emissions is crucial to reach the Paris Agreement target of maximum 1.5 degree warming, especially since methane's warming effect is shorter lived and much more potent than carbon dioxide. Therefore eliminating methane will pay off right away. Experts at COP26 have emphasized the great impact additional focus on methane emission reduction can have, which was also expressed in

the recently announced global pledge aiming at reducing methane emissions by 30% by 2030. Amongst other things, methane is emitted from cows – over 50% of emissions from milk production comes in the form of enteric methane emission. Bovaer® is a feed additive for cows which consistently reduces enteric methane emission by approximately 30% for ruminants. The endeavor to develop Bovaer® encompassed over 10 years, 45 on-farm trials in 13 countries across 4 continents,



and more than 48 peer-reviewed studies published in independent scientific journals.

Early September 2021 DSM received full regulatory approvals in Brazil and Chile for its feed additive Bovaer®. DSM has available initial commercial product volumes for near term market development. To prepare for further scale up in the next years, engineering for a new large plant in Dalry has started, which is targeted to be started up in the course of 2025. DSM's Dalry manufacturing site has been in operation for over 60 years and produces high quality micro-nutrients. The site is the only Western producer of vitamin C.

Geraldine Matchett and Dimitri de Vreeze, co-CEOs of DSM commented: "First of all we are pleased with the Scottish government's support of the buildup of our production capacity of Bovaer®, particularly within the context of COP26, where the importance of fast climate action through reduction of methane emissions is emphasized again. We are looking forward offering a scientifically proven effective solution to the challenge of methane emissions by farming. As food systems and

climate crisis are intrinsically linked, addressing the challenge of sustainable animal farming for a healthy planet is pivotal."

Nicola Sturgeon, First Minister of Scotland, said: "Methane reducing feed additives are a crucial part of the solutions that the agriculture sector needs to deploy towards achieving climate ambitions. This multi-million pound investment will make Scotland the home of this innovative product and highlights that Scotland is leading the way in delivering a net zero future."

Scottish Enterprise's Managing Director, Linda Hanna added: "Royal DSM's Project Bovaer® has the potential to be a gamechanger for the world's net zero ambitions and I am delighted that Scotland was chosen as the ideal location for this project. Alongside our partners, Scottish Enterprise worked closely with Royal DSM to build a strong relationship and provide support to help them choose Dalry as the target site for this global manufacturing opportunity. As we support sustainable economic recovery, this investment by Royal DSM provides a real boost for

Scotland's economy. It also very much underlines the message we are sharing with the world: that Scotland is open for business."

DSM recently launched a series of new quantifiable commitments aimed to address urgent societal and environmental challenges linked to how the world produces and consumes food by 2030, the Food System Commitments. These commitments cover three areas where the company believes it can make the greatest positive impact together with its business partners: Health for People, Health for Planet and Healthy Livelihoods. One of DSM's commitments is to enable double-digit on-farm reduction of livestock emissions by 2030. DSM can help make a sizeable reduction in emissions from farms by changing the feed that animals eat every day. Bovaer® is a prime example: one quarter of a teaspoon per cow per day will consistently reduce enteric methane emission by approximately 30% - enabling a 10-12% reduction in greenhouse gas emissions per kilo of milk.



Lactalis Announces Financial Assistance to Dairy Farmers at Most Reasonable Rates

World's largest dairy company and India's biggest bank come together to offer financial assistance to dairy farmers at the most reasonable rates.

In a first-of-its kind initiative, the world's largest dairy company Lactalis and India's largest bank, the State Bank of India come together to offer financial assistance to dairy farmers, thus taking a major step towards fulfilling the country's ambition of doubling farmers' income by 2024.

Lactalis announced a gala loan disbursement ceremony for 200 dairy farmers, on December 3, 2021, in Shrirampur, Maharashtra, in presence of Mr.

Rajiv Mitra, CEO, Prabhat Dairy, and Mr. Ajay Kumar Singh, CGM, Agriculture, SBI.

The State Bank of India sanctioned loans to 300 Prabhat farmers in a grand ceremony. An important step towards India's ambition of doubling farmers' income by 2024.

An MOU, between India's largest bank & the world's largest dairy group, is a major & pioneering step towards farmers' self-sufficiency in western India. Supporting farmers across the globe has been an important part of the Lactalis mission.

