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# From the Editor's Desk



## Uninterrupted Cold Chain Management – A daunting task

Raw poultry supports the growth of pathogenic microorganisms and bacteria hence it is essential to maintain an uninterrupted cold chain along the complete processing and distribution network to maintain the quality of poultry products.

Rapidly changing trends, increase in QSRs (Quick Service Restaurants) and the rise of online meat delivery platforms (Licious, Zappfresh, Tendercuts etc.) has increased the demand. Processed chicken and other value added products market is expanding at 15% CAGR.

The pandemic has led to increased use of technology and digitization enabling stakeholders with quicker decision-making based on real-time insights. Cloud technology has received a tremendous boost.

Compliance with food safety norms coupled with creating awareness about processed products is essential for consistent growth in demand. Sustainability standards are important to a majority of millennials. Companies are increasingly adopting de-carbonization strategies and pushing for greener business solutions.

There is a gap in the value chain as most vendors lack dry processing, storage, cold chain facilities and logistical (refrigerated trucks or specialized equipment) for packing and transporting produce.

It is necessary to build smarter warehouses with energy-efficient systems to create greener cold supply chains and solar-powered, temperature-controlled units, the logistics and supply chain sector has started integrating smart and planet-friendly systems in their operations.

The cost of per cubic meter storage in India for cold storage is \$ 60 as compared to the \$ 30 in the west. Some of the biggest challenges maintaining and building cold chain infrastructure are real estate price which have risen by 280%, lack of mobile infrastructure – like reefer trucks, reefer containers, shortage of consistent power supply, lack of skilled human resources, lack of clearly defined standards and protocols and to top it all the average capacity utilization in the industry is just around 30 percent.

MOFPI (Ministry of Food Processing Industries) has taken various measures for development of cold chain infrastructure. Schemes of Cold Chain, Value Addition and Preservation Infrastructure is to provide integrated cold chain and preservation infrastructure facilities, without any break, from the farm gate to the consumer.

It covers creation of infrastructure facility along the entire supply chain. The scheme allows flexibility in project planning with special emphasis on creation of cold chain infrastructure at farm level.

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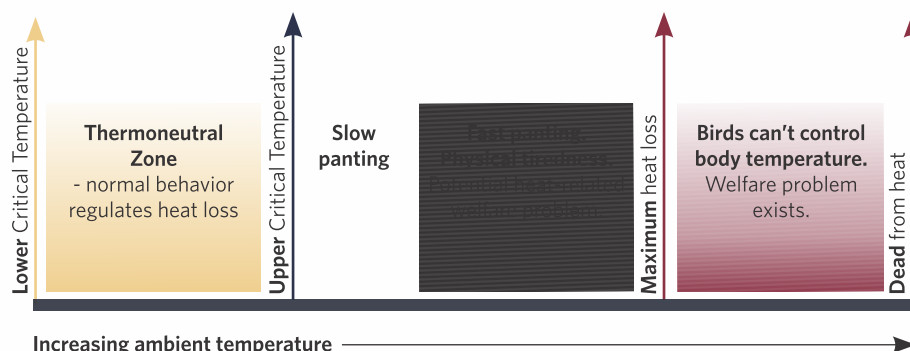
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## Coping with the seasons: Summer Heat Stress What GALLIPRO® can do for your birds



**Diagram 1.** Physiological responses of chickens to increasing ambient temperature



Increasing ambient temperature

\* Heat stress in poultry. Solving the problem | [www.defra.gov.uk](http://www.defra.gov.uk)

Heat stress is a severe and costly problem for the poultry industry. When poultry are exposed to elevated temperatures and high humidity, they experience stress, resulting in a depression of performance efficiency. The extent of stress is determined by the body temperature. The body temperature of broilers is close to 41°C. However, if their temperature rises more than 4°C above this, birds will start to die.

Birds are "heat stressed" when they have difficulty achieving a balance between body heat production and body heat loss. This can occur at all ages and in all types of poultry. When the external temperature exceeds the "upper critical temperature", birds start panting to actively lose heat. Panting is a normal reaction to heat and is not considered a welfare problem.

But as the temperature increases, panting may not be sufficient to maintain normal body temperature. If heat production becomes too intense (acute heat stress) or too long (chronic heat stress), birds may die.

Poultry begin to experience heat stress with fast panting. Reduced feed intake, growth rate or laying rate and potential mortality occur when the birds are no longer able to cope with an elevated internal temperature. While birds experiencing heat stress will have reduced feed intake, this reduction in energy and protein intake does not by itself explain the loss in meat or egg production. This is because a stressed immune system will use energy, thereby further reducing the energy available for production.

Heat stress causes \$128-\$165 million of loss per year to the US poultry industry, in addition to being a severe well-being issue as well.

### Heat Stress and the Immune System

When birds experience heat stress, a cascade of metabolic events occur.

- Increased body temperatures result in increased panting and less nutrient consumption
- Blood pH will become elevated (alkalosis), resulting in decreased calcium availability and subsequent lameness



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## INDICATIONS :

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- To enhance Microbial Immunity
- To Control Early Chick Mortality
- As a Supportive to Control Various Induced Stress Conditions

## RECOMMENDATIONS :

3g/50 birds/day  
500g / MT of feed

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- Intestinal tissue becomes weak and inflamed, resulting in “leaky gut”. Thus, the intestinal barrier function is reduced or compromised
- Nutrient absorption across the intestine decreases and the passage of harmful antigens, like lipopolysaccharides (LPS) into the blood increases, activating the immune system



### How to limit the impact of heat stress?

- Reduce bird density

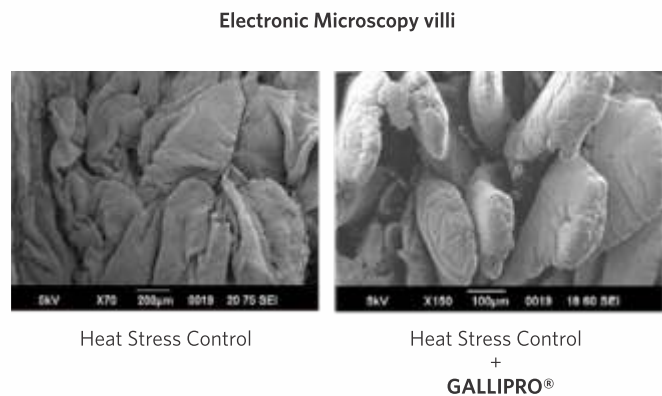
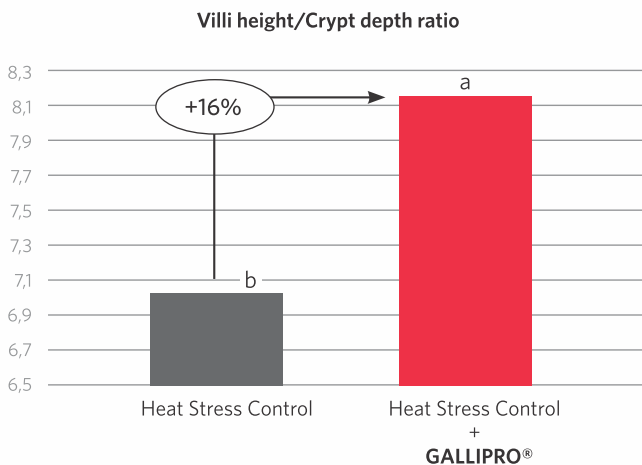
- Increase air movement with additional fans
- Stimulate water intake (by adding electrolytes such as potassium chlorate, sodium bicarbonate)
- Reduce or stop feed intake 4-6 hours before the daily peak of heat
- Use of evaporative cooling or fogging systems in the barns prior to, and during the peak, of heat

### What GALLIPRO® (Bacillus subtilis) can do for your birds:

Recent research conducted with GALLIPRO® at the dose of 8.0 x 10<sup>5</sup> cfu/g of feed at University of Delaware demonstrated that Bacillus-based products can help maintain the absorptive surface of the intestine, limit the impact of reduced feed intake, and decrease mortality.

Possible explanations for this effect may include:

- Protection of the epithelium by coating the surface of the intestine
- Preservation of villi integrity
- Beneficial support of intestinal surface absorption
- Improved feed utilization - Chemicals signaling between gut and certain areas of the brain that regulate behavior during heat stress (Wang, 2018)



\* Image credit - El Haassan M.M.O. et al, 2019

### Villi density (Nb of villi/ 1.1 mm<sup>2</sup> per small intestinal segment at 42 days old (n=12))

	Duodenum	Jejunum	Ileum
Control	18.2	23.5	27.8
GALLIPRO®	17.9	31.8 <sup>+35%</sup>	33.3 <sup>+20%</sup>

\* Ref.: El Haassan

Before and during the hot season, the use of an effective probiotic such as GALLIPRO® will help to protect the epithelium of the intestine and thus limit the impact of high temperatures by reducing leaky gut; thereby minimizing health and financial losses associated with heat stress.

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With our partners, we also provide numerous technical seminars on good practices around the world and the development of specialized tools (calculation tools available on the Dosatron website or on our Dosatron App, after-sales service videos, etc.) for farmers, technicians and veterinarians.

Drinking water treatment has long proven its flexibility, speed, safety and efficiency. The current evolution of antibiotic legislation, the continuous improvement of the solubility of treatments (oral powders), the ease of administration of certain vaccines via drinking water, the development of new supplements and additives (organic acids, pro-biotics, essential oils, minerals, etc.) and the growing diversity of products intended for water disinfection and hygiene are evidence of the renewal in favour of this technique.





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# Summer Stress And its Mitigation in Poultry



**Dr. A. Arun Bharathi<sup>1</sup>**

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The economic loss to the poultry farmers is not only caused by numerous diseases exists in the field, but also through various stress to the birds. Even though many stresses are existent, the summer stress is a major problem in poultry industry that affects chicken's performance and causes huge economic loss to the poultry farmers. It affects the body weight gain, reduction in feed intake, feed conversion ratio and also causes reduction in egg production, egg weight, shell quality, disturbance in the fertility and hatchability; also reasons huge mortality in poultry farms. The ideal temperature and humidity for the birds to maintain the production performance are 18-23°C and 20-45%, respectively. Birds are homeothermic as it can control excess body heat by its natural phenomenon such as radiation, conduction, convection, evaporation and excretion.

## **Effect of heat stress:**

Birds able to cope up with above method upto the temperature and humidity are 24-30°C and 45-75%, respectively. Environmental temperature and humidity are the two main components in heat stress. When the temperature above 30°C with various humidity ranges causes death of birds. The temperature above 30°C and humidity above 75% are highly fatal to birds as it decreases the heat loss from bird's body and make it more susceptible to heat stress.

When the temperature increases towards 30°C, the birds start panting to loss the heat through evaporative cooling. Even though birds increase the intake of water to compensate the damage and reduce the feed intake, they will become dehydrated due to loss of electrolytes. When the stress is not relieved, the condition become worse and leads to death of birds.

In layers, panting and reduced feed intake leads to change in acid base balance and low calcium level in plasma, respectively causes the production of poor quality of egg shell. Heat stress also causes reduction in size and production of eggs. In breeders, heat stress causes reduction in egg production and production of low quality eggs that affects fertility and hatchability.

