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Editorial

Dear Vets,

We present to you another digital issuely Livestock Future. Your overwhelming response has been instrumental in keeping us motivated to bring this issue.

All warm blooded animals face the wrath of the changing climates and it becomes extremely essential to manage the surrounding environment. So poultry too falls under the same category and demands maintenance of adequate temperature at the farm. Winter brings in various respiratory tract infections and most of them are known to cause high rate of mortality. The winter season calls for very precise adjustment of the temperature control system at the farm. These days most of the high end poultry farms have environmental controlled system, which takes care of the entire atmospheric conditions at the farm.

The vertical transfer of disease causing vectors, are rampant during the winter season, as the birds tend to huddle close to get the warmth. Every farm should employ a veterinarian to keep a close vigil on the farm. This will help recognize the onset of the disease before hand and ward off the probable mortality. The water supply inside the farm should be of adequate temperature, so that the bird may feel the ease of drinking water.

Apart from this, ventilation is another important aspect because the close environment maintained inside the farm due to lower temperature outside, will result in accumulation of gases in the farm. This gets more severe with the wet litter which results in emission of ammonia. Now ammonia accumulation inside the farm adversely affects the entire hygienic condition of the bird resulting in various diseases. Once again if the farm manager had opted for the environmentally controlled house, these problems could have been averted.

Even the nutrition should be designed with proper additives especially for winter and this can be done by consultation with nutritionists. This precise nutrition programme will help achieve the desired FCR, growth potential and general health of the bird. In India when we already of extremes of weather conditions, it becomes mandatory to ensure the comfortable atmospheric condition for all animals reared by humans.We once again thank you for your support to Livestock Future.

(Anup Kalra)

Bloat (Wheat Pasture) Threat: It's Management in Winter

Bloat is defined as, when gastrointestinal (GI) tract is filled with air or gas. It is a problem arises when animal grazed huge pasture leads to bloat. Wheat pasture is one of the important lush green forage available in winter season, in which excess ingestion causing bloat. Wheat pastures bloat sometimes called Sudden Death Syndrome (SDS) is a fatal problem; often killing the growing calves and adult animal that consume a high amount of forage. Bloat is a form of severe indigestion marked by accumulation of gas in the rumen that the animal is unable to expel. Most of the gases are eliminated by eructation or belching but the mechanism ceased off.

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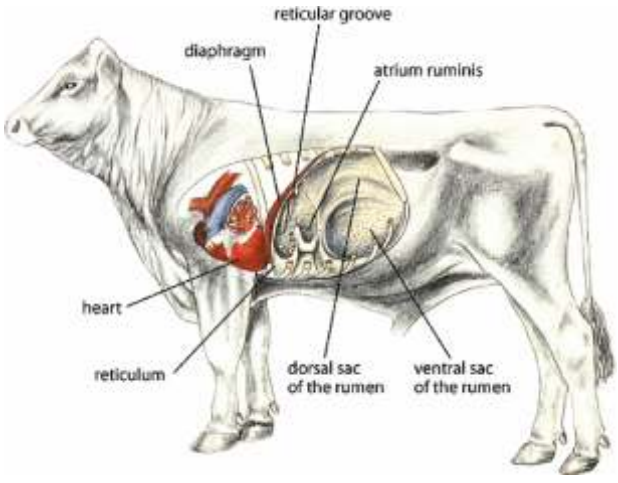


Bloat can be caused by:

- A condition secondary to acidosis
- Certain protienecious fodder
- Consumption rate, amount and coarseness of the roughage
- Rate of digestion of grains as a result of processing
- Enlargement of the lymph nodes between the lungs, which can compress the oesophagus or interfere with the function of the vagus nerves
- An inherited tendency for bloat

Wheat pasture bloat is a type of frothy bloat in

Kiran Pal Singh Saini[1], Bhavna Aharwal[2], Aayush Yadav[3], Nikhil Kumar Singh[4] and Divya Patel[5]

which gas builds up in a foam or froth above the liquid and semi liquid fraction in the rumen content and the normal eructation is inhibited.

Visual signs of bloat in ruminants

Distension of the left side of the animal as the primary sign, discomfort as indicated by stomping of feet or kicking at the belly, laboured breathing, frequent urination and defecation and collapse due to distress respiration.

Wheat is a cash crop as well as good forage. Wheat pasture is a valuable source of high quality forage, typically available in late fall winter and early spring, when other forage sources are low in quality and quantity. Wheat forage provides succulent and highly nutritious forage for ruminants. It is palatable, high in protein, rich in energy and minerals and low in fiber. Because of its high moisture content, it is sometimes difficult to meet the daily dry matter needs of animal. Making some dry, high-quality forage or grain available often improves animal performance. The crude protein (CP) content is particularly high 20-25% (on proximate basis), and sometimes above 30%. The CP component is highly soluble and available as energy to animals.

Properly computation of ration with wheat can be an effective protein supplement for livestock simultaneously grazing or eating other lower quality feedstuffs. Stage of maturity is also influences chemical composition of wheat. The

major decline in chemical composition occurs

by the heading stage. Cell wall components increase with advancing maturity.

Mineral content (potassium, calcium (Ca), phosphorus, and magnesium (Mg) also declines considerably with maturity. The Ca: P ratio is often as low as 1:1.1 compared with a desired 2:1 ratio and Mg levels can be low or inadequate for animal needs. In summary, wheat pasture is high in moisture content, crude protein and digestible nutrients prior to heading. It is palatable and digestible, and has a fast rate of passage because of its low content of cell wall constituents (fiber and lignin).

High crude protein and low fiber contents in wheat pasture are associated with bloat. Cool, moist conditions also favor bloating. Cooler than normal temperatures (especially at night) are usually associated with bloat. This may be due to higher forage intake by animals during cool weather and that plants initially are digested more rapidly while grown at lower temperatures. Cattle also tend to bloat more frequently in the morning, possibly because their biggest meal occurs at this time.(Annonymus, 2020)

Managemental practices for wheat Pasture bloat

1) Nutrition

- Grazing management can reduce bloat problems as effectively as anti bloating

agents. Grazing in such a way, that gradual change in forage quality and plant species to reduce of overeating.

- Livestock graze the highest quality forage at the beginning of the grazing period and a lower quality at the end. Both rate of intake and initial rate of digestion are higher from moist plants, causing more rapid initial digestion.
- Make paddock rotations mid-day or later to help minimize moisture and increase plant carbohydrate concentration.
- Chopped and cutting of fodder, rest for few hours that reduce the level of active anti nutritional factor.
- Total mixed ration that is the combination of balanced roughage and concentrate. So the ruminal micro flora and fauna maintain in the rumen vat.
- Avoid animal to graze with grasses the herbicides/pesticides/weedicides treated field to reduce concentration of high bloating agent plants.

2) Treatment

- Passing a stomach tube is the best treatment for gassy bloat. Once the gas has been released, the cause of the obstruction should be looked for.
- In a few cases a trochar and cannula punched through the side into the rumen will relieve

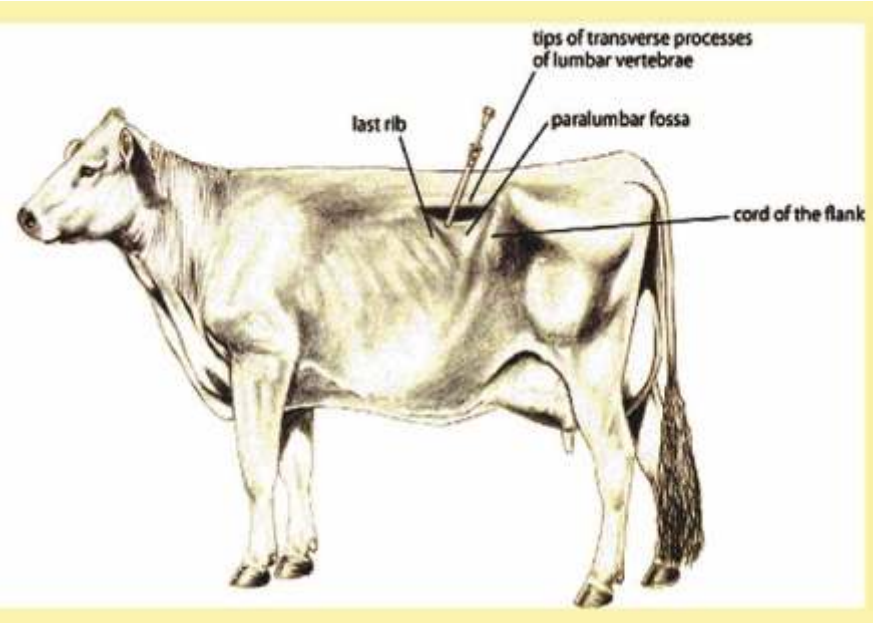
gassy bloat when a stomach tube has not worked. But such cases are rare, and as the trochar provides a tremendous opportunity for introduction of infection, it should only be used as a last resort.

- For frothy bloat, antifoaming agents that disperse the foam should be given by stomach tube. Old fashioned remedies such as linseed oil and turpentine are effective but newer treatments such as dimethicone or polaxolene are easier to give as the effective dose is much smaller.
- If an outbreak of frothy bloat occurs all cattle on that pasture should be removed immediately and put onto a high fiber diet (hay or straw), and any cows showing bloating signs treated with an anti-foaming agent. The pasture should not be grazed for at least ten days.