About Lactalis Group Lactalis Group, the world's

leading dairy group, is a French-family business founded in 1933 in Laval, France. Present in 52 countries with 270 manufacturing facilities throughout the world, its 85,000 employees promote milk in all its forms: cheese, drinking milk, yogurts, butter and creams, dairy ingredients, and nutrition. At the heart of the daily lives of millions of households, Lactalis Group offers products from emblematic brands such as Président®, Galbani®, and Parmalat® and is committed to perpetuating its dairy know-how as the world's leading player in Protected Designation of Origin (PDO) cheeses.



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	Mastitis
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

CHR HANSEN

Improving food & health

Chr. Hansen Launches Sustainable Solution To Support Normal Cattle Health And Performance



SiloSolve® FC – a simple solution for multiple problems

Each year a massive forage loss is taking place during ensiling and at feed out – most dairy producers will know this and will take due measures to ensure sufficient forage to compensate these losses. Sometimes the growing season, however, does not allow this practice - and from a resource management perspective this may not be the optimal strategy.

To the producer shortage of forage may present itself with another problem: Early feed out. Dairy producers will recognize the challenges of feeding silage that has fermented for less than the optimal 90 days: unstable silage, often associated with a reduction in milk yield.

If using a silage inoculant, specific products are mostly targeted for specific crops or conditions. As changing weather may affect the conditions for the planned forage, this can play another trick on the producers, suddenly making an already purchased silage inoculant obsolete.



Flexible – in 3 dimensions

With the introduction of SiloSolve® FC producers have a new powerful tool to the forage management challenge – flexible to crops and conditions, providing good aerobic stability – and at the same time allowing for early feed out*.

No silage inoculant, however, can entirely compensate the naturally occurring losses during ensiling nor will it compensate poor silage management. The best return on investment of SiloSolve® FC is observed when silage management overall is perfect.

Unique technology inside

SiloSolve® FC is the latest evolution of silage inoculants from Chr Hansen. It contains EU approved *Lactobacillus buchneri* 1819 and *Lactococcus lactis* O-224 with unique oxygen scavenging capabilities.

SiloSolve® FC can be used across a range of crops and dry matter concentrations.

**Although early feed out should not be a part of the tactics in modern dairy farming, it pays off to be prepared for the un-preferred.*

Bovacillus™ is a versatile probiotic that can be used in all types of feed applications.

Dairy farmers in India now have access to a technology proven to benefit gut health and productivity of their herds. Probiotics are good bacteria, well known for their beneficial effects in humans and animals. However, up to this point this technology has not been widely available to dairy farmers, due to the challenge of keeping the bacteria alive in different types of feed.

Chr. Hansen, a leading 146-year-old global bioscience company, now puts a new product into the India market,



Bovacillus™. Consisting of two strains of different species of Bacilli – Bacillus licheniformis and Bacillus subtilis isolated from nature – Bovacillus™ is a special type of probiotic. Bacillus spores can survive harsh conditions during feed production, preparation and within the gastrointestinal tract.

“Both strains of Bacilli were selected based on their capacity to produce high quantities of digestive enzymes. Bacillus organisms have been used as probiotics for farm animals for several years, where they have supported performance and health. We’re excited to offer our customers this new product range.” says Dr. Oscar Queiroz, Global Product Manager dairy and beef cattle probiotics, Animal Health, Chr. Hansen.

Widely applicable

The ability to form spores is what gives Bacilli their ability to survive and perpetuate under sub optimal conditions. Thanks to its diversified and synergistic modes of action, Bovacillus™ is an effective choice to support the health and performance of cattle. The resilience and versatility of Bovacillus™ allows this effective probiotic to be used in a broad array of applications for cattle:

- Premixes
- Mineral mix
- Mash feed
- Pellets and cubes
- Milk replacers
- Pasteurized milk

- Complete feed
- Blocks and tubs
- Liquids

“At Chr. Hansen we are uniquely positioned to drive positive change through microbial solutions. We have worked almost 150 years to enable sustainable agriculture, and as we continue to unlock the power of good bacteria to respond to worldwide challenges such as the overuse of antibiotics and pesticides, we are matching customer needs and global trends. In this way we put action behind our purpose, to grow a better world. Naturally,” concludes Dr. Raghavendrakumar M, National Sales Executive India, Animal Health. Chr. Hansen.