Due to reduced intake of feed intake,

reduction in feed absorption capacity, change in the intestinal integrity, etc leads low level of minerals required for various activities like immune, antioxidant, acid base balance, etc.

## **To mitigate heat stress:**

### **Genetic manipulation:**

Selection of birds with higher tolerance capacity for high temperature is important. Light breeds such as White Leghorn are highly resistant to high temperature when compare with heavier breeds like Rhode Island Red, Plymouth Rock, etc.

- Genomic selection of heat resistance genes (qualitative genes) like Naked neck gene, Dwarf gene, Frizzle gene, etc are supportive in alleviation of heat stress.
- CARI strains like Hitcari and Upkari which is crossbreed of Indian native naked neck and frizzle with Cari red, respectively.
- TANUVAS strains: Naked Neck Nandanam Broiler-3 & 4 and Frizzle Nandanam chicken 4

### **Nutritional strategies:**

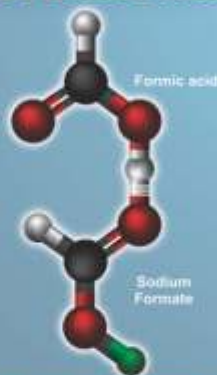
- Birds should be fed only during the cooler part of the day. Feeding at the peak temperature increases the body temperature of the birds and causes heavy mortality.

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**Most Efficient  
Pathogen Control**

**Sustained  
Release**

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- Add Sodium Bicarbonate in the diet to compensate the bicarbonate excretion due to respiratory alkalosis. It also helps to reduce the production of shell less eggs.
- Supplementation of extra vitamins mainly vitamin-C helps in reduction of heat stress as it is important for the blood vessel integrity.
- Maintain the appropriate ratio of Calcium and Phosphorus like 4-6:1 and 2:1 in the layer and broiler diet, respectively. This improves the quality of egg shell and reduces the leg weakness.
- The minerals like zinc, selenium, etc are required for the enzymes such as glutathione peroxidase and superoxide dismutase essential for reduction of formation of free radicles due to stress. Minerals can be used as nano minerals to increase the absorption and retention.
- The limiting amino acids should be balanced properly to ensure the optimum performance of the heat stressed birds.
- Check for salt content of the feed. High salt in feed increase the consumption of water and leads to consequences of wet litter.
- Addition of oil (2-3%) in the diet helps to improve the performance of birds in summer because fat has lower heat increment.
- Supplementation of probiotics and prebiotics in the poultry diet during summer helps to improve the performance and immunity of the bird.

#### **Water management and supplementation:**

- The water tank should be covered with the wet gunny bags to avoid direct exposure to sunlight. During hot weather, ice cubes can be added in the drinking water and frequent flushing out of water can be done in order to get rid of the hot water in the pipelines.
- As acid base imbalance and respiratory alkalosis happens due to panting, supplementation of electrolytes in the water will be helpful.
- Supplementation of vitamins

especially vitamin C and E and minerals in the water reduces the heat stress as it has possess the best anti-oxidant properties and co-factor of many enzymes involved in the reduction of heat stress.

- Herbs like amla, aloe vera, etc can be added in the water which modulates the immune function of the birds in summer stress.

#### **Housing guidance:**

- Poultry shed should be constructed in the east west direction and overhangs should be 4-6 feet to avoid the direct sun rays inside the shed.
- In deep litter system, side wall should be constructed one third with the brick work and the remaining two third should be in wire mesh to facilitate ventilation.
- Ridge ventilation should be provided to remove the hot air from the shed.
- Sprinkler and fogger are installed on the roof and inside the shed, respectively to reduce the temperature inside the shed.
- Roof should be insulated with the thatched roof or paint the top layer of roof with white paint or recently application of puff sheet in the field to alleviate the heat stress.
- Industrial fans are used for better ventilation in the area of hot and humid climate.

#### **Vaccination:**

- Vaccination should be done at cooler

part of the day either early morning or late evening. Water withdrawal period before vaccination should be minimized to avoid dehydration.

#### **Lighting:**

Midnight feed can be practiced to increase feed intake. If the lights switched on at midnight from 11 pm to 1 am, birds will consume extra 2-3 gram of feed. This will increase the egg weight during hot summer season.

#### **General management:**

- The temperature of brooding house should not exceed 35°C and brooding of chicks should be done only for first 7 days of age. Chicks should be provided with the electrolyte and sugar in water immediately after the arrival.
- Switch on the fans when the temperature and humidity are high as usage of foggers further increase the humidity and cause mortality of birds.
- Foggers are helpful when the temperature is high with low humidity. Sprinklers are operated to reduce the heat stress mainly when the temperature is in peak.
- The side wall can be covered with the wet gunny bags on wind ward side, thus the hot air becomes cool once it passes through the gunny bags.
- Rake the litter and feeder to avoid the caking due to usage of foggers, which reason for necrotic enteritis and other infections.



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#### Clostridium Perfringens

Type A, C, B, D, E

#### Staphylococcus Aureus



# Management of Backyard Chicken in Summer



## Dr. Ankit Sharma<sup>1</sup>

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### Introduction:

Chicken in the backyard need to be protected from the sun. They can easily overheat and succumb to high temperatures if they lack the ability to sweat. The three most basic needs for keeping chickens comfortable throughout the heat are shade, water, and ventilation. Additional cooling, such as ice blocks and misters, can provide additional cooling and help birds live in hot weather. Chickens, unlike humans, do not have the ability to sweat, thus they must find alternative ways to maintain a comfortable body temperature. The following are some of the methods that birds naturally cool down:

- Panting/laboured breathing: Their breathing rate increases as they open

their beaks wide and spread their wings. This is done to eliminate heat from the body and expose more surface area to air movement.

- Sitting or seeming lethargic: A tendency to sit and a decreased urge to range. Keep an eye on their water and feed intakes, since they may decrease or stop.
- Dust bathing or digging/ burrowing:



Dust bathing protects feathers and skin from direct sunlight. Digging/ burrowing gets them closer to cooler layers the dirt.

- Spread wings: This allows more air to flow into and around your body.



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- Selective eating: Reducing feed intake lowers the internal heat generated as part of digestion.
- Increased water consumption: As the kidneys start to compensate, bird will strive to maintain a balance by increasing fluid intake.
- Diarrhoea: Disturbance of the digestive system, loss of nutrient digestion, and the expulsion of excess water and nutrients. Kidneys working hard leading to dehydration and fatigue.

**Symptoms of heat stress:**

- When a bird is under heat stress, it may pant more. Bird may also squat slightly and hold her wings away from her body to aid with heat dissipation through the unfeathered portions beneath her wings.
- Feed consumption will likely drop during extreme heat waves; a heated chicken will have a reduced appetite.
- Due to a drop in feed intake during periods of high heat, egg production will most certainly fall.
- Reduced calcium consumption also reduces eggshell quality, which can be detrimental. During strong heat waves, eggs should be picked up even more frequently. The majority of

hens will lay their eggs early in the day. It is advisable to pick them up as soon as feasible.

**Prevention of heat stress:**

- When the chickens get too hot, they should be able to get out of the sun. This could be in the form of trees or specially created shades. Ascertain that the shaded location provides adequate ventilation. Small coops and other enclosed structures can grow very stuffy inside. A better ventilated shaded space is ideal for chickens, but if that is the only source of shade, a fan can help move air around.
- Nesting areas that lack ventilation could subject hens to heat stress while laying (especially if they go broody). Ventilate nest boxes as much as possible. If possible, don't allow hens to go broody. Broody hens often only leave the box once a day to eat, drink, and eliminate. A broody hen is much more susceptible to heat stress and exhaustion due to her decreased water intake.
- Feed consumption will likely drop during extreme heat waves; a heated chicken will have a reduced appetite. Because of this, it's important to limit treats and extras (especially scratch

grains). Things such as frozen watermelon or fruits/veggies chopped and frozen into a block work to keep hens cool and busy without excessively filling them up. Feeding hens layer rations in the early morning or late evening when temperatures are lower will aid in increasing feed consumption.

- Reduced feed intake also means less calcium, which might impact the quality of eggshells. During strong heat waves, eggs should be picked up even more frequently. Because most hens lay early in the day, it is best to pick them up as soon as possible to ensure food safety and to avoid hens from becoming broody.
- Chickens should always have access to fresh, clean, cool water, especially in the summer heat. Provide multiple water sources located in shady, cool areas to encourage hens to drink and wade. Add ice cubes, ice blocks, or frozen water bottles to keep water cool. Use of electrolytes to restore balance, but also use a feed containing a probiotic.
- Mistery are another way chicken keepers can cool the flocks. Hot, dry weather lends itself well to evaporative cooling.







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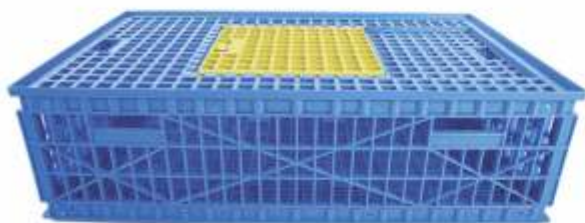
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# Managing gut health, a multi-factorial approach

With the understanding of gut health growing every day, managing it properly has become more and more of a priority. One key point has been clear since the beginning: gut health is a complex multi-factorial concept, and as such improving and maintaining it requires a holistic approach. Luckily the tools to do so have evolved as well, and new methods emerge frequently.

BY BEN DEHAECK, DVM GLOBAL PRODUCT MANAGER ANTICOCCIDIALS AND TER VAN DER VEKEN, GLOBAL PRODUCT MANAGER PROBIOTICS AT HUVEPHARMA

**T**wo major gut health issues are coccidiosis and necrotic enteritis (NE). Although caused by different pathogens, there definitely is an interaction between the two challenges: the presence of coccidiosis is often an important predisposing factor for the development of NE. Because of this link, it is very likely that the current rise of NE problems in the field is linked to suboptimal coccidiosis control. The practical implication is that both challenges should be dealt with at the same time. However, monitoring the actual coccidiosis pressure is difficult and a challenge in itself. It is therefore crucial to have a good and validated coccidiosis control programme in place, including the use of anticoccidials and product rotation in order to maintain their efficacy.

The mentioned coccidiosis program above ties in with having a good NE control program, of which supporting gut integrity and its microbiota is a crucial part. With this goal in mind, probiotics form an interesting tool to achieve this, especially as the pressure on the use of classic antimicrobials is increasing. Depending on the strain selected, these viable beneficial bacteria are able to influence the gut and its microbiota in multiple ways. An example of this is minimising the risk of pathogens, such as *Clostridium perfringens*. A well-known probiotic to do so is B-Act®, which has proven its efficacy under many different conditions.