3) Clinical Signs

- Distended left abdomen is the most obvious sign.
- Usually associated with pain, discomfort and bellowing.
- Death can occur within 15 minutes after the development of bloat.
- Gaseous bloat is usually seen in one or two animals. Frothy bloat can affect up to 25% of cases.
- In some cases sudden death may be the first

sign seen by the stockman, although in such cases it is likely that there will be other cattle with bloat that are still alive.



4) Diagnosis

- On the clinical signs described above.
- History of access to lush pasture.
- Passing a stomach tube will distinguish between gassy and frothy bloat. If it's gassy bloat a stomach tube passed into the rumen will allow the gas build up to escape through the tube. No such gas is seen in frothy bloat.

5) Prevention

- It is much more effective to prevent bloat than treat affected animals. Management and planning can significantly reduce the number of cases. To prevent frothy bloat
- If possible avoid using high-risk pastures at high-risk times. Pastures with a history of bloat problems or with a high clover content should not be used for cows soon after turnout.

- Stagger turnout with buffer feeding as this will allow the rumen to adapt to the new diet. In particular try and keep up fibre intakes at risk periods.
- If you have to use high-risk pastures, introduce the cattle to them slowly. In some cases restricting access to as little as ten minutes per day at the start may be necessary to prevent bloat.
- Avoid starting to graze high-risk pastures when they are wet.
- Administer anti-foaming agents daily if bloat is a severe problem. If this is the case and you can strip graze then spraying antifoaming oils (emulsified with water) onto the grass can significantly reduce labor costs.
- Remove high-risk animals. Some animals have recurrent bloat despite prevention and treatment

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Farm Animals and Climate Change

Climatic changes will have a negative impact on all animals, but particularly livestock who are associated with certain activities that directly contribute to climate change. It is therefore imperative that animal agriculture practices and the welfare of animals be considered when developing climate change policies and programmes, both as potential victims and causes. Such policies and programmes that minimize the impact animal production has on the environment should not be at the expense of animals and/or their caregiver's welfare. The climate debate may lead to a greater increase in intensive production practices at the expense of medium and long term environmental and animal welfare friendly extensive production methods. Harming the health and well-being of animals directly compromises the societal, economical, physiological, and cultural aspects of humans. Effects of Climate Change on the Spread and Emergence of Animal Diseases As global temperatures increase, the effects will be quite complex and vary from region to region.

At least a billion of the world's poorest people depend on animals for food, fiber, income, social status, security, and companionship. Climate change is expected to cause an increase in weather-related disasters and extreme weather events, such as droughts, heat waves, storms, desertification, and increases in insect infestations. Long-term changes in climate will jeopardize the future of all animals—including those in oceans, on farms, in forests, in wilderness areas, and in our homes. All climate change related hazards and their related disasters have a negative impact on animals. Animal agriculture the raising of animals for food, clothing, and draught power is a major contributor to climate change, responsible for 18% of greenhouse gas (GHG) emissions (9 % CO2, 37 % methane and 65 % N2O).

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Dr.Kedar Karki

Though the extent of these effects is uncertain, it is known that those communities and regions with the least resources, such as rural agricultural areas, will be the most vulnerable to climate change. Warmer and wetter weather (particularly warmer winters) will increase the risk and occurrence of animal diseases, as certain species who serve as disease vectors, such as biting flies and ticks, are more likely to survive year-round. Certain existing parasitic diseases may also become more prevalent, or their geographical range may spread, if rainfall increases. This may contribute to an increase in disease spread, including Zoonotic diseases. Transportation of animals for personal, entertainment, or agricultural purposes also increases the possibility for the introduction and subsequent presence of diseases and pests, including ticks and parasites, previously considered exotic. The viral infection Bluetongue Disease, for example, was once only a threat in Africa, now affects cattle and sheep in the whole of Europe. Conditions inherent in industrial animal agriculture facilities can increase the emergence of diseases that affect humans and animals alike.

Outbreaks of diseases such as Foot & Mouth Disease or Avian Influenza affect very large numbers of animals and contribute to further degradation of the environment and surrounding communities' health and livelihood. Effects of Climate Change on Farm Animals and Their Caregivers Animals are intrinsically dependent on the environment, and any fluctuations in weather and climate can affect them through water and land changes, such as desertification, and feed and water availability, access, and appropriateness. Climate change will not only impact the health and welfare of animals, but also the more than billion people who depend on them. Desertification and climate change are inextricably linked through feedbacks between land degradation and precipitation: less rain leads to soil compaction and hardening, making the land unable to absorb rainwater. This could have disastrous effects as rain becomes less frequent but heavier.

The increased use of chemical-based agricultural inputs, including artificial fertilizers, pesticides, and herbicides, and their impact on soil and water quality will likely exacerbate the effects of climate change by further degrading other ecosystems such as coral reefs and rivers, decreasing the land's ability to produce food. It is much easier for farmers in developed countries to endure a climatic setback than those in poorer nations such as Malawi, where 80% of the population lives in rural areas and approximately 40% of the economy is supported by rain-fed agriculture. For example, as grazing areas dry up in sub-Saharan Africa, pastoralists will be forced to travel farther to find food. Cattle, goats, camels, sheep, and wildlife dependant on access to grazing areas for food will suffer. This will lead to greater conflict between people and between people and animals.Resources must be made available to educate and prepare for change if the negative impacts of climate change on animals suffering is to be minimized.

Effects of Farm Animal Agriculture on Climate Change Not only are the effects of climate change on animal welfare important, but also the contributions of animal production to climate change due to the contribution to GHGs and energy consumption. Unfortunately, many studies and recommendations do not take into account multiple causes and effects, thus

significantly restricting the potential outcomes. Livestock agriculture accounts for 35-40% of methane and nearly 70% of nitrous oxide worldwide, gases that arise mainly from the digestive processes of animals, and animals' waste. Levels will continue to rise as animal numbers grow to meet the increasing demands for meat and milk from developing countries such as China and India. Agricultural emissions of nitrous oxide from manure and the production of artificial fertilisers are projected to increase by 35-60% by 2030 . Some developing regions will have very large increases, including parts of East Asia with an increase of 135% from enteric fermentation and 86% for manure management. Deforestation for animal production accounts for 89.5% of all CO2 livestock related emission and 34% of CO2, CH4, and N2O emissions.

The increased production of beef in South America and soybean production for feed transported to Europe is leading to deforestation of the rain forest, which has a great impact on the emission of GHG. Soybean production for feed also causes losses of biodiversity and chemical pollution. Western Europe is the only region whose emissions are falling and predicted to continue to decrease by 2020, but that does not include these areas used for feed production in other parts of the world. With good management, animals genetically suited to their environments and raised in low-density systems can play important roles in proper land management through consuming biomass unsuitable for human consumption. Grazing animals can contribute to a rich biodiversity, fertilizing the soil, and improving the land's ability to collect and absorb water.

Agricultural and pasture lands can act as "carbon sinks," pulling and storing carbon from the atmosphere. Sustainable land management practices, such as agro forestry, silvo-pastures, and growing cover crops, can prevent carbon from being lost. By contrast, poorly managed, high-density and intensive practices and systems are typically inhumane and destructive to the environment. Ensuring adequate animal welfare can also help to reduce GHG emissions and ultimately the future sustainability of meat, egg, and milk production. While animal agriculture emits significant amounts of CO2 through the production of fertilizers and feed, and the energy required to heat and cool industrial operations and run farm machinery, the farm animal agriculture sector emits enormous quantities of nitrous oxide and methane emissions from animal manure, methane emissions from animals' digestion, and nitrous oxide emissions from the artificial fertilizer used to grow feed crops for animals. There is a great deal of research demonstrating how changes to agricultural practices might help alleviate climate change; however, comparisons between different farming methods and land use change are complex and the findings from different research studies are often contradictory.

Farming methods are varied in their effect on climate change, the environment, people, and the animals. Industrial pig and bird production, for example, is a significant source of GHG emissions and is predicted to become even greater with countries such China and India increasing production. On the other hand the more intense the production the less GHG emission per kg of product. There is a lack of research comparing organic or pasture-raised versus conventional or industrial animal agriculture and energy use.

Most studies to date do not include a complete life cycle analysis of all the "ingredients" that go into animal agriculture, including land use changes (deforestation or the clearing of grasslands or pastures to produce crops for animal feed) and the amount of energy used to produce and transport fertilizer, antibiotics, feed, animals, and animal products. While it is difficult to compare species, regions, and farming systems some studies indicate that production of cattle, followed by dairy cows, pigs, and birds is the most damaging to the environment when considering such factors as the type of GHG emission, manure and industrial wastes, water use, production system, feed conversion, and land requirements .