About Chr. Hansen Animal Health and Nutrition

With an ever-expanding range of probiotics, Chr. Hansen works continuously to develop the products of tomorrow, enabling farmers to produce the high quality, sustainable, and safe food that global consumers demand. We have the world’s largest commercial bank of bacterial strains (+40,000), and from this strong foundation, we continue to innovate and produce the best bacterial solutions for cattle, poultry, swine and silage. All this is accomplished from our strong platforms in bioscience technologies combined with extensive research and in close dialogue with our customers and business partners.

About Chr. Hansen

Chr. Hansen (www.chr-hansen.com) is a global, differentiated bioscience company that develops natural ingredient solutions for the food, nutritional, pharmaceutical and agricultural industries. At Chr. Hansen we are uniquely positioned to drive positive change through microbial solutions. We have worked for over 145 years to enable sustainable agriculture, cleaner labels and healthier living for more people around the world. Our microbial and fermentation technology platforms, including our broad and relevant collection of around 40,000 microbial strains, have game-changing potential. Matching customer needs and global trends we continue to unlock the power of good bacteria to respond to global challenges such as food waste, global health and the overuse of antibiotics and pesticides. As the world’s most sustainable food ingredients company, we touch the lives of more than 1 billion people every day. Driven by our legacy of innovation and curiosity to pioneer science, our purpose – To grow a better world. Naturally. – is at the heart of everything we do.



Hon'ble CM of Odisha Inaugurates Ultra-Modern Dairy Plant Set up by NDDB

Shri Naveen Patnaik, Hon'ble Chief Minister, Odisha inaugurated the newly commissioned ultra-modern automated dairy plant of OMFED at Arilo, Cuttack on November 10, 2021, for which technical consultancy has been provided by NDDB. Dr. Arun Kumar Sahoo, Minister, Agriculture & FE, Fisheries & ARD, Higher Education, Govt of Odisha; Shri Devi Ranjan Tripathy, MLA, Banki; Shri Suresh Chandra Mahapatra, Chief Secretary, Govt of Odisha; Shri Meenesh Shah, Chairman, NDDB; Shri R Raghu Prasad, Commissioner-cum-Secretary, Fisheries & ARD, Govt of Odisha; Shri Pradeep Kumar Jena, Development Commissioner-cum-ACS & Administrator of OMFED and Dr. Yeddula Vijay, Director, AH&VS, Govt of Odisha were present.

The Hon'ble Chief Minister said that our farmers have contributed in the development of OMFED and the government's main aim is to enhance

farmers' income. Shri Patnaik conveyed that OMFED belongs to farmers and the state government always supports them. While mentioning milk as a major component in providing nutritional security, the Hon'ble CM said that the government is eager to bring milk revolution in the state.

Shri Meenesh Shah, Chairman NDDB said that it is a matter of great pride and happiness that the ultra-modern 5 LLPD capacity dairy plant with 20 MTPD Powder Plant and other milk products like butter, ghee, flavored milk, paneer, etc. is being inaugurated by the Honourable Chief Minister of Odisha. The plant has come up with an outlay of about Rs 250 crore. He further said that such technical advancement and infrastructure up-gradation with NDDB's support will bring the much-needed socio-economic transformation of rural Odisha.

NDDB has played an important role in the dairy development of Odisha. A state-of-the-art BSL3 laboratory has been set up by NDDB at Bhubaneswar for ICAR to conduct systematic epidemiological and molecular epidemiological studies on Foot & Mouth Disease (FMD) with an outlay of about Rs 160 crore.

NDDB has completed IVF/ ETT Laboratory at CCBF Sunabeda and Chiplima in order to improve the productivity of milch animals. NDDB has also completed 150 MTPD Cattle Feed Plant at Khurda with an outlay of Rs 27 crore, which can produce up to 300 MTPD Cattle Feed with a 20-hour operation.

NDDB is also replicating the manure management model across eight states in the country including Odisha. Cuttack Milk Union is spearheading the implementation of the first such manure management project in the state. The project is being implemented with funding support from Indian Immunologicals Ltd through NDDB Foundation for Nutrition.