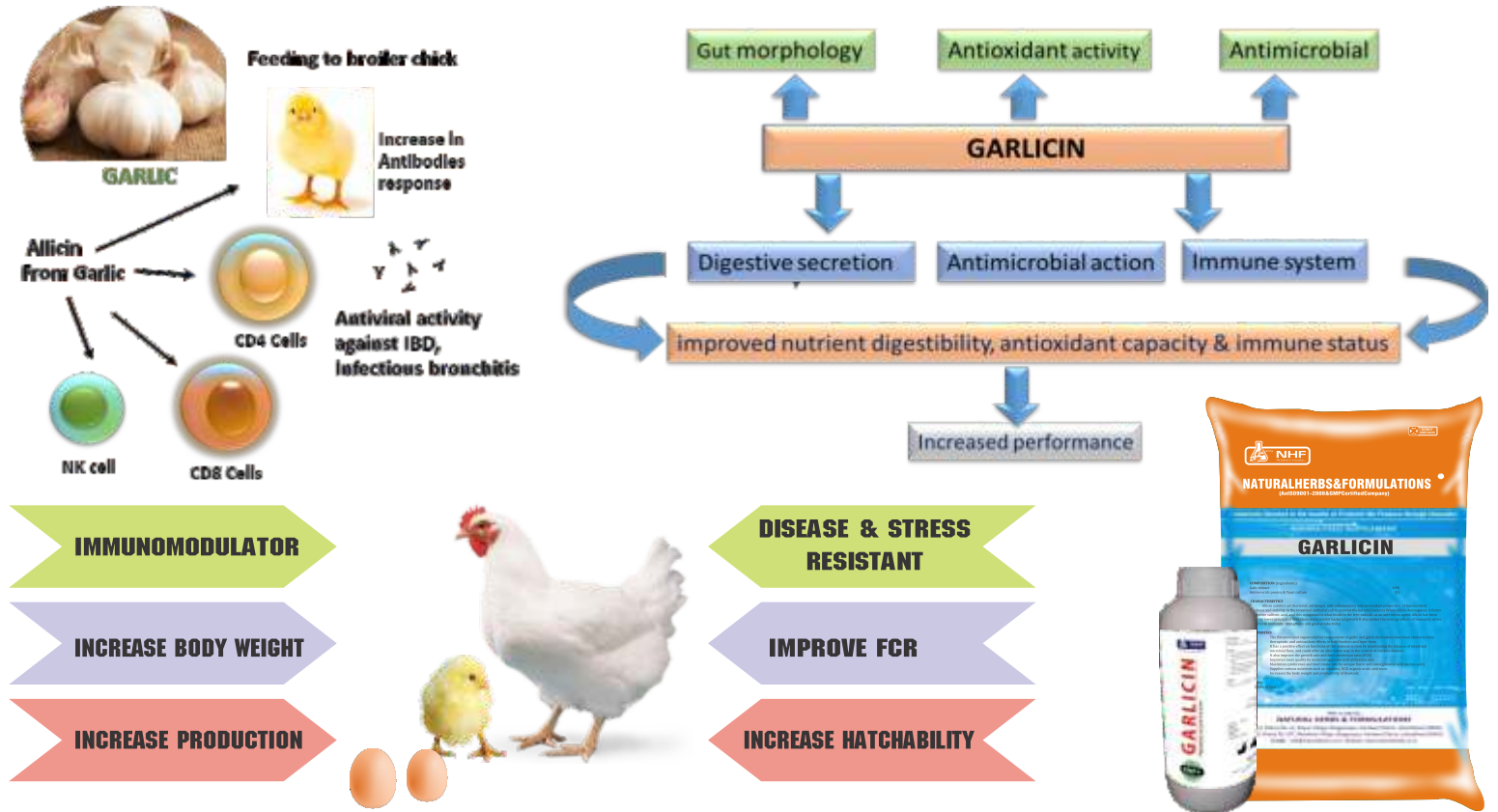
The probiotic recently obtained an extension to its current European approval for use in broilers and pre-laying birds, by adding turkeys and minor avian species to the list of registered species. The specific *Bacillus licheniformis* strain in B-Act® has a unique mode of action, based on the concept of competitive exclusion. This goes a lot wider than just competition for space and nutrients – even though *Bacillus* spp. are often only given credit for this. For example, its capacity to produce antimicrobial compounds should not be neglected. This unique mode of action allows the probiotic to mitigate challenges efficiently, which would have otherwise led to severe NE and dysbacteriosis. Keeping this and the possibility to combine the probiotic with Coxiril® (chemical anticoccidials) in mind gives B-Act® a competitive advantage, especially in those situations where producers might worry about not applying ionophores. Approaching gut health and its management as a multi-factorial challenge and dealing with it in a similar fashion is the way forward. This includes using multiple products to work on the same challenge from different perspectives, ensuring various aspects of general gut health effectively.

The well-known probiotic B-Act® recently obtained an extension to its current European approval for use in broilers and pre-laying birds, by adding turkeys and minor avian species to the list of registered species.

To know more, please contact Huvepharma technical team  
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 Suguna foods private limited, Coimbatore,  
 Tamil Nadu

# Heat Stress in Poultry



## Introduction

Birds are heat stressed if they have difficulty in achieving a proper balance between body heat production and body heat loss. This condition generally occurs at all ages and in all types of birds. In the thermoneutral zone, birds can lose heat from the body at a controlled rate using normal behaviour conditions. There is no heat stress and body temperature are stated to held constant. When the upper critical temperature is exceeded, birds lose heat actively by panting. Panting is considered a normal response to heat and is not initially considered a welfare problem. But there is sudden increase in temperatures, the rate of panting increases. If heat production becomes greater than the maximum heat loss, then either in intensity to acute heat stress or over long periods of chronic heat stress the birds may die.

## How is the body heat produced in birds?

Heat is produced by the metabolism within the body of birds, which mainly includes maintenance, growth and egg

production. Heat production is generally affected by the body weight, species, breed, level of production, level of feed intake, feed quality and to a lesser extent by the amount of activity and exercise performed by birds.

## What are the other heat sources within shed?

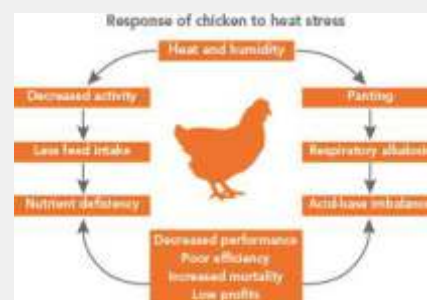
By excluding the temperature of the air ventilating from the shed, the heat is also added from the roof and walls. Much of the heat from litter material is used to evaporate moisture and dry the litter. However, hot weather condition and damp litter will make the birds more heat stressed and feel more uncomfortable than dry litter material. In dry litter, the birds will attempt to dust bathe more readily to aid cooling. The heat of electric lights and motors is a very small fraction of that produced by the body metabolism which is normally less than 1%. The body heat is the dominant source of heat produced by the birds.

## How do birds lose heat?

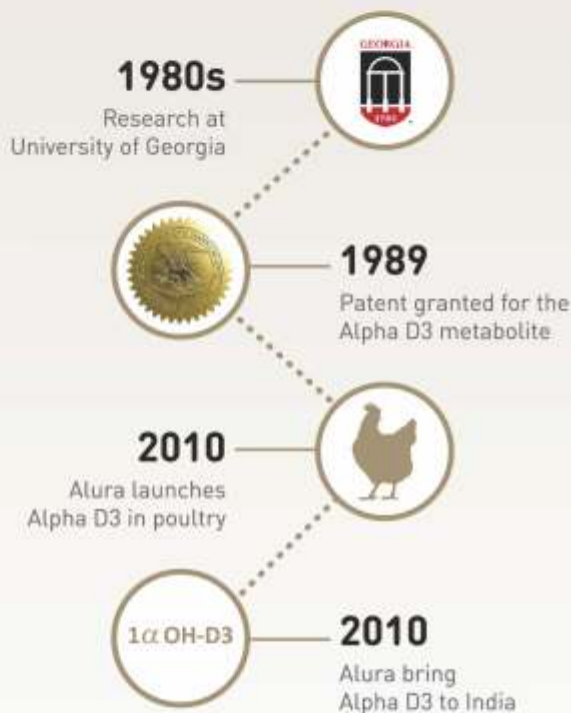
Heat can be lost in different ways and birds can modify their behaviour to stay in the thermoneutral zone by:

**1. Radiation** – Heat will be lost from the body by radiation if the surrounding surfaces are below bird surface temperature. Conversely hot walls and roofs may radiate heat to the bird body surfaces.

**2. Convection** – The heat loss will occur from the natural rise of warm air from around a hot body. Providing moving air



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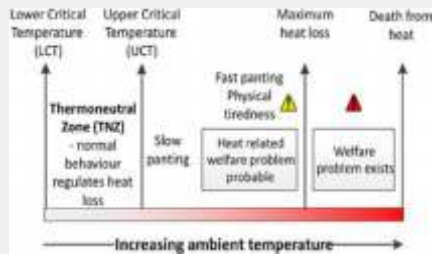
- Increased bioactivity in comparison to regular Vitamin D3 and other metabolites
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can assist convection, if the air moves fast enough to break down the boundary layer of the still air that surrounds the body.

**3. Conduction** – The heat will transfer from one surface in contact with another surface, for example, if the birds are on litter material that is cooler than their bodies. However, the litter material immediately under the birds soon assumes a temperature close to that of the body. After a bird can no longer maintain its body heat balance by one of these three methods i.e. upper critical temperature, it must use evaporative heat loss, or panting to maintain its body temperature.

**4. Evaporation** – At the higher temperature level evaporation is important for poultry as they do not sweat but depends on panting. This method is only effective if the humidity is not too high. So, Hot and humid conditions are much more stressful than hot dry conditions for birds.

#### How do birds respond to increasing temperature?

Birds will try to re-establish their heat balance with the surrounding by changing their normal behaviour.

Birds may: 1. Try to move away from other birds 2. Move against cooler surfaces, such as the block walls or into the moving air streams 3. Birds lift their wings away from their bodies to reduce insulation and expose to any areas of the skin that have no feathers 4. Elect to pant slowly 5. Rest to reduce heat generated by activity 6. Reduce feed intake 7. Increase water consumption. 8. Divert blood from internal organs to the skin, which darkens skin colour 9. Begin fast panting.

#### What are the consequences of panting in birds?

1. Heat is lost as moisture is evaporated from airways in the birds.
2. Panting requires the muscle activity, requiring energy use that generates some additional heat and the heat

lost by evaporation must be greater than the additional heat generated by panting.

3. Slow panting is a normal activity in birds and can be sustained for extended periods of time.
4. Respiration rate can be increase by as much as 10 times the resting rate. Heavy panting can tire birds, reducing their ability to cope with extended periods of hot weather conditions.
5. The high relative humidity can reduce the effectiveness of evaporative heat loss.
6. Increased respiration rate results in loss of carbon dioxide and a rise in blood plasma pH which is called respiratory alkalosis. The blood potassium and phosphates are depleted during heat stress conditions whereas increase levels of sodium and chloride.
7. Growth rate or egg production will reduce.

#### What are the key features of housing that protects the birds from hot weather condition?

The key features are mainly proper insulation, house design, location and ventilation of shed to protect the birds from adverse climatic conditions.