However, these studies do not consider the effect agriculture production has on the animal or on the surrounding communities. Birds raised for meat and eggs are, just as other farmed animals including fish, sentient individuals recognized as such by various governments. While decreasing beef and increasing poultry production could potentially reduce GHG emissions, the acceptability of such policies are limited by decreased welfare of birds in agricultural systems, increased potential for disease outbreaks as well as point source environmental contamination. Industrial animal production facilities require significant amounts of feed, antibiotics, and water to operate and produce huge quantities of manure, with dangerous concentrations of heavy metals, antibiotics and other drugs, and pathogens, such as E. coli, which can pollute the soil and water. In contrast, farm animals reared in more extensive systems, which are less water-reliant and provide for reduced disease transmission, typically use local resources and their manure can be efficiently utilized as a source of fertilizers, thus avoiding artificial fertilizers. Organic agriculture and small diverse farming has the potential to contribute substantially to global food supply while reducing detrimental environmental impacts. But this has been done at a cost that has left deep physical, biological and social scars that now need the full attention of the scientific, moral and political authorities. □□

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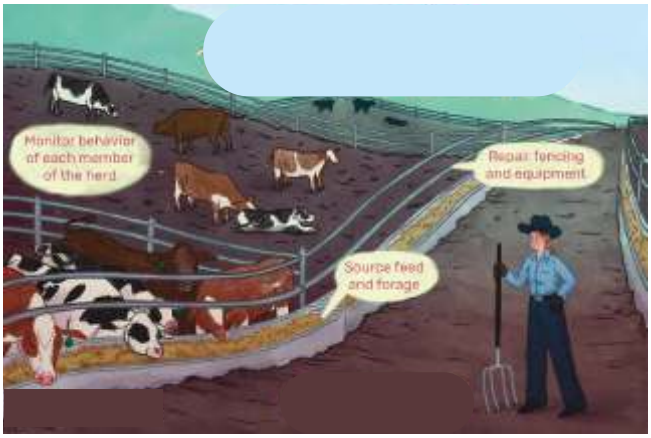
Shelter Management for Sustained Productivity in Farm Animals

Good housing is important for quality milk production. A welldesigned shed provides a clean, comfortable home for the herd and a pleasant, efficient workplace for the operator. A dairy building should be carefully planned for the storage and handling of milk, feed, bedding and manure, as these accounts for most of the labour. A good dairy building must satisfy a number of regulations & must investigate these before construction begins. Make sure a plentiful, dependable supply of good water should be made available 24 h a day. Supply pipes buried deep in the ground will help keep water cool in summer and prevent freezing in winter. A large, mechanized operation also needs dependable electrical power plus a standby system.



Site selection

Site selection Select a high, levelled, welldrained site that will allow future building expansion. Build the floor above ground level to keep out runoff water. Where possible, pick a site that allows chill and hot control. Windbreaks

Dr. Mangesh M.Vaidya, Dr. Sandeep A.Dhenge, Dr.Vivek Khandait, Dr. S.M.Durge and Dr. S.V. Singh[1]

chill hot and wind-control fences should be used. Construct the milk parlour on the north or east side of the barn to reduce the summer heat load. Locate yards where they are exposed to winter sunlight those facing south or southeast thaw and dry faster, so are easier to manage. The barn should be served by a good allweather driveway, or border a high, well-drained service yard with a good gravel base. Consider a circular driveway if milk is shipped in bulk. The truck driver should not have to open or close gates or back up to load. Build the barn close to pasture lanes and where it gives easy access to the house and other work areas.

Housing system

Shed must protect animals from wind, moisture and extreme temperatures. The warm or cold housing, or loose tie-stall or free-stall management depends on the size of operation,availability of bedding, climate, existing facilities, the degree of mechanization and personal preferences. Removes excess moisture in the winter and excess heat in the summer. Shed in winter is only slightly warmer than outdoors. Natural ventilation removes moisture and keeps the barn temperature about 5-

10°C above that outside. Insulation under the roof reduces condensation in winter and heat buildup in the summer. Shed for protecting animal from cold cost less than warm barns but their watering systems must be protected against freezing.

Housing facilities

The housing system should accommodate the need for animals to have shade in the summer, wind protection in the winter, and a clean, dry hair coat. Cold temperatures can be managed with nutritional management and protection from the wind along with a dry bedded resting area. Hot temperatures can cause heat stress, realized in reduced milk production and reproduction problems. Exotic and crossbred cattle and Buffalo should have access to natural or artificial shade during the hottest part of the day and easy access to water at all times. Muddy conditions usually result and the hair coat is constantly wet causing stress on the animals and

high somatic cell counts. Wind Breaks Natural tree lines and wooded areas can act as windbreaks to protect animals. Temporary windbreaks can be constructed from large square or round bale packages of hay or bedding or forage boxes. The windbreak height of 8'-10' can be accomplished with a stack of 2-3 bales high. The bales are also stacked side by side to provide a solid windbreak barrier. A windbreak fence can also be constructed from wood posts and boards or synthetic cloth. Buffalo and crossbred cattle are highly productive animals and are able to perform even under very poor conditions of nutrition and management. However if they are provided with better conditions their productive efficiency could be improved.

Housing and management in organised farms

In organised dairy farms the routines are similar to the backyard farms, except the animals are not let out for wallowing. Generally one labour takes care of about ten lactating animals. The animals are mainly kept tied up in a head-to-head or tail-to-tail system, with a raised manger in which the animals are fed. There would be a centrally located water trough for drinking water and potentially crossbred cattle and buffaloes are washed here once or twice a day. Depending upon the ambient condition the barns are washed and cleaned with water at least once a day and dung are picked up and dumped into manure pits outside the barns. These farm activities are very labour intensive. Now a day's dairy farmers have moved out of the cities and relocated in larger farms in rural areas, where they can produce fodder and make optimum use of manure, improving their profits by 30 to 40%. These farms have adapted improved technology in feeding and milking and they have also been able to bring down the replacement rate to about 10 to 15% while restricting calf mortality to around 10%.

Improved housing and management

The productivity of lactating cattle and buffaloes in

closed housing and in loose housing were studied, and the result proved beyond doubt that loose housing was more profitable, with increased milk yield. Giving the animals some protection from hot and cold seasons has provided some valuable information. A higher conception rate of around 80% was obtained in animals given showers in addition to wallowing facilities. This may also prevent early calf mortality. If loose housing cannot be practised, animals should be tied up in a conventional half-walled shed during the daytime (after milking) from April to June. Over-herding of cattle or buffaloes in the shed should be avoided, with a maximum 25 animals in a floor space of 25 ft x 50 ft. The animals should be let out into an open paddock or yard overnight, for exercise and to provide opportunity for natural breeding behaviour. Care should be taken to empty and disinfect the ponds at least once week otherwise they can spread a variety of contagious diseases. With proper management dairy farming is indeed profitable.

Housing in warm and temperate regions

Good shelter/shed should protect the animals against thermal stress–mainly from direct sun exposure, rains and cold weather. It must allow good ventilation. Due to variations in climatic conditions under different agroclimatic zones/ conditions, housing may therefore be different in different areas, but all housing should allow

enough space for each animals. The open space of the shed should be covered with grass or concrete, just to prevent it from becoming an unhygienic mud hole in rainy seasons. Buffaloes and crossbred cattle are more susceptible to high ambient temperature/temperature humidity index (THI) and required protection from direct sunlight during hot dry and hot humid season, partly because the animals can maintain their normal body temperature without extra energy expenditure. High yielding animals thus have a disadvantage over lower yielding animals and need more cooling facilities. If animals are not provided proper shelters, wallows or showers, their feed intake and growth rate declines. Water intake increases and in the case of lactating animals there could be a drop in milk production. There is a significant decrease in conception rate and a rise in anestrus conditions, artificial insemination/conception, inter calving period, age of puberty and maturity during heat stress. The overall deterioration in the semen quality of breeding bulls was also reported.

Housing in cold regions

The shelter may be a simple construction with a roof and three walls. This system will allow the animals to go outside when the weather conditions are favourable. There should be a feeding manger inside the shelter. A separate heated milking area is recommended. Dry and

clean bedding is important during winter season to maintain animal healthy. Ventilation systems in livestock housing serve an important function, maintaining a comfortable micro environment. An adult dairy cow/buffalo will breathe out four to five gallons of water per day as water vapor and produce 2000 to 2400 BTU/hr. Ventilation systems continuously remove the heat, moisture, and odors created by livestock, and replenish the oxygen supply by bringing in drier, cooler outside air. Proper air exchange also removes gases such as ammonia (NH_3), hydrogen sulphide (H_2S), and methane (CH_4) which can be harmful to both animal and operator health.

Ventilation System Requirements

The good ventilation system should provide the following features.

- **Air exchange.** Sufficient air exchange is accomplished by the natural driving forces of wind.
- **Control.** Ventilation rates required adjustment depending on the inside and outside ambient conditions. This can be achieved by opening and closing curtains, doors, or ventilation panels manually.
- **Flexibility.** Ventilation requires different operating conditions depending upon different seasons/climatic conditions. At least three operating conditions must be provided.
- Continuous minimum air exchange is required to remove moisture constantly produced by the animals.

- Temperature control which is needed during hot and mild weather conditions to remove excess heat from the building.
- High air exchange rates and air velocity surrounding the animals is needed during hot weather to remove heat from the animal's body.
- **Proper barn construction.** Naturally ventilated barns must have sufficient and properly located openings that can be adjusted to take advantage of wind forces and direction.

Shade

Shade is the basic requirement during summer for protecting animals from direct solar radiation during the day. The most effective source of shades are trees. They provide not only protection from sunlight, but also create a cooling effect through the evaporation of moisture from their leaves. Shade has a beneficial effect during heat stress by lowering/ maintaining the physiological responses of dairy animals within physiological limits.

Fans

Air movement increases the rate of heat loss from animal body surface, as long as the air temperature is lower than the animal skin temperature. Higher wind velocity reduced the body temperature, respiration rate and improved the weight gain, milk yield and milk composition. However, if the air temperature is higher than the skin temperature, the skin will gain heat from the surrounding air. The THI more than 72 becomes a source of heat stress for dairy animals.