DSM Receives Positive EFSA Opinion for Methane-Reducing Feed Additive Bovaer®



Royal DSM, a global purpose-led science-based company, today announces that it has received a positive European Food Safety Agency (EFSA) opinion for the use of its novel methane-reducing feed additive for ruminants, Bovaer®, in the European Union. The EFSA opinion confirms that the feed additive reduces enteric methane emissions from dairy cows and is safe for the animal and the consumer. This opinion progresses the application to the

final stage of approval from the European Commission Standing Committee on Plants, Animals, Food and Feed.

Bovaer® is the result of a decade of scientific research, including more than 50 peer-reviewed studies published in independent scientific journals and 45 on-farm trials in 13 countries across 4 continents. Since receiving full regulatory approvals in Brazil and Chile for Bovaer® in early September 2021, DSM has signed a

development agreement with JBS S.A., one of the world's largest food producers. European Commission approval would allow DSM to start market development in Europe in the first half of 2022. DSM has already begun engineering for a new large scale production facility in Dalry, Scotland.

Ivo Lansbergen, DSM's President, Animal Nutrition and Health, commented: "It is very timely, after the IPCC's climate change report and the recent Global Methane Pledge during COP26, that a positive opinion has been given for a feed additive that we know can have such a beneficial environmental impact. We see the livestock sector recognizes this opportunity for change and is eager to act. We are hopeful that the European Commission will approve the application with speed so that we can offer a scientifically proven effective answer to the challenge of farming's methane emissions."



January 2022

1. DairyTech

Dates: January 25- 27, 2022

Venue: Crocus Expo International Exhibition Center

City: Moscow - Russia

Website: www.dairytech-expo.ru

February 2022

1. Agro expo

Dates: February 2- 6, 2022

City: Izmir

Country: Turkey

Website: www.en.agroexpo.com.tr

March 2022

1. EuroTier Middle East

Dates: March 21- 23, 2022

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

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, Vietnam

Email: panadda@vnusiapacific.com

Website: www.ildexvietnam.com

2. Livestock Malaysia

Dates: August 10 - 12, 2022

Venue: MITC Complex

City: Melaka - Malaysia

Email: livestockmalaysiamy@informa.com

Website: www.livestockmalaysia.com

3. Livestock Philippines 2022

Dates: August 23 - 25, 2022

Venue: World Trade Center Metro Manila, Pasay City,
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.victamasiam.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/en-us

November 2022

1. EuroTier

Dates: November 15 - 18, 2022

Venue: Deutsche Messe AG

City: Hannover

Country: Germany

Website: www.eurotier.com/de

Arla Foods introduces new technology to separate milk's different proteins



Revolutionary technology to separate milk into its different protein components has been pioneered by the leader of the dairy ingredients category, Arla Foods Ingredients, opening the door to infinite innovation possibilities.

The patented method, called milk fractionation, is developed by Arla Foods Ingredients (AFI), a global leader within specialized high-quality milk and whey ingredients and subsidiary of the European dairy cooperative Arla Foods. AFI set themselves the challenge of delivering the scientific breakthrough to enable scientists, nutritionists, and health professionals to create next-generation dairy products. Now, this is made possible through the selection of specific pure milk proteins, for example, casein and serum whey proteins.

Enabling the development of specialized nutrient-specific foods opens up new opportunities for taking infant formula and sports products to the next level and catering to other vulnerable groups such as the elderly and people with medical nutrition needs, as well.

UNIQUE TECHNOLOGY CREATES BIGGER POTENTIAL RAW MATERIAL POOL

The separation of milk's different

proteins from whey, previously relied on cheese-making as whey is a by-product of this process. Now, by bypassing the cheese-making process, Arla's new patented milk fractionation technology not only allows for a bigger potential raw material pool it also creates protein streams in a unique and fully controlled process with significantly reduced processing steps and a much more gentle processing of the milk.

Henrik Andersen, CEO of Arla Foods Ingredients, says, "The method has been several years in development and I'm delighted to see what was once a vision become a commercial reality with the power to completely revolutionize targeted nutrition for vulnerable groups. As science-based innovators we are driven to invent and reinvent our processes to ensure we have the best possible products available and continue to lead the way in whey."

Arla Foods Ingredients is currently using the new technology manufacturing the organic Baby&Me® brand for Arla Foods and AFI expects to launch its first organic private label infant formula solutions based on the technology during 2022.