#### Management practices to be taken care to prevent heat stress

##### Feeding

Most often, birds are hungriest in the morning hours, and they will tend to fill up during morning. This feeding during morning hours will make them more prone to the heat stress in the afternoon hours. By practicing withdrawal of feed from the birds for six hours before peak warm temperatures in the afternoon can lower the risk of heat stress. One can reintroduce the feed after peak temperatures have started to decline. Birds can then feed during night time when it is expected cooler temperature conditions. Always have the feeders full

when lowering the feedline. Else one can use lighting during night-time mostly midnight feeding to allow intake these procedures can reduce the heat stress in birds.

##### Water management

During heat stress condition, birds will increase their water intake by 2 to 4 times then their normal intake. Sufficient water space, operating waterers and cool water temperatures will encourage the birds to drink more amount of water to reduce stress conditions. Flush the water lines and waterers routinely to keep the water fresh and cool this will increase the water intake of birds.

##### Using electrolytes

Addition of electrolytes to in drinking water for up to three days can be effective in reducing the heat stress condition. Heat stress causes increased in the loss of several minerals including potassium, sodium, phosphorus, magnesium and zinc. Potassium chloride electrolytes plays a major role in increasing the water intake. It is more effective than other potassium and sodium salts. One should start providing electrolytes prior to the heat stress period.

##### Providing sodium bicarbonate

The use of sodium bicarbonate in the feed or carbonated water is useful for birds in egg production. Generally, panting and the release of carbon dioxide can change the acid-base balance in poultry, and the bicarbonates available for eggshell formation. Thus, sodium bicarbonate can help to decrease these changes.

##### Supplementing vitamins

Supplementing drinking water with adequate vitamins like A, D, E and B complex can be effective in reducing the heat stress mortality in broiler birds. In breeder birds, vitamin C can be effective in declining the moderate warm temperature in egg production and eggshell quality in laying hens, and sperm production in breeder males.

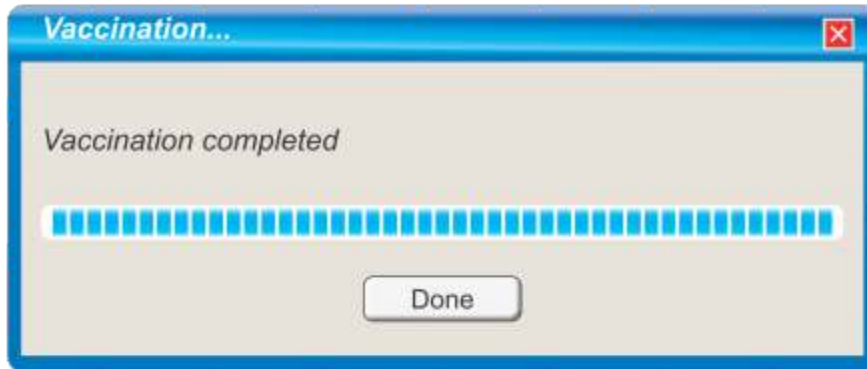


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**Dr. Yogesh Paharia**  
B.V.Sc , M.V.Sc (Nutrition)

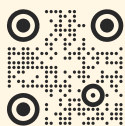
# Importance of Optimising The Dietary Electrolyte Balance

As the global demand for protein increases, so too do the demands placed on our meat-producing animals. Like top athletes that are constantly performing at the edge of their ability these animals are asked to perform at the apex of their genetic and physiological capabilities. It is our job as nutritionists to do what we can to keep them in balance throughout their lives. In the same way that a serious athlete recognises the importance of managing dietary electrolyte balance (dEB) so too should we see the benefits of managing the dEB of our animals. And yet, while diets are often balanced down to the energy and individual amino acid percentages, dietary electrolyte balance is seldom, if ever, automatically calculated as part of a formulation optimisation result or even part of commonly used nutrient recommendations.

Electrolytes (sodium, potassium and chloride) are compounds that dissolve into positive and negative particles in solution. The relationship between these compounds, known as the 'dietary electrolyte balance' (DEB), is affected by either electrolyte or its supplemental salt source. The National Research Council recommended 0.20% sodium, chloride, and 0.30% potassium for starter phase and lower doses of sodium and chloride for the finisher phase of broilers. However, these requirements are increased under heat stress conditions, and birds perform better

when increasing levels of these electrolytes are offered, maintaining a DEB of preferably 250 mEq/kg. Increased levels of these electrolytes, especially sodium, were found effective for growth but caused increased water consumption and ultimately higher litter moisture in summer. In conclusion, a combination of the electrolytes with higher levels of cations and lower level of anions is recommended. DEB is an indication of the metabolizable ions that can generate or consume acid during metabolism. As such, the very significant balance between acids and bases in the organism is closely related to the cation-anion balance. Diets with a low dEB are likely to cause metabolic acidosis, whereas alkalosis is expected with diets high in dEB. Metabolic acidosis has been implicated with reduced feed intake — the most obvious symptom that affects productivity. Dietary electrolyte balance may also affect energy, amino acid, vitamin and mineral metabolism. For example, excess dietary alkalinity (high dEB) may increase lysine oxidation and, thus, increase the requirement for lysine.

Heat stress causes excess panting leading to respiratory alkalosis. As the birds pant, they respire excessive amounts of carbon dioxide, which leads to reduced concentrations of carbonic acid and hydrogen. In response, the kidneys respond by regulating excretion and secretion of these compounds in an attempt to maintain the acid-base balance. As a





# Balance is Important



- Prevention from the heat stress
- Maintain Optimum dEB
- Promote growth & development
- Protect dehydration & stress
- Heat stress makes birds more susceptible to
  - Coccidiosis
  - Mycotoxicosis Disease etc.

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or as directed by the veterinarian/nutritionist)



consequence, the balance of monovalent ions — closely related to acid-base balance — also change: Potassium and sodium concentrations decrease, whereas that of chlorine increase. In reverse, it is hypothesized that by altering the dietary electrolyte balance during heat stress, it might be possible to minimize the negative effects of heat stress. The processes involving carbon dioxide partial pressure (PCO<sub>2</sub>), HCO<sub>3</sub><sup>-</sup>, and pH is peculiarly effective in transporting and regulating the CO<sub>2</sub> resulting from the metabolic processes (Filley, 1972). Because of their physiological characteristics, birds are subject to alkalosis during high temperature exposure as a result of PCO<sub>2</sub> loss during panting (Calder and Schmidt-Nielson, 1968; Frankel and Frascella, 1968). Because of the economic effects of reduced growth rates resulting from chronic heat exposure and death losses resulting from acute heat exposure, there is interest in alleviating the effects of high temperature through chemical manipulation of the blood acid-base balance. Teeter et al. (1985) reported the use of dietary ammonium chloride (as a potential blood acidifier and the use of sodium bicarbonate (NaHCO<sub>3</sub>) as a source of HCO<sub>3</sub><sup>-</sup> in alleviating the effects of chronic heat exposure in broiler chickens. both NaHCO<sub>3</sub> and NH<sub>4</sub>Cl has dramatically changed blood pH.. The requirements of different electrolytes (sodium, potassium and chloride), dietary electrolyte balance (DEB) and salt source in broilers have considerably changed in recent times. The increasing level of sodium (Na), potassium (K) and DEB are associated with higher pH (i.e. alkalosis) while lower levels of chloride (Cl) and DEB are linked with a lower pH (i.e. acidosis). A narrow range of DEB (150–250 mEq/kg) is recommended to overcome the variations in acid base homeostasis and normal blood

chemistry especially in summer conditions. The supplementation of suitable salts like NaHCO<sub>3</sub> and KCl are proven to be beneficial to sustain viability of various biochemical processes. The cations usually alleviate whereas anions exacerbate the lysine:arginine antagonism. In most cases, the electrolytes and their balance (DEB) are considered ineffective in order to influence carcass and related traits; however, the supplementation of their respective salts under heat stress, showed contrary but potentially useful results. The role of electrolytes in combination with coccidiostats is still ambiguous; however, the level of both entities (electrolytes and coccidiostats) should be kept low and studied in detail for mutual compatibility. The inclusion level of electrolytes from various salt sources changes whenever there is change in coccidiostat and environmental condition. Keeping in mind environmental constraints, it is recommended to use the lower dosage alongside ionophores. Consequently, it is recommended to supplement electrolytes and maintaining dietary electrolyte balance (150–250 mEq/kg) is mandatory to exploit improved physiological responses of broilers for maximum growth response.

Considering the loss of electrolytes during the periods of heat stress when panting birds are experiencing respiratory alkalosis. During heat stress, the loss of carbon dioxide (CO<sub>2</sub>) through respiration and bicarbonate ions coupled with monovalent cations (particularly sodium and potassium) through urine, disturbed the acid-base balance (respiratory alkalosis). The corrections in blood acid-base balance have been achieved by electrolyte supplementation, either through drinking water or feed. These electrolytes, in different amounts and proportions, proved

beneficial for broilers under different heat stress regimens. The discrepancies exist among different research workers about an appropriate DEB for heat-stressed broilers. Different environmental conditions in which broilers are reared; heat stress regimens (cyclic, acute, chronic), feeding regimens, source of electrolyte salts, combination of different electrolyte sources and the bird's genotype itself are factors that influence the requirements of a particular electrolyte as well as their balance in the diet.

### The importance of dEB for performance

Nutritionists had observed for a long time – that there is an optimum dEB. For poultry, this is at around 240 mEq. They also showed that on either side of the curve apex one could expect poorer performance as measured by weight gain, feed consumption and feed conversion ratio (FCR). The fact that as animal nutritionists we finally had a tool with which to calculate dietary electrolyte balance. In its simplest form, the dEB is the balance between Na<sup>+</sup>, K<sup>+</sup> and Cl<sup>-</sup> in the feed and is calculated as follows:

$$dEB (mEq) = Na/0,023 + K/0,039 - Cl/0,035, \text{ where } Na, K \text{ and } Cl \text{ is in } g/kg \text{ dry matter.}$$

What is interesting is that commonly used nutrient recommendations such as breed manuals or NRC recommendations do not take dEB into account. As such, for broilers between 106 mEq and 310 mEq<sup>5-7</sup> depending on which values you choose amongst the range of acceptable Na<sup>+</sup>, K<sup>+</sup> and Cl<sup>-</sup> values given by various nutrient guidelines<sup>8</sup>. Most notably, layer breed nutrient guides lack recommendations given for some of the macro minerals making it impossible to calculate dEB. This information is particularly disconcerting considering that these

**INDIAN HERBS ROBUST AND COMPLETE RANGE OF PRODUCTS FOR POTENTIATING ANTIOXIDANT DEFENSE, STRESS TOLERANCE AND IMMUNOCOMPETENCE IN BIRDS**

# HeatBeat

Power-packed with natural heat stable vit. C, organic chromium complex and mint

*Replenishing & Revitalizing Formula*

# ELECTRO-C

Water soluble concentrate power-packed with electrolytes, natural vitamin C & energy

# HERBAL C

Natural heat stable vitamin C and universal anti-oxidant

*With Triple Advantage*

# OSMO C

Natural, heat stable vitamin C with betaine and Phyto-antioxidants



### Heat stability

Naturally conjugated phytoconstituents remains highly heat stable at pelletization (upto 130°C)



### Universal antioxidant

Antioxidant activity in both lipid and is aqueous phase and is higher than synthetic coated vitamin C



### Adaptogen

Helps attaining adaptive homeostasis



### Outstanding bioavailability

Provides self replicating, sustained bio-activity and gets fully absorbed in biological system

Heat and oxidative stress

Cellular oxidation

Free radical generation

Cell death and mortality

Immuno-suppression

Increase respiration, alkalosis and compensatory HCO<sub>3</sub> loss

**Extreme heat stress adversely affects production, performance and farm profitability**

Modern high performing poultry birds face difficulties in coping with heat and other stressors resulting into thermo-intolerance, reduced feed intake, poor growth, FCR, poor shell quality, reduced egg production, hatchability, increased morbidity and mortality. There is a need to strengthen antioxidant defense of birds by supplementing potential antioxidant.