Mist and Fan System

The mist particles are sprayed on to the animal's

body to wet. A high velocity/blasting fans are used to evaporate the moisture for cooling the animals. The results showed an increase in milk production of 0.66-1.90 kg/day for cows producing 20-25 kg/day.

The milking byre

The milking byre should be neat and clean, efficient place to milk the animal and handle, cool and hold milk. Sanitation regulations differed in different agro eco regions, therefore before construction of a shelter, should contact to the local health or dairy officials. The milk byre must meet strict sanitary requirements. Make sure that the bulk tank can move in and out, by installing double doors or removable panels that extend to the floor. The milking parlour is used for regular milking. It reduces labour by bringing the animals to the operator. Layout will depend upon required capacity, personal preferences, economics and design. Parlours can be as simple as a few stanchion milking stalls beside the milk house, with the milk carried out by hand, to something as complex as a rotary system with automated equipment and transfer systems. The animals wait to be milked in the holding area. This may be part of the regular animal traffic area or a separate space used only for this purpose.

Dung management

The common method to remove the dung from the animal shed in India is by manually. The dung is lifted in the tractor trolley and so transfer into the manure pit in the field away from the shelter for preparation of FYM. In organised dairy farms, the manure is either moved directly into a spreader for field spreading, or stacked outside on a paved slab that has low curbs or earth banks to confine runoff. Locate the proper storage area so prevailing winds carry odours should be away from the animal shelter.

Points to be remembered for better animal management

- The feeding, watering and milking place should always provide shade and protection from rains, either by trees or by a roof.
- Cool drinking water either from a pond/hand pump/tube well helps the animals to maintain their body temperature. Drinking buckets are used extensively for animals as an effective way to provide clean, cool, fresh water at all times. Water troughs should always be placed in the shade.
- Paddock with good leafy trees gives very effective protection to the animals from direct sun radiations. The trees should also be protected from the wild animals.
- Under hot humid climatic conditions it is better not to built walls, becaues walls may lead to inadequate ventilation, favouring bacteria and mould growth which makes the shed unhygienic. To protect the interior from sunshine (or heavy rain), curtains made from straw, textile or other suitable material can be used.
- Particularly for buffaloes, if possible provide wallowing, but the water of the pond should be clean and not far from the farm. Spending more time in walking during direct sun exposure and from the wallow costs more than it saves.
- Intermittent showering of cattle and buffaloes with cool water has proven to be an efficient way for them to get rid of excess heat. □□

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Repeat Breeding in Dairy Cattle Most Challenging task in Dairy

Cows that are cycling normally, with no clinical abnormalities, which have failed to conceive after at least three successive inseminations.

In practice, some will have been inseminated at the wrong time, others may have pathological changes in the bursa or oviduct that are difficult to

palpate, or undiagnosed uterine infections.

Repeat breeders can be divided into two groups:

1.Early repeats

Cows that come into heat within 17-24 days after AI. In these animals the luteal function has been shorter than normal or typical for the physiological oestrus cycle in non bred cow. In these cows the most probable event is either failure of fertilisation (delayed ovulation, poor semen quality etc.) or early embryonic death (delayed ovulation, poor embryo quality, unfavourable uterine environment, precocious luteolysis)

Late repeats

Cows that come into heat later than 25 days after AI. In these animals the luteal function was maintained for longer than the physiological luteal phase in non bred cows. Fertilisation and initial recognition of pregnancy probably took place but for some reason (inadequate luteal function, inadequate embryo signalling, infectious diseases, induced luteolysis) luteolysis was induced and pregnancy lost. Treatment of Repeat breeders Repeat breeders should be carefully evaluated in order to define the most probable reason for the failure to conceive (early repeats) or failure in pregnancy maintenance (early and late repeats). Principles of treating a Repeat Breeding Cow includes

=correcting the nutritional defeciency

=correcting the uterine infections

=better heat detection and proper AI

=correcting the hormonal defeciencies

=use of assisted reproduction techniques => Nutritional treatments

1.Diets containing higher concentration of inorganic iodine from 8-12 days before estrus improve the stimulation of the pituitary gland

2.Deficiencies of Copper and magnesium have been associated with infertility, anemia or immune suppression.

3.Beta-carotene, precursor of vitamin A, has recently been investigated for its involvement in the formation and function of CL, it is suggested that beta-carotene improves the progesterone synthesis and reduces the luteal hypofunction

4.Deficiencies of phosphorus and zinc are linked to low levels of progesterone, which could be the cause of failures in fertilization or early embryonic death. In conclusion, it is important to consider the nutritional imbalance in Repeat Breeding Cows, However, it is not practical to analyze the mineral or chemical composition in blood. It is better to administer 50g of mineral mixture/cow/pay orally in order to avoid disruptions to the reproductive function. □□

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Peste des Petits Ruminants (PPR) A Devastating Goat Disease

Poisoning is contact with a substance that results in toxicity. Symptoms vary, but certain common syndromes may suggest particular classes of poisons. Diagnosis is primarily clinical, but for some poisonings, blood and urine tests can help. Treatment is supportive for most poisonings; specific antidotes are necessary for a few.

Peste des petits ruminants (PPR) is caused by a Morbillivirus that belongs to the family Paramyxoviridae. Its name derived from French for "disastrous disease of small ruminants".PPR is an acute, highly contagious and fatal disease primarily affecting goats and sheep, whereas cattle undergo sub-clinical infection.PPR is classified as an OIE (Office International des Epizooties)-listed disease.

Considering the importance of sheep and goats in the livelihood of the poor and marginal farmers in Africa and South Asia, PPR is an important concern for food security and poverty alleviation. Clinically, the disease resembles rinderpest (RP) in cattle and is characterized by high fever (pyrexia), conjunctivitis, oculo-nasal discharges, necrotizing and erosive stomatitis, diarrhea and bronchopneumonia followed by either death of the animal or recovery from the disease. Pregnant animals may abort. The incubation period of the disease is 2–7 days. Death usually occurs 4–6 days after the onset of fever. PPRV infection leads to high morbidity (up to 100 %) and up to 90% mortality.

Synonyms

The disease used to be called 'Kata', 'Goat plaque', 'Psuedorinderpest', 'Pneumoenteritis complex' and 'Stomatitis pneumoenteritis syndrome'.

Epidemiology

The disease is currently endemic in most of Africa, the Middle East, South Asia, and China. As one of the largest sheep (71.5 million) and goat (140.5 million) rearing countries in the world, India considers PPR as one of the major and priority of livestock diseases. Though there is no evidence of the first appearance of PPR in India, its presence was first reported in 1987. The fi rst confirmed outbreak of PPR in sheep with 25 % mortality was reported in Arasur village, Villupuram district of Tamil Nadu during 1987, where characteristic clinical signs of PPR were noticed.

Economic Consequences

PPR is an OIE (Office International des Epizooties)-listed disease. Sheep and particularly the goats (also known as poor man's cow)

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contribute significantly to the nutrition and cash income of small farmers in Africa and South Asia, the two regions with the largest concentration (about 72.90%) of the poor peoples in the world. According to the FAO estimates, the morbidity, mortality, production losses, and treatment cost of PPR altogether are likely to cause an economic loss of $2,972.5 million/year during 2012-2017 in the SAARC region among which, in India alone, it would be $2569.00 million/year.

Etiology

The causative agent, PPR virus (PPRV) is an enveloped RNA virus belongs to the genus Morbillivirus of the family Paramyxoviridae (subfamily Paramyxovirinae) under the order Mononegavirales with other members of the genus, which include rinderpest virus (RPV), measles virus (MV), canine distemper virus (CDV), phocine distemper virus (PDV) and dolphin and porpoise morbillivirus(DMV). The virus is a pleomorphic particle with a lipoprotein membrane enveloping a ribonucleoprotein core. The genome is a negative sense single stranded-RNA, approximately 16 Kilo bases (kb) long with negative polarity. The PPRV is genetically grouped into four lineages (I, II, III, and IV) based on the F and N gene sequences analyses. Lineages I–III circulate in Africa, while lineage IV is generally found in Asia. Till now, only lineage IV viruses have been reported in India. Three PPRV isolated from India of lineage IV that includes (PPRV/ Sungri/96, PPRV/Arasur/87, and PPRV/Coimbatore/97) (Palaniswami et al., 2005).

Pathogenesis

PPRV is both lymph- and epithelio-tropic and infection usually result in conjunctivitis, rhinotracheitis, ulcerative stomatitis, gastroenteritis, and pneumonia.

Clinical sign

The clinical signs, pathogenesis, and lesions of the disease in sheep and goats, in general, are similar to those of rinderpest except that the disease is more acute in onset, especially in goats, and follows a more rapid course. Another difference is the marked involvement of the respiratory tract; affected animals have dyspnea, hyperpnea, and cough. There is also a marked serous to mucopurulent nasal and ocular discharge. Erosion/ ulceration of the oral and pharyngeal epithelium may be diffuse and pseudomembranes are characteristically observed in the oral cavity.

The different stages of the disease are (i) incubation period, (ii) Prodromal phase (febrile), (iii) mucosal phase (ocular and nasal discharges, hyperemia of conjunctiva and mucosa of anterior nares, and erosions on the tongue, palate, lips (iv) diarrhoeal stage and (v) in non-fatal cases, 'recovery stage' in which, sheep and goats that recover from PPR develop active lifelong immunity.