Signing of MoU between Department of Animal husbandry & Dairying (DAHD) & Ministry of Food Processing Industry (MoFPI)

17 NOV 2021 6:08PM

As part of Azadi Ka Amrit Mahostav, Shri Atul Chaturvedi, Secretary, Department of Animal husbandry and Dairying, Ministry of Fisheries, Animal Husbandry & Dairying and Smt. Pushpa Subrahmanyam, Secretary,

Ministry of Food Processing Industry signed an MoU between DAHD and MoFPI for Extension of benefits to Dairy Entrepreneurs/ Dairy industries through convergence of various schemes of Department of Animal Husbandry and Dairying (DAHD), MoFAHD in the presence of Shri Parshottam Rupala, Union Minister of Fisheries, Animal Husbandry and Dairying, Shri Pashupati Kumar Paras, Union Minister of Food Processing Industries and the Ministers of State of Fisheries, Animal Husbandry and Dairying Dr. Sanjeev Kumar Balyan and Dr. L. Murugan, as also the Minister of State for Food Processing Industries Shri Prahlad Singh Patel.



The objectives of MoFPI & DAHD are interlinked and complementary in nature. Hence, the DAHD and MoFPI will work together to achieve the goal for income generation for sustainable development of the rural poor through extension of benefits of various schemes to the beneficiaries whenever they require credit support for establishment/ extension/ strengthening of quality control, dairy processing and its value addition, meat processing and value addition infrastructure, animal feed plant and technology assisted breed improvement farms without any limitation.

Union Minister for Fisheries, Animal Husbandry and Dairying, Shri Parshottam Rupala highlighted that the Dovetailing and synergizing efforts



Dairy processing and Infrastructure Development Fund (DIDF), is another important programme of the department, wherein assistance at subsidised rate of interest (Interest Subvention) will be given. The project focuses on building an efficient milk procurement system by setting up of processing and chilling infrastructure & installation of electronic milk adulteration testing equipment at village level.

Supporting Dairy Cooperatives and Farmer Producer Organizations engaged in dairy activities (SDCFPO) will provide Interest Subvention on working capital to Dairy Cooperatives/Milk Unions/MPC. Also, Animal Husbandry Infrastructure Development Fund where in Interest Subvention and credit guarantee to help increasing of milk and meat processing capacity and product diversification thereby providing greater access for unorganized rural milk and meat producers to organized milk and meat market.

Novaquest Capital Management Acquires Techaccel's Interest In Covenant Animal Health Partners

NovaQuest Capital Management, LLC ("NovaQuest"), a biopharma and life sciences investment firm specializing in human and animal health investing, and TechAccel LLC ("TechAccel"), a technology and venture development organization, announced today that NovaQuest has acquired TechAccel's ownership stake in Covenant Animal Health Partners. Covenant is a novel product development partnership originally formed by TechAccel and Reliance Animal Health Partners in 2018.

The acquisition leverages NovaQuest's

of the DAHD and the MoFPI especially in the context of common objective of helping the farmers and double their income through the livestock sector is the need of hour.

Livestock sector is an important subsector of agriculture in the Indian economy. It grew at CAGR of 8.2 per cent during 2014-15 to 2018-19. India is the world's largest producer and consumer of milk & milk products. Milk production in the country has increased from 146.3 million tonnes in 2014-15 to 198.4 million tonnes in 2019-20 with the annual Growth Rate of 6.28%. Per capita availability of milk has increased from 307 grams in 2013-14 to 406 grams in 2019-20 showing a growth of 32.2%. Also, we have large domestic market with a growing demand for livestock products including dairy and dairy products.

Despite these, the sector is facing many challenges. Almost 60% of the sector is unorganized, scattered production and inadequate processing infrastructure. There is Shortage of Milk quality testing infrastructure and Shortage of village cold chain infrastructure, which are affecting the huge export possibilities. Presently, the export of Dairy products by India is 0.1% of world.

In order to overcome these challenges, GoI is trying to develop new developmental and production oriented schemes/programmes along with Increasing organized offtake of produce through expanding Network of Cooperatives and FPOs, Setting up low-cost support infrastructure like chilling units and testing centres at the village level, Focus on Easier availability of Credit, Expansion of processing, value addition, marketing infrastructure, Increased demand through exports, premium niche products, inclusion in Poshan Abhiyan and a Shift focus to Entrepreneurship based Models.