**INDIAN HERBS SPECIALITIES Pvt. Ltd.**

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electrolytes are integrally linked with fluid and acid-base balance in the organism. As such, they are part of the most tightly controlled physiological mechanisms in the body. Mechanisms

As is commonly known this buffering effect is caused by the addition of sodium bicarbonate to an acidic environment such as the stomach, which neutralises the acid. This in

**Average daily weight gain of broilers at day 35 with sodium bicarbonate or Sodium formate Zeactive (cplVetnova).**



that affect everything from bone density, heart and breathing rate, thirst, to nutrient absorption in the intestine to mention a few.

#### What to choose to increase dEB?

The challenge for a nutritionist is to increase the dEB in the most cost efficient way possible. Many try to achieve this by increasing the salt (NaCl) content of the diet, but rapidly reach the limit of what is feasible since Na<sup>+</sup> is tied to Cl<sup>-</sup> in the dEB calculation. It is possible to increase the dEB using potassium sources such as potassium bicarbonate. This solution is not favourable when compared to using sodium to improve dEB. Mainly due to the relatively smaller impact on dEB which means that the costs involved in achieving a similar result are inhibitive. This leaves a combination of the electrolytes with higher levels of cations and lower level of anions is recommended as a first choice for increasing the dEB.

turn increases the gastric pH and releases CO<sub>2</sub> and water. It is precisely this effect that is capitalised upon when we use sodium bicarbonate based antacids to get relief from our own heartburn or indigestion symptoms, whose instant relief is usually signalled with a satisfying eructation of CO<sub>2</sub> – we burp. However, for our animals this mechanism has a number of negative nutritional implications. Firstly, an increase in pH negatively affects the key proteolytic enzymes. Pepsinogen requires a low gastric pH to convert to pepsin and pepsin in turn has its activity optimum at a pH 2 and ceases to function above pH 6.5. Secondly, any commercial acidifiers added to the diet will effectively be neutralised by up to 30% by sodium bicarbonate (Figure 3). So, while sodium bicarbonate provides sodium, this is either at the cost of added acidifiers, digestive performance or both.

#### Conclusion

There is no doubt that optimising dEB in broilers can have significantly positive effects and give performance improvements of 4-7%. However, when balancing dEB, the choice of sodium source may affect other performance enhancers as well as total feed cost. While sodium bicarbonate has the potential to increase gastric pH and neutralise a substantial part of the gastric acid or any added feed acidifier, so combination of the electrolytes with higher levels of cations and lower level of anions is recommended. As a first choice for increasing the dEB. Optimising the dietary electrolyte balance and choosing the correct tool to achieve balance is key to achieving significant broilers performance, improvements and profitability.

# Poultry Management – A cursory Glance

**Priyanka Patlan**  
Co-Editor

Poultry is an excellent source of protein, fat, vitamins, and minerals. Poultry farming and processing are one of the fastest-growing sectors in India. There is an extensive process for making the poultry products consumption-ready and the path is fraught with challenges.

Disease Outbreaks occur time and again, putting the processing and management at high risk. Feed And Logistics Cost are spiraling making poultry rearing a challenging task. The lack of trained professionals in the poultry sector results in poor handling and practices. Other notable challenges include lack of biosecurity standards, price fluctuations, and non-compliance with government food safety regulations.

Scientific poultry management strives to maximise profits while requiring the least investment. Some strategies that can aid in effective poultry management are:

**Biosecurity:** It refers to implementing measures to reduce the risk of introducing and spreading disease agents among the flock. It helps lower the mortality rate and create healthier birds.

**Pre-placement Preparation:** To prevent losses during brooding, one

must monitor essential checkpoints like floor temperature, relative humidity, ventilation, drinkers, feeders, etc.

**Controlled Stock Density:** Low stock density and spacious housing conditions must be encouraged because crowding causes stress to the birds and intestinal micro biota.

**Advanced Waste Disposal:** Unclean cages with wet litter are an ultimate breeding ground for pathogenic microorganisms. In addition, high ammonia levels can be detrimental to birds' health. Thus, proper litter management and routine cleaning must be encouraged.

**Cold Chain Supply:** Due to the increase in E-commerce platforms and their warehouses, cold chain supply for poultry can be a huge boost. It will encourage frozen poultry goods, better storage conditions, and the advancement of the traditional poultry market.

Poultry farms must diligently employ poultry management strategies to improve product quality and health quotient. Moreover, it will increase the supply chain's overall efficiency and boost the growth opportunities in the sector.



# Water System Maintenance During Summer



**Dr V Rajendra Prasad**  
Poultry Consultant

Heatwave conditions across India are continuing and temperatures rising in many states.

- a) It is important for Poultry producers to keep their flock in a comfortable zone.

#### Here are a few tips:

In the Poultry shed please use foggers at 5 to 6 feet to reduce the inside temperature to 28 to 30 °C making birds enjoy summer.

- a) Fogging System Keep your Poultry farm Cool & Keep your birds away from extra heat.
- b) So Mortality due to heatstroke gets very less.
- c) Generator backup is a must because birds get habitual to favorable environments,

At normal temperatures, 10,000 layers will drink 2,000 liters of water daily, but their intake will increase by 50% if the house temperature rises to 90° F (32° C) — and that's when you're likely to have a problem with wet litter and soiled eggs.

There should be adequate drinker space and more drinkers if layers are floor-reared.

Maintenance of the water system for cleanliness and function is another critically important chore if heat stress is to be prevented in layers.

It's easy to overlook a nonfunctioning drinker here and there; drinkers must be

systematically checked to make sure they're all working.

During periods of heat stress, birds will deplete electrolytes faster than usual.

- a) Potassium is usually depleted the most but sodium and chloride levels can also rapidly fall.
- b) Providing birds electrolytes in the drinking water will replenish those that have been lost and encourage the birds to drink.

Immuno modulators Immunotech of ABTL and probiotics CosBac of ABTL in water will give an immense boost and broad support for immunity and gut integrity simultaneously in your flock during heat stress.

#### Flush water pipes.

Summer temperatures soaring above 40 C across India.

Poultry farms should be well equipped to combat heat stress.

To keep your flock in a safe and comfortable zone at this point is the need for hours for poultry producers.

Drinker line should be flushed two to three times till we feel chill on our hands.

It's helpful to cool the drinking water by flushing lines in the afternoon.

Cool water helps bring down the birds' core temperature. If the water is below 77° F (25° C), birds will drink more.



Water over 86° F (30° C) will reduce their water intake, further reducing feed intake.

Water flow should be greater than 70 ml per minute per nipple.

If it isn't, the lines need to be checked for flow restriction. If there's a buildup of iron and other minerals - Biofilm.

### **Maintaining water quality is vital for flock performance in Summer.**

Water is often the forgotten nutrient but plays a very important role in unlocking genetic potential.

- a) Water quality and management of the system supplying water to the birds is vital to ensuring optimum flock performance.
- b) Water constitutes about 55% to 75% of body weight in poultry birds and is considered one of the most important nutrients for their growth and development.

### **On average, birds consume twice the amount of water as feed on a weight basis.**

- a) In summer, water consumption is 3-4 times more.
- b) Even a slight shortfall of water can lead to heatstroke and mortality.
- c) Usually feed, and water consumption ratio is 1:2, but when the temperature shoots beyond 95 OF, this ratio may increase to 1:4 or more.
- d) Increase in environmental temperature tends to cause an increase in water intake while a decrease in environmental temperature causes a decrease in water intake.
- e) Hence, in addition to its nutritional role, water is more important for thermoregulation in poultry, especially during hot conditions.

Water quality challenges can have detrimental effects on the normal physiology of the birds resulting in reduced performance.

Drinking water for poultry arrives from different sources posing a serious threat to the quality of water due to the presence of a wide variety of

- a) bacterial contaminants,
- b) Inorganic ions

c) or other pollutants, which directly or indirectly affect the overall performance and health of birds.

Hence, maintaining and providing good quality water is essential for the efficient development of birds in terms of health and nutrition.

### **Water quality is evaluated by several criteria such as**

- a) total alkalinity,
- b) hardness,
- c) total dissolved solids (TDS), etc.,

But the primary and most important parameters in poultry are

- a) pH,
- b) hardness
- c) and microbiological analysis.
- d) TDS

### **Ideal parameters in Poultry drinking water:**

- a) Ideal pH between 6 to 6.5 Hardness increases the pH of water.
- b) Hardness between 60 – 180 ppm
- c) TDS: Less than 1,000 is desirable and No serious burden to any class of poultry. - between 1,000 to 2,999 is Satisfactory.
- d) Microbiological analysis:  
To be considered acceptable, water should contain less than 100 CFU/ml of coliforms and less than 100,000 CFU/ml of total bacteria.
- e) There should be no Salmonella contamination in the drinking water.
- d) and microbial count of less than 1000 colonies forming units (CFU) /ml is optimum for poultry drinking water.

### **Hard water has higher concentrations of dissolved minerals, such as calcium and magnesium.**

- a) High levels of magnesium sulfate (MgSO<sub>4</sub>) may cause an increase in water consumption, wet droppings, and a drop in the production & of thin-shelled eggs.
- b) Extreme hardness may diminish the effectiveness of water-administered medications, disinfectants, and cleaning agents.
- c) Water is softened by removing

these minerals, either mechanically or chemically.

### **RO water purifiers are used in few Poultry farms where hardness and TDS is on the higher side due to groundwater.**

- a) Main disadvantage is wastage of water up to 50%.
- b) 10% of water is being used for cleaning and washing.
- c) Remaining 40% of water is used for gardening and agriculture purposes on few farms.
- d) This RO method is more viable in Poultry farms where underground water is adequate and sufficient.

TDS includes inorganic and organic substances that cannot be filtered through filter paper.

The main risk with closed water systems is the build-up of a biofilm which typically is not visible.

- a) This biofilm is a thick mucus (slime) secreted by bacteria that builds upon the inside of a waterline if the system is not managed properly.
- b) This biofilm can cause flock health challenges as it harbours bacteria such as E. coli and salmonella.
- c) Biofilms are also difficult to remove and require mechanical action to remove them from the water system.
- d) They may also block nipples or cause them to leak.

A robust cleaning and sanitizing program during a turnaround is recommended to prevent biofilms.

### **Flush water lines regularly**

A high-pressure flush should be performed on water lines between each flock.

Ideal pipeline cleaner in your poultry farm.

Please use DT Smart of Huvepharma which is an alkaline detergent for cleaning of pipes, feeding systems, and cleaning machines between flocks.