Gross Pathology

The pathology of PPR is characterized and dominated by retrogressive and necrotic changes in lymphoid tissues and epithelial cells of gastrointestinal and respiratory systems. The prominent lesions include, consolidation, changes in the colour of lungs and sometimes, frothy mucus is observed in cut pieces of a lung on squeezing, anteroventral areas of right lung are frequently involved; areas of lungs become dark red or purple, firm to touch mainly in the

anterior and cardiac lobe. Secondary bacterial pneumonia is common. The congested alveolar border is found to be one of the most characteristic clinical and pathological changes of PPR in goats. Bronchopneumonia is a constant lesion, with the possibility of pleuritis and hydrothorax (Sreenivasa et al., 2000).Lymph nodes associated with lung (mediastinal) and intestine (mesenteric) are most commonly affected which are generally enlarged, oedematous and congested. Necrotic or hemorrhagic enteritis or congestion around the ileocaecal valve, at the caeco-colic junction and in the rectum are seen usually. In the posterior part of the colon and rectum, discontinuous streaks of congestion (''Zebra stripes'' or ''Zebra markings'') on the mucosal folds are observed, which are typical of PPR.

Histopathology

Microscopically the prominent lesions in the palatine tonsils, which included necrosis of surface and crypt epithelium with infiltration of neutrophils, the formation of syncytial cells and scattered intranuclear inclusion bodies. Lymphocyte depletion (primarily in the cortical lymphatic nodules) and numerous multinucleated syncytial cells and apoptotic cells. In the spleen, the white pulp areas depleted of lymphocytes and the red pulp appears hypercellular. Intestinal lesions are most severe and observed within the duodenum, jejunum, and ileum, with the ileum showing the most severe changes characterized by blunted villi, degeneration of surface and crypt epithelial cells, expansion of lamina propria by a primarily mononuclear infiltration with scattered syncytial cells and severe depletion of lymphocytes within Peyer's patches. In the lungs, severe bronchointerstitial pneumonia, observed in the cranial and middle lobes. Multifocal suppurative and necrotizing bronchiolitis, with variable epithelial attenuation to hyperplasia and occasional intracytoplasmic inclusion bodies. The alveolar walls are expanded by inflammatory cells and hyperplastic type II pneumocytes. Multifocal consolidation with infiltrates of mixed inflammatory cells also present.

Diagnosis

PPRV is routinely diagnosed based on case history, clinical signs, gross and histopathological findings but more accurately by using molecular techniques like Immunocapture ELISA (ICE), Cell culture in Vero cell line (Diallo et al. 1989), Transcription polymerase chain reaction (RT-PCR) (Sannat et al., 2014), Loop-Mediated Isothermal Amplification (LAMP) Assay (Li et al., 2010). Differential diagnosis Rinderpest, contagious caprine pleuropneumonia (CCPP), bluetongue, Pasteurellosis, contagious ecthyma, foot and mouth disease (FMD), heartwater, coccidiosis, and Nairobi sheep disease and have similar outcomes.

Treatment

Since PPR is a viral disease, there is no specific treatment for this disease. However, treatment of affected animals by administration of antibiotics (long-acting oxytetracycline, chlortetracycline) to prevent secondary bacterial infections and antidiarrhoeal medicines has been practiced with supportive therapy (B-complex and Dextrose saline) for 5–7 days, which may be useful to reduce the severity of the disease. Treatment and management of clinical cases of PPR or in the

event of outbreaks in sheep and goats are necessary to minimize the economic losses to farmers.

Vaccination

The only way to control PPR is by vaccination. For the prevention of PPR, OIE since 1972 recommended the use of the Tissue culture rinderpest vaccine. It was successfully used to control PPR in West African and other African countries. The first homologous PPR vaccine was developed using live attenuated Nigerian strain PPRV Nig 75/1 after 63 passages in Vero cells produced a solid immunity for 3 years. Nowadays recombinant vaccine also developed to control PPR.PPRV/Sungri/96 strain (Sreenivasa et al., 2000) is the only vaccine virus strain used in India under mass PPR vaccination campaigns as all the commercial manufacturers in India, both at private and public sector, are currently using only this Lineage IV virus. The recommended age for a vaccination with this vaccine has been estimated to be 5 months and above as the maternal antibodies from vaccinated

dams wane by about 4 months (Balamurugan et al., 2012). Single-dose immunization protocol is sufficient for the protection of small ruminants.

Prevention and control

For the proper control of PPR, there is a need for strong support of diagnostic methods and proper, timely vaccination of the susceptible population. Hence, the availability of attenuated cell culture vaccine and various diagnostic techniques/kits for the diagnostic of PPR favors strong recommendations put forward for the control program. The control of PPR can be ensured only through the implementation of effective prophylactic measures. All the sheep and goats of the affected flock should be under quarantine for at least 1 month after the last clinical case. Animal movements have to be strictly controlled in the area of the infection. The only effective way to control PPR is by mass vaccination of the animals

and quarantine measures and the use of an effective vaccine against PPR is the only solution to control the disease effectively.

Some of the other control measures (sanitary prophylaxis) are strict quarantine and control of animal movements, quarantine of newly purchased or newly arriving goats/sheep for at least 2–3 weeks and know the health status and the source of any new animal (s) brought into the flock, migratory flocks are a threat to local sheep and goat, therefore, contact may be avoided, effective cleaning and disinfection of contaminated areas of all premises with lipid solvent solutions of high or low pH and disinfectants including physical perimeters, equipment, and clothing, dead animal/carcasses should be burnt/buried deeply, monitor animals closely and frequently for any developing illness or signs of disease, isolate any sick animals from the flock and contact the Veterinarian immediately to examine sick animals in the herd/flock, use separate facilities and staff to handle isolated animals, educate and train the employees about PPR and the signs of illness and monitoring of wild and captive animals, especially in contact with sheep and goats. □□

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Substitutes of Antibiotics for Maximizing Growth Performance and Feed Efficiency in Poultry

For almost eight decades,Antibiotic Feed Additives (AFAs) have been used in poultry for increased productivity and efficiency. A great deal of research has been focused on the development of antibiotic substitutes to maintain or improve poultry health and performance. Optimal combinations of various substitutes coupled with good management and husbandry practices will be the key to maximize performance and maintain poultry productivity. This review article describes the potential for the various substitutes available to increase poultry productivity and help poultry birds to perform their highest genetic potential under existing commercial conditions. An ideal substitute should have the same beneficial effects of Antibiotic Growth Promoters (AGPs); ensure optimum poultry performance and increase nutrient availability (Huyghebaert et al., 2011). Considering the proposed mechanism of action of AGPs (microbiome and immune-modulating activities), a practical substitute should possess both of these properties in addition to having a positive impact on feed conversion and/or growth (Huyghebaert et al., 2011; Seal et al., 2013).

Classes of Substitutes

Several classes of substitutes have been proposed and tested in poultry production; including probiotics, prebiotics, synbiotics, organic acids, enzymes, phytogenics and trace metals. Novel substitutes such as hyperimmune egg yolk IgY, AntiMicrobial Peptides (AMP), bacteriophages and clay have come into existence in recent years.

Dr. Majdood Ahmad

1. Probiotics

Probiotics help establish a micro-environment in the gut that favors beneficial microorganisms and reduces the colonization of pathogenic bacteria (competitive exclusion) by:

(i) Creating a hostile environment for harmful bacterial species through production of lactic acid, Short Chain Fatty Acids (SCFAs) and reduction in pH;

(ii) Competing for nutrients with undesired bacteria;

(iii) Production and secretion of antibacterial substances (e.g. bacteriocins by Lactobacillus, Bacillus spp.)

(iv) Inhibition of bacterial adherence and translocation (Nurmi and Rantala, 1973; Fuller, 1989; Netherwood et al., 1999; Schneitz, 2005; Ng et al., 2009; Brown, 2011).

Probiotics are mono or mixed cultures of live organisms which when administered in adequate amounts confer a health benefit to the host. Probiotics may contain one or more strains of microorganisms and may be given either alone or in combination with other additives in feed or drinking water (Thomke and Elwinger, 1998). A

variety of Bacteria (Bacillus, Bifidobacterium, Enterococcus, Lactobacillus, Streptococcus and Lactococcus spp.) and in some cases Yeast (Saccharomyces spp.) have been tested as probiotics in poultry birds (Simon et al., 2001; Patterson and Burkholder, 2003; Griggs and Jacob, 2005; Kabir, 2009). Supplementation of diets with a single strain of Lactobacillus sp. (L. casei, L. fermentum, L. bulgaricus, L. reuteri) showed to improve the body weight and feed efficiency in broilers (Yeo and Kim, 1997; Khan et al., 2007; Apata, 2008; Nakphaichit et al. 2011; Salim et al., 2013).

2. Prebiotics:

Prebiotics are macromolecules that are either derived from plants or synthesized by microorganisms. A number of characteristics should be taken into consideration when selecting prebiotics including – resistance to gastric acidic environment, intestinal/ pancreatic enzyme hydrolysis and absorption across intestinal epithelium (Hume, 2011; Heo et al., 2013; Ricke, 2015). The most important characteristic of an ideal prebiotic is the ability to selectively enrich beneficial microorganisms associated with health and well-being (Simmering and Blaut, 2001; Patterson and Burkholder, 2003; Heo et al., 2013; Samantha et al., 2013).