With the above mentioned objectives, Department of Animal Husbandry is implementing many schemes. National Programme for Dairy Development is to provide assistance through Grants for creating/strengthening of infrastructure for Production of quality milk, Procurement, Processing and Marketing of Milk & Milk Products through State Implementing Agency (SIA) i.e State Cooperative Dairy Federation. JICA assisted project (UP and Bihar) will provide Credit link Grant Assistance to Dairy Cooperatives.



capital and expertise, and Covenant's development and registration know-how and ability to bring "revenue-ready" animal health products to

NOVAQUEST CAPITAL MANAGEMENT

market. Covenant will address critical market needs across production and companion animals and will advance new assets into industry partner portfolios.

"We are truly excited to be a part of Covenant and work with their accomplished industry leaders," said Brian Axe, Managing Director at NovaQuest. "The investment in Covenant will allow NovaQuest to expand the development universe and continue to support innovation growth in animal health."

Covenant's partners will also serve on a newly established Strategic Advisory Committee to support NovaQuest's evaluation of animal health investment opportunities moving forward.

"This is a historic milestone for NovaQuest animal health and will be instrumental in advancing our funding commitment to the animal health industry across products and companies," commented Jonathan Tunnicliffe, Chief Investment Officer of NovaQuest.

Anpario Awarded UK Patent for Orego-Stim, the Composition of Which Reduces Antimicrobial Resistance in Calves

Anpario have successfully been granted a UK patent for their leading phytogenic product Orego-Stim. The composition of which is effective in reducing antimicrobial resistance.

The patent grant follows a combined and successful research programme with the University of Reading. The research demonstrated that the proportion of E. coli bacteria resistant to a fourth-generation cephalosporin antibiotic can be significantly reduced by adding Orego-Stim Liquid to calf diets, according to research undertaken at the University of Reading in the UK.

Antimicrobial resistance is one of the greatest threats globally to human health and has been predicted to be responsible for 10 million deaths a year by 2050 if not acted upon.

University researchers Dr. Partha Ray and Dr. Caroline Rymer, undertook the trial to determine the effect of supplementing Orego-Stim Liquid, a source of 100% natural oregano essential oil, in waste milk fed to dairy calves, on the population of antimicrobial-resistant bacteria in their feces. This resistance can occur when calves are fed waste milk or colostrum containing antibiotic residues.

Waste milk occurs on farms when cows have been treated for a disease, such as mastitis, with antibiotics. The milk from these cows cannot be sold for human consumption and, as it contains valuable nutrients, is often fed to pre-weaned calves.

In the trial, two-day-old Holstein male calves were offered either waste milk with Orego-Stim Liquid added for the first ten days or a control diet of the same waste milk source without the addition of Orego-Stim Liquid. After the initial ten days, all calves were fed the same ration of untreated waste milk and concentrates until weaning at 8 weeks of age.

In the faeces of calves fed waste milk with no Orego-Stim, 44.1% of E. coli present were resistant to the cephalosporin antibiotic (cefquinome). However, in calves fed waste milk supplemented with Orego-



Stim Liquid until day ten, this was significantly reduced, with only 12.6% of total E. coli being resistant to cefquinome.

Mobile Veterinary Ambulance Services at Farmer's doorstep



The Central Government is implementing a scheme viz. Establishment & Strengthening of Veterinary Hospitals & Dispensaries – Mobile Veterinary Unit (ESVHD-MVU), with an aim to provide veterinary services at farmer's doorstep by mobile veterinary units.

The scheme provides 100% financial assistance towards non-recurring expenditure on the procurement of mobile veterinary units and central share towards recurring expenditure (90:10 for the North Eastern States & Himalayan States, 100% for Union territories, and 60:40 for all other States) on running of these mobile veterinary units for the delivery of veterinary services at farmer's doorstep.

The Government has received a proposal from the State Government of Telangana for the release of central assistance under Establishment & Strengthening of Veterinary Hospitals & Dispensaries – Mobile Veterinary Unit (ESVHD- MVU). Accordingly, a sum of Rs.16.00 Crore has been released for procurement of 100 Mobile Veterinary Units (MVUs) during the current financial year.



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