- a) Breaks down all types of dirt.
- b) High descaling and degreasing power.
- c) Dissolves organic matter and mineral deposits.

# Pakshimitra - An Effort Towards a Sustainable Future



**Bhavana Gupta**  
Editor-in-Chief



India's poultry sector has seen a paradigm shift in structure and operation during the last few decades. With the advent of big food processing firms and the adoption of contract poultry farming, it has gone from a backyard activity to a significant commercial industry. In 2021, the Indian poultry market reached a value of INR 1,708 Billion.

The Indian poultry sector has some major challenges in meeting the increasing demand for quality and sustainability. Here, PakshiMitra emerged as an ultimate helping hand to bring revolution in India's poultry industry.

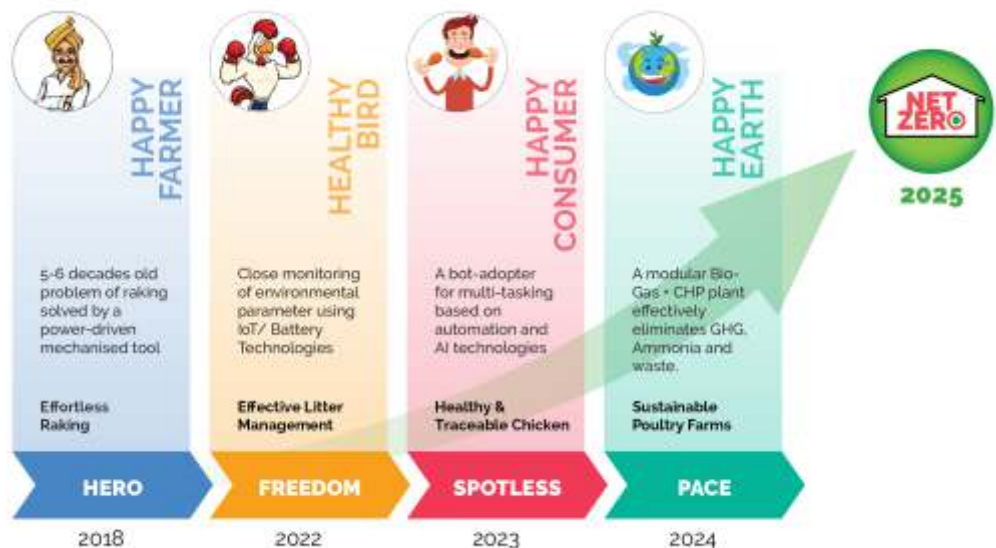
PakshiMitra started its journey in 2015, finding a solution to the local problem of litter raking. Although the problem looked easy at first, it was pretty challenging. Fortunately, the PakshiMitra team had decades of experience designing critical equipment for nuclear & heavy engineering, which helped them develop quality and reliable solutions. Their litter raking machine named 'PakshiMitra- HERO' was a

result of over two years of continuous hard work and nine prototypes!

The PakshiMitra HERO made its first appearance in the industry in 2017, winning several awards in its journey till now. Today, the company's primary focus remains poultry farm waste management with their 4 stage plan - Effortless Raking, Effective Litter Management, Healthy & Traceable Chicken, and Sustainable Poultry Farms.

In 2018-19, they built a vast presence across many countries worldwide through their award-winning designs and strategies. No wonder they were listed among India's Top 20 MSMEs 2020 by ET Rise, Economic Times. Moving forward in the journey, the company won under the category of 'Sustainability' at Maharashtra Startup Week 2021. More recently they have received the FICCI Agri Startup Award 2022 for the Most Innovative Agtech (Emerging Startups).

Pakshimitra can comfortably boast about meeting 6 out of 17







Sustainable Development Goals of United Nations. Good health and well-being by ensuring healthy lifestyle & improvement in welfare, Gender Equality by promoting poultry farming amidst women for financial independence, Affordable and Clean Energy by use of biomass to generate energy with minimal investment, Decent Work and Economic Growth by improving productivity by 40-5-%, Industry Innovation and Infrastructure with their innovative product range as a solution to old problems and Climate Action by reducing ammonia, green-house gases, water and soil contamination.

PakshiMitra aims to complete its 4 stage plan by 2025, contributing toward a sustainable future. This sustainable approach towards poultry and agriculture industry will be effective in disease management, bring greater productivity and excellent product quality, and affordable production costs thereby improving the complete supply chain.

# India – The Investors Hotspot

**Siddhi Gupta**

*Co-Editor*

“ India is one of the world's largest and fastest-growing economies. With the current population of 1.33 billion we are expected to reach 1.65 billion and surpass China by 2050. 71% of Indians over the age of 15 are non-vegetarian. To address the nutritional security we have a high requirement of protein to feed the vegetarian and non-vegetarian population. ”

Growth in per capita income and increasing disposable income is shifting consumer preferences from cereals to fruits, vegetables, dairy and meat. Rapid urbanization has further accelerated the demand of processed poultry and meat in urban areas.

According to the OECD-FAO Agricultural Outlook 2030, poultry meat is expected to represent 41% of all protein from meat sources globally. Poultry meat and eggs are the fastest growing food segments in India and the per capita chicken consumption is expected to grow from 3.2 to 9.1 Kg and the share of poultry & other meat in household food consumption is expected to grow from 12% to 24% by 2030.





India's food processing industry is one of the world's largest, with production anticipated to reach \$535 billion by 2025-26. India is a hotbed of opportunities across the complete value chain of the poultry sector.

India has one of the highest feed cost per kg of broiler and opportunities exist right from crop production to feed formulation and production for optimum nutrition. The animal feed market has a market potential of \$6 bn by 2025. Compound feed has a market potential of \$400 - 650 mn

with 16% growth over the next 5 years with potential capacity addition of 10-18 MMT. The major growth drivers are low organic feed market, penetration, increasing formal offtake, etc. Feed manufacturing potential has Internal Rate of Return (IRR) of 17-20% and a payback within 9-12 years.

With burgeoning demand the production needs to grow at the same pace. The Indian animal healthcare industry accounts for 2.5% of global animal healthcare industry and is expected to grow @6% CAGR. Animal Vaccines comprise 17% (\$170 mn) of the overall Animal Healthcare industry in India, which stands at \$ 950 mn. Indian poultry market, consisting of broilers and eggs was worth \$25B in 2018 and projected to reach \$60B by 2024, growing at a CAGR of ~16%. India ranks 3rd in Egg Production in the world with 122.04 billion poultry eggs produced in 2020-21.

The emergence of vertically integrated poultry producers that have reduced consumer prices by lowering production and marketing costs and the market is transitioning from live birds to chilled and frozen products. Barely 5% of eggs produced are processed into dehydrated/frozen products.

Feed Production	Animal Production	Processing	Distribution
			
Ingredients	Stock	Primary	Wholesalers / Traders
Premixes	Healthcare	Value Addition	Quick Serve Restaurants (QSR)
Feed	Vaccine		Online Retail Platforms

Poultry processing & value addition are still at a very nascent stage but both the quantity and value of the exported processed poultry products have increased during the last few years. Despite being 3rd biggest poultry producer more than 90% of chicken is unprocessed (live chicken). Though, the trend is changing rapidly with processed chicken market is expanding at 15% CAGR with rise of QSRs (Quick Service Restaurants like KFCs) and online meat delivery platforms (Licious, Zappfresh, Bigbasket, Grofers etc.).

The biggest opportunity lies in this budding consumer brands segment. There exists a gap in the value chain as most of these vendors lack dry processing, storage, cold chain facilities and logistical (refrigerated trucks or specialized equipment) for packing and transporting produce.

Compliance with food safety norms is essential for consistent growth in demand and coupled with creating awareness about processed products will promote the consumption of healthy, safe and hygienic meat products win customer confidence.

With increasing development in the food retail sector, favorable economic policies, and attractive fiscal incentives, India's food ecosystem provides tremendous business prospects to investors. The poultry industry needs capital investment and state of the art technology in its operations to bring in greater efficiency in supply chain management and business processes.

The Ministry of Food Processing Industries (MoFPI) making impressive efforts to attract investment across the national and global food processing value chains.

Government norms permit 100% foreign investment through automatic route for Animal husbandry (poultry, fish farming, aquaculture under controlled conditions) and agriculture for trading, including through e-commerce, in respect of food products manufactured and/ or produced in India. 100% FDI is permitted through automatic route for food processing as well.

In 2020-21, the food processing industry saw FDI inflows amounting to\$ 393.41 million, and from April 2000 to November 2021, the food processing sector received a total of US\$ 10.88 billion in FDI.

At the end of the day the most significant reason to invest in the sector is the ever-increasing demand and profitability of the food processing sector.

# Cold chain – Opportunity and Challenges

**Bhavana Gupta**  
Editor-in-Chief

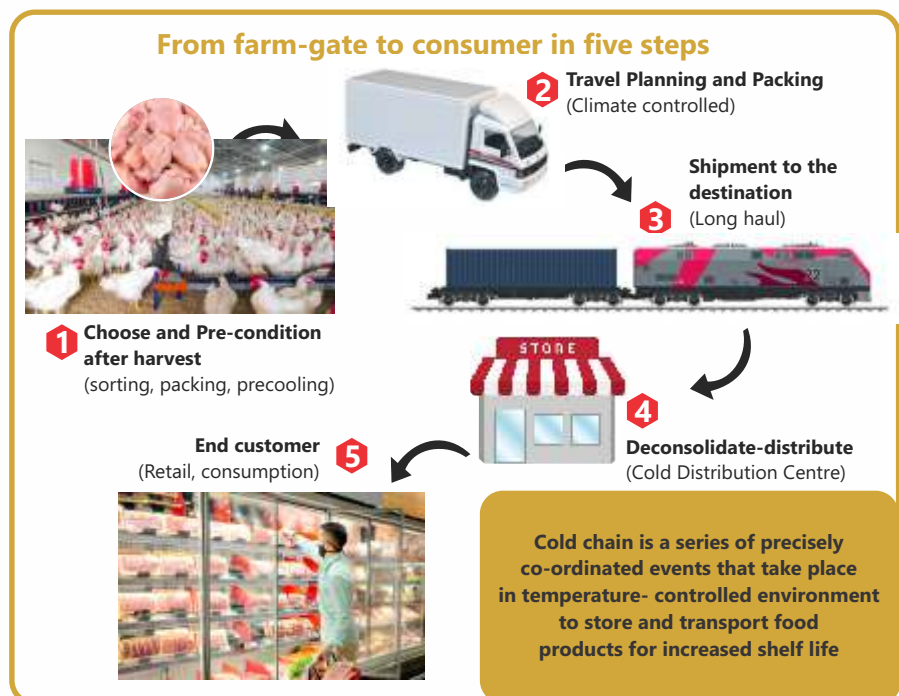
Food of animal origin has a short shelf life and poultry is no exception. Cold chain management is the biggest essential for maintaining the quality of poultry products. Raw poultry supports the growth of pathogenic microorganisms and bacteria and it is essential to maintain the temperatures without any interruptions in the cold chain right from processing to packaging and then along the distribution chain.