Mannan Oligo Saccharide **(MOS)**, derived from the outer cell-wall layer of Saccharomyces cerevisiae has been studied extensively as a prebiotic supplement in poultry diets. The addition of various levels of MOS to the broiler diets significantly increased their body weight and improved feed conversion efficiency (Benites et al., 2008; Bozkurt et al., 2008; Hooge et al., 2003; Yang et al., 2007; Mohamed et al., 2008) with increased intestinal villi height (Baurhoo et al., 2007; Yang et al., 2007), also it improved immune-competence in the intestine (Janardhana et al., 2009; Shanmugasundaram and Selvaraj, 2012), altered jejunal gene expression (Xiao et al., 2012; Brennan et al., 2013) and influenced intestinal microbiota (Geier et al., 2009; Corrigan et al., 2011; Kim et al., 2011; Pourabedin et al., 2014). Fructo OligoSaccharide (FOS) which is derived from plants has also showed to possess significant prebiotic effect and improve performance in broiler chickens (Xu et al., 2003; Kim et al., 2011).

Another class of prebiotics includes Inulo OligoSaccharide (IOS) showing promise as an antibiotic substitute owing to their efficacy in improving weight gain and FCR when fed to broilers (Mookiah et al., 2014). Calik and Ergün (2015) showed that lactulose supplementation in broiler diets not only improved body weight and FCR but also increased villi height, goblet cell numbers, total SCFA concentrations and Lactobacillus counts.

3. Synbiotics:

Synbiotics are additives that combine the use of probiotics and prebiotics such that they act synergistically (Alloui et al., 2013). The use of synbiotics was based on the concept that a mixture of probiotics and prebiotics beneficially affect the host by improving the survival and implantation of probiotic organisms and by selectively promoting the growth or metabolism of beneficial bacteria in the intestinal tract (Gibson and Roberfroid, 1995). Supplementation of diets with a synbiotic product was shown to significantly improve body weight, average daily gain, feed efficiency and carcass yield percentage compared with controls or probiotic-

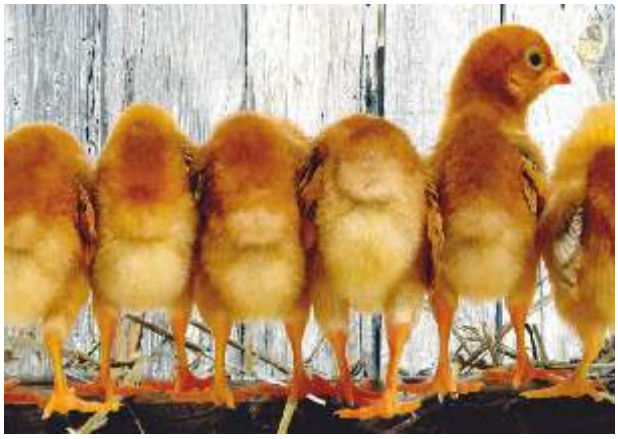
fed broilers (Awad et al., 2009). There is a great potential for synbiotics to be used as antibiotic substitutes for improving performance and reducing pathogenic load in the intestines of poultry birds. But still careful consideration must be given when selecting the combinations of various prebiotics and probiotics to be used as symbiotic substitutes and proper research based trials must be conducted to demonstrate their synergistic effect compared with the use of either product alone because till date mostly all studies were done on Broilers leaving space for research in other poultry birds too.

4. Organic acids

Dietary organic acids have been considered as potential substitutes to AGPs, owing to their antibacterial nature. Chemically, organic acids used in poultry production can be described as either simple monocarboxylic acids like formic, acetic, propionic and butyric acids or carboxylic acids bearing hydroxyl group like lactic, malic, tartaric and citric acids (Dibner and Buttin, 2002). They are widely distributed in nature as normal constituents of animal or plant tissues and some of them (specifically SCFA) are produced in the hind gut of food animals and humans through microbial fermentation of carbohydrates (Van Der Wielen et al., 2000; Ricke, 2003; Huyghebaert et al., 2011). They can be administered in the feed or drinking water and can be used either individually as organic acids or as their salts (sodium/ potassium/ calcium) or as blends of multiple acids or their salts (Huyghebaert et al., 2011).

5. Enzymes

Dietary enzymes are biologically active proteins that facilitate chemical breakdown of nutrients to smaller compounds for further digestion and absorption (Thacker, 2013). The different classes of enzymes commonly employed include phytase, carbohydrases (xylanase, cellulase, α-galactosidase, β-mannanase, α-amylase, pectinase) and proteases. The effect of various in-feed enzymes in improving the growth and feed efficiency in poultry is already well documented and reviewed by several scientists' time & again (Bedford and Schulze, 1998; Choct, 2006; Selle and Ravindran, 2007; Adeola and Cowieson, 2011; Slominski, 2011; Woyengo and Nyachoti, 2011).



6. Phytogenics

Phytogenic Feed Additives (PFAs), also referred as phytobiotics or botanicals are natural bioactive compounds that are derived from plants and incorporated into poultry feed to enhance productivity (Windisch et al., 2008). A wide range of plants and their products fall under this category and based on their origin (part of the plant), they can be broadly classified as Herbs – flowering, non-woody, non-persistent plants of which leaves and flowers are used or Spices (non-leaf parts of plants, including seeds, fruits, bark or root with intensive taste/ smell (Windisch et al., 2008; Van Der Klis and Vinyeta-Punti, 2014). They can be used in solid, dried ground form or as extracts (crude or concentrated).

Depending on the process used to derive the active ingredients, PFA can also be classified as Essential Oils (EOs- volatile lipophilic substances obtained by cold extraction or by steam or alcohol distillation) and Oleoresins extracts derived by non-aqueous solvents (Windisch et al., 2008; Van Der Klis and Vinyeta-

Punti, 2014). The main bioactive compounds of the PFAs are polyphenols while their composition and concentration vary according to the plant, parts of the plant, geographical origin, harvesting season, environmental factors, storage conditions and its processing techniques (Windisch et al., 2008; Applegate et al., 2010).

In recent years, PFAs have been used as natural growth promoters in the pig and poultry industries (Windisch et al., 2008; Franz et al., 2010). A wide variety of herbs and spices (e.g.- thyme, oregano, rosemary, marjoram, yarrow, garlic, ginger, green tea, black cumin, coriander, and cinnamon) have been used in poultry for their potential application as AGP substitutes. Guo et al. (2004) showed a significant increase in body weight gain and improvement in feed efficiency when broilers were given diets supplemented with a mixture of 14 herbs.

7. Hyperimmune egg yolk antibodies

Pimentel and Cook (1988) and Pimentel et al. (1991) showed that progeny from hens injected with jack bean urease had improved body weight at 3 weeks of age. It was proposed that urease antibodies maternally transferred to the progeny decreased ammonia production in the intestinal tract by inhibiting bacterial urease enzyme and improving growth.

The use of egg yolk antibodies offers several advantages. Large quantities of antibodies can be produced in laying hens and can be non-invasively collected. Their use is environmentally friendly, less toxic and does not select for resistance.

8. Antimicrobial peptides

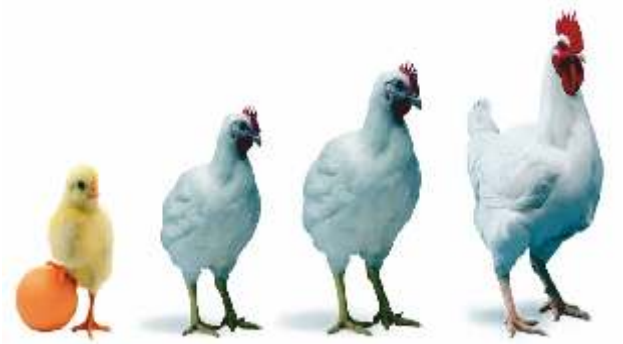
AMPs are widely distributed, small, gene-encoded peptides that have germicidal properties. They have been seen in all kingdoms of life and have shown activity against a wide range of pathogens such as Gram-negative and Gram-positive bacteria, fungi, enveloped viruses and parasites (Koczulla and Bals, 2003; Li et al., 2012; Kim et al., 2016b). The studies that have been done on AMPs and their applications in poultry have been mostly focused on their protective potential against diverse pathogens causing infectious diseases rather than growth promoting activities. They reported that the birds that were given naturally synthesized AMPs showed improvement in growth performance, intestinal ability to absorb nutrients and mucosal immune parameters such as intraepithelial lymphocytes or mast cell counts and in secretory IgA levels when compared with un-supplemented or non-inoculated birds (Liu et al., 2008; Bao et al., 2009; Wang et al., 2009).

One of the most reported bacteriocins as a dietary supplement in poultry is divercin AS7, which is produced by Carnobacterium divergens AS7, a lactic acid-producing bacterium isolated from fish, which has been extensively studied by Józefiak and colleagues. Dietary supplementation of AMPs in poultry seems to affect the birds in a positive way by improving their intestinal balance and creating gut micro ecological conditions that suppress harmful microorganisms like Clostridium spp. and coliforms while favoring beneficial microorganisms like Lactobacillus spp. (Ohh et al., 2009).

9. Bacteriophages

Bacteriophages can be considered safe antibiotic substitutes as they exhibit no activity against

animal and plant cells. Increased body weight gain and reduced FCR were reported in broilers given diets supplemented with 0.10% and 0.15% (Kim et al., 2013c) or 0.5g kg-1 of bacteriophages, respectively (Wang et al., 2013b).



10. Clay

The mechanism by which clays and clay minerals influence growth is unclear, but it depends largely on their ability to physically bind and remove toxins, anti-nutritional components and pathogenic organisms. This results in reducing microbial metabolites, toxins, enzymes in the intestine and thus preventing irritation and damage with improving morphological characteristics of the intestinal mucosa (Xia et al., 2004; Jorge de Lemos et al., 2015) hence improving performance. The inclusion of clay was also shown to improve nutrient digestibility by reducing digest transit time and also decreasing litter moisture (Olver, 1997; Jorge de Lemos et al., 2015).

Clays based products are the most effective mycotoxin adsorbents. However they are diverse aluminosilicates with a variety of properties. Many types of clays do not capture mycotoxins; some can absorb water, others can absorb ammonia and only certain clays can adsorb mycotoxins. Scientific studies have demonstrated that some aluminosilicates are very effective in preventing aflatoxicosis at an inclusion rate of 5 or 10 kilos/mt of feed; and only few can do it at 2.5 kg/mt.

11. Trace minerals

The use of trace minerals to increase poultry productivity and performance has been gaining importance in the recent years and they are being substituted in levels beyond the recommended nutritional requirements. Copper, an essential trace mineral, plays a significant role in hemoglobin synthesis, angiogenesis, connective tissue, bone development and more importantly serves as a cofactor for many metabolic enzymes (Brainer et al., 2003; Richards et al., 2010; Vasanth et al., 2015).

Nutritional strategies and feed additives

i. Diet Digestibility and Enzyme Supplementation

The digestibility of wheat, barley, rye, triticale and even corn-based diets can be significantly improved through use of exogenous enzymes including xylanases, phytases and ß – glucanases. Rosen (2001) concluded that the effect of enzymes was nearly equivalent to the effects of antibiotics on gain and FCR, while that in combination there was further improvement but less than the sum of the two. Enzymes are perhaps the most extensively reviewed products that seem to be capable of limiting the performance losses associated with removal of antibiotic growth promoters.

ii. Acidifiers and Organic Acids

As organic acids have strong bacteriostatic effects, they have been used as salmonella-control agents in feed and water supplies for livestock and poultry. But the benefit for poultry seems to be less conclusive.

iii. Herbs, Spices and Essential Oils

Plant-based antimicrobial compounds, which function in a fundamentally similar way to antibiotic compounds produced by fungi, could be used to replace some antibiotic growth promoters. To be most effective as growth promoters, these herbal antimicrobial compounds must be supplemented to the feed in a more concentrated form than found in their natural source. As with antibiotics, continued use of these plant-based antimicrobials may result in the development of resistance in some pathogenic bacteria. However, more research is necessary to

confirm this risk.

Essential oils from oregano are showing the greatest potential as a substitute to antibiotic growth promoters. Oregano contains phenolic compounds, such as carvacrol, that have antimicrobial activity (Akagul and Kivanc, 1988). Like antibiotics, oregano essential oils modify the gut microflora and reduce microbial load by suppressing bacteria proliferation.

There are some claims that oregano oil can replace anticoccidial compounds, not because they inactivate coccidia, but because they increase the turnover of the gut lining and prevent coccidial attack by maintaining a more healthy population of gut cells (Bruerton, 2002).

iv. Oligo Saccharides

Oligosaccharides are promising substitutes to antibiotic growth promoters because they facilitate and support the symbiotic relationship between host and micro flora. FOS and MOS are two classes of oligosaccharides that are beneficial to enteric health, but they do so by different means.

v. FOS

These compounds are inulin-type oligosaccharides of D-fructose attached by ß (2-1) linkages that are attached to a D-glucosyl residue at the end of the chain (Yun, 1996). A sucrose unit attached to one additional fructose residue is commonly referred to as 1-kestose. Nystose contains two additional fructose units and three additional fructose units are designated as 1F- ß-fructofuranosyl (Hidaka and Hirayama, 1991). FOS is found in numerous plants such as the onion, Jerusalem artichoke, garlic, banana, chicory, asparagus and wheat. Ammerman et al. (1988) demonstrated that the addition of either 0.25% or 0.50% dietary FOS improved feed efficiency from 1 to 46 days of age and reduced mortality when fed at the higher level (0.50%). FOS treated birds also had less air sac lesions at day 46.

vi. MOS

Bio-Mos® (Alltech Inc., Nicholasville, KY) is the commercial source of MOS that has been used in most of the published research literature. Based on the scientific literature, Bio-Mos® enhances resistance to enteric disease and promotes growth by the following means: 1) inhibits colonization of enteric pathogens by blocking bacterial adhesion to gut lining; 2) enhances immunity; 3) modifies microflora fermentation to favor nutrient availability for the host; 4) enhances the brush border mucin barrier; 5) reduces enterocyte turnover rate; and 6) enhances the integrity of the gut lining.

Conclusion

Owing to the rise in consumer demand for livestock / poultry products from antibiotic-free production systems, there exists a great need for the development of antibiotic substitutes that can help improve performance and maintain optimal health of the poultry birds. Several products have been evaluated in poultry over the past several years for their potential to replace antibiotics. Though the beneficial effects of many of the substitutes tested have been well demonstrated, there is the general consensus that these products lack consistency, also as results vary greatly from farm to farm. Hence care must be taken in the choice of substitutes, such that they fit the needs of the individual production program. □□

Retd. Dy. Commissioner Poultry (Govt. Of India)

Expert's advice

Dr. P.K. Srivastava
Senior Veterinarian

Q. What is the importance of artificial insemination? Ramu, Bikaner

A. A.I. is the technique in which semen is collected from the superior bulls and introduced into female reproductive tract at proper time with the help of instruments. The major advantage of AI over natural mating is that it permits the dairy farmer to use top proven sires for genetic improvement of his herd and enables dairy farmers to breed individual cows to selected sires according to their breeding goal.

Q. What are the mastitis control measures? Ramesh, Jodhpur

A. The important features of successful mastitis control programme are:

(a)Regular testing of animal for sub clinical mastitis.
(b)Adopt hygiene measures.
(c)Post-milking teat dippings be adopted.
(d)Institute dry cow therapy.
(e)Increase udder resistance to mastitis.

Q. How lameness in dairy animals affects the reproductive efficiencies. How farmers can contact / check lameness? Jamshed, Punjab

A. Due to pain animal does not express signs of heat. It is related with reproduction failure. To control / check lameness farmers must;

(a)Always undertake hoof trimming every six months
(b)Always feed mineral mixture regularly
(c)Take the help of qualified veterinary doctor if problem is severe / clinical.

Q. Dear Sir, I am a student of class 12th in Pune. Will you kindly let me know how to apply to top Veterinary Colleges in India Please let me know there telephone nos and website addresses also. Vivek Sharma, Pune

A. There are number of colleges in India. The VCI conducts the exam for admission you may please visit VCI website & contect their New Delhi Office. Dear friend, here is a list of colleges you can join in those colleges;

1. Maharashtra Animal & Fishery Sciences University, Nagpur
2. College of Veterinary & Animal Sciences, Parbhani
3. Nagpur Veterinary College, Nagpur
4. Bombay Veterinary College, Mumbai
5. College of Veterinary & Animal Sciences, Udgir
6. K.N.P. College of Veterinary Sciences, Satara

To know their contact numbers you have to go the official website of a particular college.

Q. Sir, I am presently pursuing B.V.Sc. IIIrd year, I wanted to know career prospects after successful completion of this course. Kindly suggest. Shriyansh Seth, Pune

A. Veterinary career is a very promising and scopes are increasing day by day. You can have an employment opportunity in Govt hospitals, Government projects, Research Companies, Pharmaceuticals, Universities, Animal Food Companies, Zoos and Wild Life, own your own private clinic.

Q. What are the main causes of infertility in dairy animals? Rajesh Kumar, Delhi

A. Infertility is mainly caused by following reasons;

a) Nutritional imbalance
b) Reproductive tract Infections
c) Congenital abnormalities
d) Hormonal imbalance
e) Management errors

I attended the webinar organized by Ayurvet Ltd. on topic of **"AGP's for growth & helath of Poultry towards safe food producations"** & found it useful & informative. Plaese let me update about next webinar and send me the recording.

-Sachin Garg, Arman Poultry Farm, Naraingarh, Haryana, email: gargsachin81@gmail.com

Long Pepper
Piper longum

Long pepper is a perennial plant and it belongs to piperaceae family. It is also known as Pippali. It is a slender aromatic climber and fleshy fruit. It grows at the height of 90-120 cm and plant leaves are 5-9 cm long and 5 cm wide lower leaves are broadly ovate, deeply cordate with big lobes at the base, and upper leaves are dark green and cordate with short petioles. When fruit of this plant is immature it has dark green colour and when it gets maturity it turns in blackish-green colour. It's fruit and roots contain essential oil and alkaloids like piperine.

Distribution
It can grow throughout India but mostly grown in Assam, Tamilnadu, Andhra Pradesh, Maharashtra, Karnataka, West Bengal, Uttar Pradesh.

Climate & Soil
The plant requires hot humid climate and an elevation between 100 to 1000 MSL. It requires partial shade for its ideal growth. Black cotton soil, Laterite soils with high organic matter content is more suitable for long pepper.

Vine cuttings can be rooted in polythene bags filled with the common pot mixture. The nursery can be raised during the month of march and April. The cutting planted in March- April will be ready for planting in the main field by the end of May.