There has been a remarkable change in the poultry sector in the past decade. It is moving from an unorganized lot to the organized at a very fast pace. The trends are changing rapidly as the demand for processed chicken and other value added products is growing. The increase in QSRs (Quick Service Restaurants like KFCs) and the rise of online meat delivery platforms (Licious, Zappfresh, Tendercuts, Grofers etc.) has led to market expanding at 15% CAGR.

Compliance with food safety norms is

essential for consistent growth in demand and coupled with creating awareness about processed products will promote the consumption of healthy, safe and hygienic meat products win customer confidence. There exists a gap in the value chain as most of these vendors lack dry processing, storage, cold chain facilities and logistical (refrigerated trucks or specialized equipment) for packing and transporting produce.

The pandemic has led to increased use of technology and digitization which has enabled an end-to-end overview of the supply chain, helped build transparency and forecasting disruptions. Internet of Things (IoT), Artificial Intelligence (AI), data analytics, etc. are already being used in smart shipping and it has enabled stakeholders with quicker decision-making based on real-time insights. It provides improved visibility, real-time status updates and smart container tracking. Cloud technology



has received a tremendous boost and it is estimated that the industry will be worth \$1250 billion by 2028. Remote sourcing will become more dominant with technologies, such as Augmented or Virtual Reality, AI and Blockchain.

SME retailers are expected to emerge as a dominant sector with independent or freelance sourcing experts, working with multiple buyers for shared procurement resources. Drone facilities for last mile deliveries in congested urban areas are picking up. India has already come with the Drone Rules 2021 to pave the way for faster deliveries, smoother logistics and substantial reduction in carbon emission. Asia Pacific region has the largest market share for the global drone logistics and transportation market which is estimated to be valued at \$11.20 billion in 2022.

Majority of millennials are ready to pay more for products meeting the sustainability standards. In a bid to be environmentally responsible companies are increasingly adopting de-carbonization strategies and pushing for greener business solutions. Building smarter warehouses with energy-efficient systems to create greener cold supply chains and solar-powered, temperature-controlled units, the logistics and supply chain sector has started integrating smart and planet-friendly systems in their operations.

- Cold chain industry in India is riddled with challenges which is clearly indicated by the significantly higher operating costs, the cost of per cubic meter storage in India for cold storage is \$ 60 as compared to the \$ 30 in the west. Establishing the required infrastructure at various stages is the biggest challenge. Some components that need to be developed include:
- **Static Infrastructure** - modern-pack houses with pre-coolers at farm-gate, bulk cold warehouses and cold distribution hubs.
- **Mobile infrastructure** – like reefer trucks, reefer containers.
- Standards and protocols need to be clearly defined.
- Skilled human resources is another major challenge.
- Shortage of consistent power supply is a burden for cold chain companies as they have to make extra

investment for power backup which in turn adversely impacts the cost for storage. Fuel component goes up to 30% of operating expenses as compared to 10% in the west.

- Real estate costs have risen by 280% consequently raising the project cost of developing cold chain infrastructure. Minimum investment of INR 50 million is required to build a cold storage and add to this the real estate procurement price.
- The average capacity utilization in the industry is just around 30 percent.

MOFPI (Ministry of Food Processing Industries) has taken various measures for development of cold chain infrastructure. Scheme of Cold Chain, Value Addition and Preservation Infrastructure is to provide integrated cold chain and preservation infrastructure facilities, without any break, from the farm gate to the consumer. It covers creation of infrastructure facility along the entire supply chain viz. pre-cooling, weighing, sorting, grading, waxing facilities at farm level, multi product/ multi temperature cold storage, CA storage, packing facility, IQF, blast freezing in the distribution hub and reefer vans, mobile cooling units for facilitating distribution of horticulture, organic produce, marine, dairy, meat and poultry etc. The scheme allows flexibility in project planning with special emphasis on creation of cold chain infrastructure at farm level.

The integrated cold chain project is set up by Partnership / Proprietorship Firms, Companies, Corporations, Cooperatives,

Self Help Groups (SHGs), Farmer Producer Organizations (FPOs), NGOs, Central / State PSUs, etc. subject to fulfilment of eligibility conditions of scheme guidelines.

**A few steps include:**

- Grant-in-aid @ 35% for General Areas and @ 50% for North East States, Himalayan States, ITDP Areas and Islands, of the total cost of plant & machinery and technical civil works will be provided for storage infrastructure including Pack House and Pre cooling unit, ripening chamber and transport infrastructure.
- Grant-in-aid @ 50% for General Areas and @ 75% for North East States, Himalayan States, ITDP Areas and Islands, will be provided for value addition and processing infrastructure including frozen storage/ deep freezers associated and integral to processing.
- Grant-in-aid @ 50% for General Areas and @ 75% for North East States, Himalayan States, ITDP Areas and Islands for irradiation facilities.
- 40% of the cost subject to a ceiling of INR 7.5 lakh per beneficiary as assistance for purchase of specialized transport units for animal products.
- 40% of the cost subject to a ceiling of INR 35 lakh per beneficiary as assistance for setting up of environment control e.g. pollution control, effluent treatment etc.
- Operating Guidelines are under preparation for establishment of common infrastructure facility in PPP mode.

<b>MoFPI Assistance सरकारी सहायता</b>	
<b>For storage infrastructure including Pack House and Pre cooling unit, ripening chamber and transport infrastructure</b>	Grant-in-aid @ 35% for General Area and @ 50% for North East States, Himalayan States, ITDP Areas & Islands, of the total cost of plant & machinery and technical civil works will be provided.
<b>For value addition and processing infrastructure including frozen storage/ deep freezers associated and integral to the processing</b>	Grant-in-aid @ 50% for General Areas and @ 75% for North East States, Himalayan States, ITDP Areas & Islands will be provided.
<b>For irradiation facilities</b>	Grant-in-aid will be provided @ 50% for General Areas and @ 75% for North East States, Himalayan States, ITDP Areas & Islands

# Block the Summer Shock by Nutritional Intervention

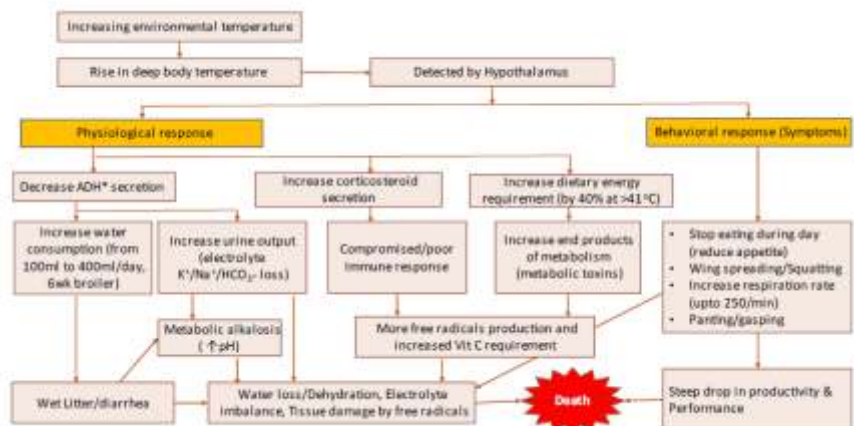


By **Dr Pooja Bhardwaj**  
MVSc (Pharmacology & Toxicology)

One of the greatest challenges to production facing poultry farmers in the India is heat stress and the strain that it causes to the bird. Climatic conditions in India are such there is intense radiant energy for an extended period of time. Poultry create a large quantity of metabolic heat and accumulate additional heat from radiant energy. Heat production and accumulation, coupled with compromised cooling capability because of environmental conditions, causes heat load in the bird to increase to the point that body temperature rises, intake declines and ultimately the bird's productivity drops. Birds are 'heat stressed' if they have difficulty achieving a balance between body heat production and body heat loss



## Consequences of Heat Stress



## Management of heat Stress

The strategies to minimize the effects of heat stress can be achieved by:

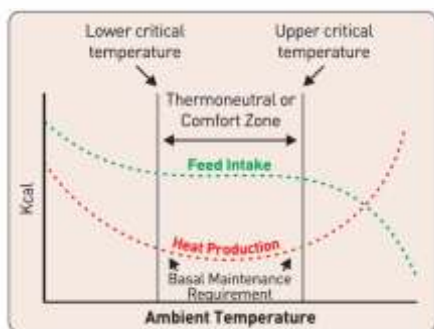
- 1) Genetic modification by developing heat-tolerant breeds
- 2) External environment management:
  - a) Improved nutritional management practices.
  - b) Physical modification of the environment [shading, cooling]

In this article we will discuss about nutritional management of heat stress.

### Improved nutritional management practices.

#### 1) Feeding Strategies for Heat Stress

During hot weather birds reduce feed consumption resulting in deficiency of some nutrients. Manipulating the ration such as increasing energy intake, should be done carefully and technically. Avoid using rancid fats & amino acids balance must be maintained by using vegetable protein sources rather animal protein. Measure feed intake per day/per week regularly & adjust the level of critical nutrients according to intake. To encourage feed consumption during heat stress various feeding strategies can be employed like:



**a) Feed Restriction:** Feed restriction can be done to reduce the heat load when the ambient temperature is high. Gratification for 2 hours prior to the warmest period during the day to fix the FCR and reduce mortality without affecting body weight. One option is to complete the morning feeder cycle by 10:00 am. An additional advantage with this is the availability of calcium in the digestive system during shell formation at night and in the early hours of the morning so-called 'midnight snacks' are a good tool to give hens extra feeding time in the cooler parts of the night. A

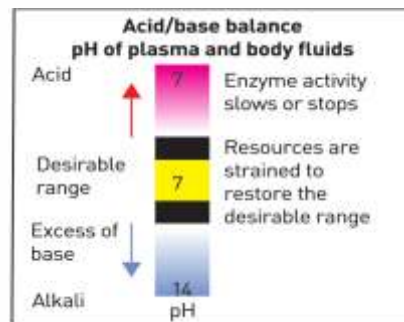
good strategy to take an unnecessary heat load off the birds is to withdraw feed 8 hours prior to anticipate time of peak temperature. One third of the daily feed ration should be given in the morning and two thirds in the late afternoon. Feeders should run empty at least once a day to enhance the appetite and to ensure that the fine particles of the feed [premixes, vitamins etc.] are consumed.

**b) Free choice feeding:** Poultry can adjust nutrient consumption by the need to select appropriate feed ingredients physiological needs. Feed with the rough shape particles will have a longer retention time in the digestive tract so will generate heat slower during digestion. In addition, feed consumption as coarse particle encourages more water consumption than regular feed so that it can reduce the heat load to facilitate heat dissipation in evaporation. The feed texture should not be too fine. Oil/Molasses can also be used to avoid "dusty" feed and to increase palatability.

#### c) Wet feeding:

As shown in flow chart Prolonged panting causes increased CO<sub>2</sub> loss & changes acid base balance in body. Birds' metabolism also gets affected due to respiratory alkalosis & dehydration.