Useful Part
Fruit.

Propagation
It is propagated through stem/vine cutting at the beginning of rainy season. It can be easily propagated through the terminal stem cuttings obtained from one-year-old growth and 3-5 internodes.

Field Preparation
The field is prepared to good tilth by ploughing twice, harrowing and planking 10-15 tonnes of Farm yard manure (FYM), 250 kg of Single Superphosphate, 65 kg of Muriate of potash and 25-50 kg of Zinc Sulphate Per Hectare are applied basically. Planting is done during rainy season. Stem cutting 30 cm long having at least 3 nodes are planted in 15 cm deep holes leaving 1 node above the ground at a distance of 60- 90 cm between the rows and 15 cm between the plants (Approx.74,000-1,11,000 Cutting/Hectare requires).

Irrigation
Apply irrigation in 15-20 days' intervals and as and when require irrigation to be applied.

Plant Protection
There are no pests or disease on this crop which cause severe damage, hence plant protection practices are not needed.

Crop maturity and harvesting
Vines start flowering six months after planting. Fruits take about two months to mature from its formation, full-grown mature fruit are harvested before ripening, when it is firm and blackish-green.

Post harvested Management
The harvested spikes are dried in the sun for 4 to 5 days until they are perfectly dry the dried spikes are then stored in the moisture proof containers.

Ranjan Kumar Rakesh

Yield

The fruit yield per hectare increasing from 500-700 kg in the first year of bearing to 1600-2000 kg in the second and third year of bearing.

Medicinal uses of Long Pepper

- It is good for hair growth and used as a hair tonic.
- Pippali is useful for Asthma disease.
- It helps to give relief from throat infections.
- Long pepper is very effective in hiccups.
- It is used as brain tonic.
- It is used in the treatment of diarrhea.
- It helps to maintain blood circulation and enhances immune system.
- This helps to transport nutrient and helps to eliminate wastes from body.
- It is good to enhances digestion, assimilation and metabolism of the food. □□

New Education Policy 2020 likely to curtail VCI authority

India's new education policy 2020 has been approved by the cabinet headed by Prime Minister on 29 July. The former chairman of ISRO has prepared the draft of new education policy. The team of experts, headed by Kasturirangan had the challenge to prepare the draft which included everything from pre-primary to professional education. Let us know what would be the effect of this new education policy on the VCI, the regulatory body of Veterinary Education in the country.

According to what we understood after reading the New Education Policy 2020, VCI's power to regulate Veterinary Education will end after the implementation of the new education policy.

As far as the field of education is concerned, professional councils like VCI, ICAR will become more of an academic standard drafting bodies, which would be known as Professional Standard-Setting Bodies (PSSB) in the new education policy. These institutes will create academic standards for courses in their domain, but they will not have regulatory powers. If we dwell in more depth, it seems that the academic standards created by the VCI will serve as a reference according to which the Veterinary College and University will be able to create their own syllabus. That is, in the new education policy, there is a possibility of more autonomy for the college and university.

Currently, VCI has two major mandates, the first regulation of minimum standards of veterinary education and the second regulation of minimum standards of veterinary practice. Of these two mandates, the formulation of minimum standards of veterinary practice has not yet been established and thus not much control of VCI on these matters. Now the regulation of minimum standards of veterinary education in the new education policy will also be taken over from the jurisdiction of the VCI to the single point regulator which is the National Higher Education Regulatory Council. In such a situation, the importance of VCI is set to decrease. However, an Act has to be passed in the parliament for the decision to be implemented on VCI.

According to the new education policy, a Higher Education Commission of India (HECI) will be set up at the national level. Four different institutions will work under HECI for the four domains of Higher Education - Regulation, Accreditation, Funding and Academic Standards Setting. For example, as per ICAR Regulation, Accreditation, Funding and Academic Standard are all looked after by ICAR and VCI does both VCI Regulation and Academic Standard-Setting work. □□

News and Views

Government to invest more than 20KCr in 5 yrs in fisheries

Minister of State for Fisheries, Animal Husbandry and Dairying, Shri Pratap Chandra Sarangi in a written statement in the ongoing parliament session

informed that to minimize the COVID19 impact in the Fisheries sector, Government would invest more than 20000 crores in five years.

The Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying with a view to avoiding adverse impact on fisheries due to COVID-19 pandemic lockdown in the country, had issued advisory to State Governments/Union Territories (UTs) to include fish and shrimp in the list of commodities to exempt from lockdown and also allow movement of fish and fish products, fish seed & fish feed for fish-farmers/fishers, aquaculture farms and other commercial establishments like aquarium shop etc.

Besides, the Ministry of Home Affairs' Guidelines dated 10th April 2020 also allowed operations of the fishing(marine)/aquaculture industry including feeding & maintenance, harvesting, processing, packaging, cold chain, sale and marketing, hatcheries, feed plants, commercial aquaria, movement of fish/shrimp and fish products, seed/feed and workers. In addition, the Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying has launched a flagship scheme namely Pradhan Mantri Matsya Sampada Yojana (PMMSY) as a part of Atma Nirbhar Bharat COVID-19 relief package with an estimated investment of Rs.20,050 crores for implementation in all States/Union Territories over a period of 5 years from Fy 2020-21 to Fy 2024-25.

VCI elections results declared

The results for the Veterinary Council of India (VCI) elections held for electing 11 members were declared today. The results were declared following the E-Voting held on today itself. The counting of votes and the declarations of the result through clicking on e-voting software took place at Krishi Bhawan, New Delhi today at 11 AM.

A total of 92 candidates contested the elections for 11 elected members of the VCI. Following is the list of 11 winning candidates along with the number of votes secured.

Candidate	State	Number of Votes
Chirantan Kadian	Haryana	10860
Umesh C. Sharma	M.P.	10735
Amit Nain	Punjab	10626
Devi Shankar Rajoria	Rajasthan	9938
Ingale S. Vinayakrao	Maharashtra	9330
Arun T R	Kerala	9311
Pradeep K. Yadav	New Delhi	9220
Ramesh R	Tamil Nadu	8755
Kantharaju L	Karnataka	8576
Vijay Kumar Jha	Bihar	8405
Gurucharan Dutta	West Bengal	8302

Congratulates the winning candidates along with the Department of Animal Husbandry, Ministry of Fisheries, Animal Husbandry and Dairying GOI, for smooth conduction of VCI elections through Digital mode and swift declarations of the results. The new council should now work with zest and enthusiasm to resolve long pending issues of the Vets of the country.

ICMR okays COVID testing lab at GADVASU

Punjab Government is leaving no stone unturned to meet the challenges posed by the ongoing

COVID 19 pandemic. In this context, four new COVID testing labs are being established by the state government including the one at College of Animal Biotechnology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana. Dr J P S Gill Director of Research cum Nodal officer of the lab informed that GADVASU lab is the first one out of the four to get the necessary approval from Indian Council of Medical Research (ICMR) which is a pre-requisite step for opening COVID 19 lab. He told that diagnostic tests are highly skill-oriented and GADVASU is having the expertise and well-established research labs in the field of animal biotechnology, virology, and cell culture and disease epidemiology. Already ten scientists of the university have been instrumental in the initial set up of the labs at Government Medical colleges Amritsar and Patiala.

Uttarakhand sets an example by providing the sexed semen @Rs 100 per dose

In Uttarakhand, the government will provide sexed semen of indigenous breed to farmers at a very concessional rate of Rs100 per straw. This information is given by the secretary of Animal Husbandry Department, Dr R Meenakshi Sundram in a press conference at Deharadun.

Dr Sundram informed the media that the second phase of the National Artificial Insemination Program (NAIP) in the state will start from 1stof August and continue till 31st May 2021. During this period department targets to inseminate 4.85 lakh cattle in the whole state. He informed that during this period the sex-sorted semen straw of indigenous breed cow and buffalo whose actual cost is Rs 1150 but will we provided at a concessional rate of Rs 100 to the farmers.

Here it is to be informed that Uttarakhand Livestock Development Board(ULDB) operated sex semen sorting lab is the first semen sorting lab established under the Rashtriya Gokul Mission(RGM) as a Central Government sponsored scheme. ULDB Signed an MOU with the Sexing Technologies(ST) company of USA in September 2018 and started commercial production in record time in Feb 2019.

Kerala Vet owned Company develops Indigenous COVID19 rapid testing kit

A Veterinarian owned Cochin based Ubio Biotechnologies, has developed the first indigenous antibody-based testing kit for COVID-19. Named Sensit Rapid, this kit can provide the results within 20 minutes with an accuracy rate of 95 per cent. This kit has received all approvals from the regulatory authorities and is now available in the market. Dr Bishor said that his company Received support from the department of biotechnology for the development of indigenous antibody-based test kit for COVID-19. It is the first indigenously developed antibody-based test kit for COVID-19. The kit is readily available in the market and the Company has a production capacity of 30 lakh kits per month. Accuracy of the kid is above 90 per cent at 8 to 10 days post-exposure. He further said that the development of antigen-based COVID-19 test kit is also in advance stage, most probably it will be launched Within a month.

As per Dr Bishor accuracy in results of screening for COVID 19 can be achieved by adopting a combination of both antigen and antibody tests. The antigen test works well in the initial stage of disease while antibody test works well in the later stages of the disease. The antibody-based test is more useful in the identification of symptomless carriers.

□□

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