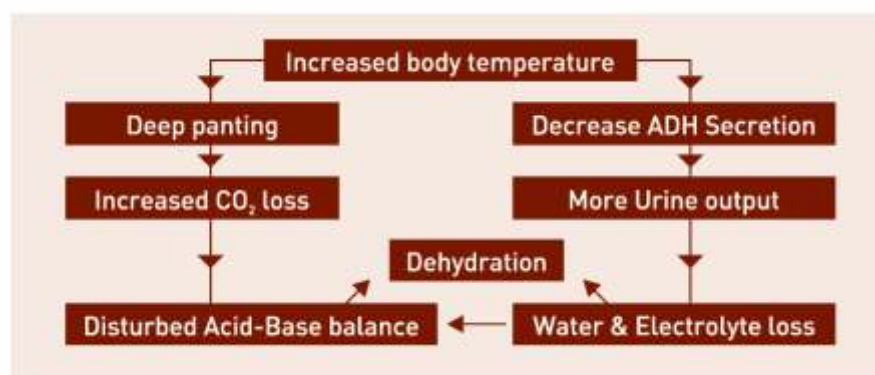
To overcome this imbalance acidifier & electrolyte can be supplemented in feed as wet feeding. This will also create optimal conditions for enzyme activity & digestion so that feed can easily digested and absorbed, which will improve body weight gain and FCR.



- Improves palatability of feed. Thus, improves voluntary feeding
- Improves digestion & absorption of feed by balancing the gut pH

#### d) Special Feed formula for summer

**Increase dietary protein:** In hot weather the need for maintenance energy is much lower than at an ideal temperature and birds respond by less feed consumption. With the reduction in consumption, there is often a reduction in intake of essential nutrients such as protein, essential amino acids, minerals and vitamins, which can result into reduced body weight and egg production. So, to ensure feed intake of essential amino acids & vitamins, it is recommended that protein content of feed should be increased by 1-2%. However, there is a possibility that increasing dietary protein might be detrimental to the bird as more heat is produced during its utilization and that may well overload heat dissipation mechanisms (i.e., panting, blood circulation etc.)



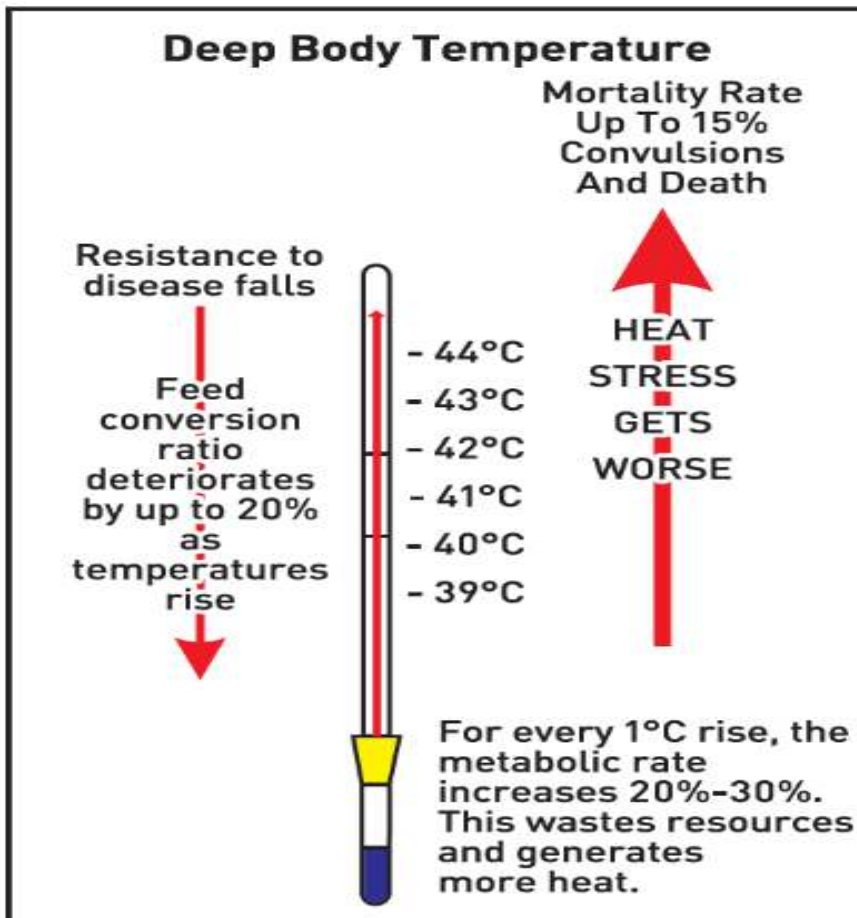
#### Advantage of use of acidifier for wet feeding

- Liquid acidifier moistens the feed without compromising the sterility of feed
- Acts as feed sanitizer

Therefore, improving overall balance of the diet by amino acid supplementation appears to be more effective than increasing protein intake.

#### Increase nutrient density of the diet:

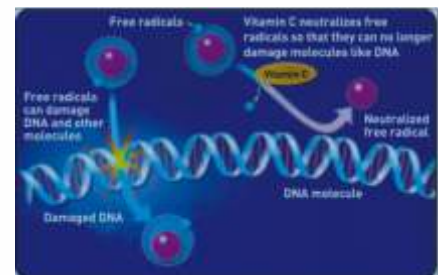
To increase the energy content of the



carcass weight and mortality in birds. Supplementation of essential herbs like *Ocimum sanctum*, *Withania somnifera*, *Emblca officinalis* & minerals can also help to overcome the heat stress.

**Advantage of Vitamin C supplementation in feed**

1. **Antioxidant:** Ascorbic acid can scavenge free radicals and reduce oxidative stress. It is also protecting the fat-soluble vitamins A and E as well as fatty acids from oxidation.



2. **Immune System:** Vitamin C makes the epithelial tissues in the mouth less permeable to bacteria. It also assists the white blood cells for proper function and so contributes in maintaining the immunity. Furthermore, it protects the immune system and reduces mortality in growing birds infected with IBD in a hot environment by protecting the lymphoid organs and bursal activity.
3. **Maintenance:** Vitamin C helps in hydroxylation & maturation of collagen fibers. Collagen is integral part of bone, cartilage & blood vessels. So, better maturation of collagen helps to improve egg shell quality in layers & dressing percentage in broiler.
4. **Enhances iron absorption:** Vitamin C improves the absorption of iron by converting Fe into its bioactive form, which intern increases the hemoglobin level in body & limit the respiratory alkalosis to an extent.

**Water Management**

The availability of adlibitum clean, cool drinking water is very crucial during hot conditions. Any action which limits water intake will depress production.

The ideal drinking water temperature is

diet during hot weather, it is always recommended the use of supplemental fat. Dietary fat increases palatability of feeds and reduces the amount of heat increment that is produced during its utilization in the body.

Feeding calcium carbonate or oyster shells: Calcium content of the diet should be adjusted according to anticipated level of intake, such that each bird can consume the right amount per day. For laying hens, top dressing feed with oyster shell or large particulate limestone is beneficial and has the added advantage of stimulating feed consumption. Limestone and oyster chips may be provided at a rate of 625 g per 100 hens.

**Supplements (Minerals and Vitamins):**

Imbalances acid-base is very common in heat stressed birds. Therefore, inclusion of various us compounds in the diet or water is a common practice to alleviate the adverse effects of heat stress. These include sodium bicarbonate, potassium chloride, calcium chloride, ammonium

chloride and Research has proven that sodium bicarbonate at high temperature stimulates water and feed consumption & contributes to improved weight gain. Sodium bicarbonates can act as alternative source of sodium & assists in maintaining healthier living environment with better condition. The addition of 8 g of sodium bicarbonate to the 100 liters of drinking water [or 35g per 25kg] can be useful in heat stressed birds to stimulate water consumption.

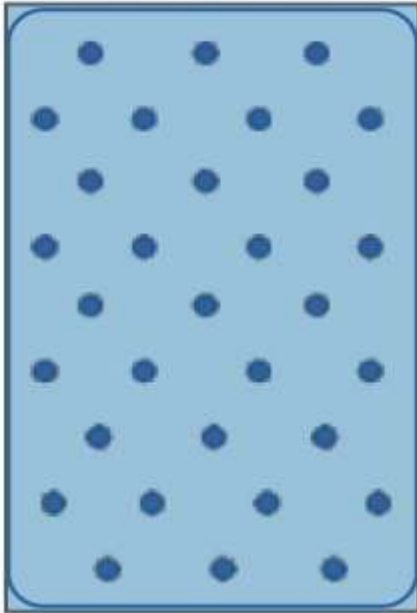
**Vitamin C rich diet**

Any stressors like heat stress may increase the chickens' need for vitamin C, since chicken is not able to synthesize enough vitamin C to meet increased physiological demands. Vitamin C plays crucial role in amino acid & mineral metabolism and synthesis of some hormones.

Vitamin C ameliorates heat stress induced problems such as poor immunity, feed intake, weight gain, oxidative stress, rectal and body temperature, fertility and semen quality,



## Ideal drinker distribution



## Ideal nipple height



10-120C. Ensure there are enough drinkers with even distribution throughout the shed at the right height. Water tank should be filled in every 4 hours with fresh & cool water.

- a) Use of Vitamin C in drinking water to avoid Heat Stress: Vitamin C in drinking water can lower rectal temperature during the day time in chickens. The secretion and release of corticosterone can be reduced by Vitamin C supplementation. Supplementation of honey @ 20ml per liter of drinking water can decrease the frequency of panting and heart rate. Honey contains phytohormones that play a role in muscle contraction and relaxation of the heart and lungs.
- b) Advantage of water acidification in summer: Water quality frequently changes from season to season in each location or area depending on the source. In summer the decreased underground water level results into increased pH & total dissolved solids [TDS] in drinking water leading to high water alkalinity and hardness. It is advisable to monitor water composition every six months and not only when the producer experiences poor flock performance. In summer as water

consumption also increased, there is maximum threat of water borne diseases. Chlorination is an ideal tool to achieve highest water sanitization, but for proper chlorination water pH should be kept in acidic range. By using acidifier in drinking water both the problems can be solved as organic acids balance water pH in 5-5.5 range and due to their bacteriostatic action ensures the safety of drinking water.

By understanding heat stress and taking steps to prevent it, you will be keeping your birds comfortable and still loving the sunshine.

Vitamin C is necessary for various biosynthesis [collagen, 1,25- dihydroxy vitamin D and adrenaline] as well as for regulation of diverse reactions [secretion of corticosterone, regulation of body temperature and activation of immune system). It has been reported that vitamin C enhances the antioxidant activity of vitamin E by reducing the tocopheroxy radicals back to their active form of vitamin E. Adult poultry under normal conditions are able to synthesize vitamin C to meet the requirement. However, it has been reported that vitamin C requirement is higher during stress and several reports have documented a beneficial effect of

supplementing poultry feed with ascorbic acid.

Ascorbic Acid [Vitamin C], had been very useful as a supplement in poultry diets under stress, particularly under heat stress. In view of the fact that ascorbic acid of tissue synthesis is not sufficient at periods of stress, and that diets do not usually contain vitamin C, the birds are liable to suffer from vitamin C deficiency, if rations are not supplemented with vitamin C. It has been observed that supplementation of diets with ascorbic acid at required levels, especially under heat stress, improves growth, egg production, egg shell strength, fertility within (male and females) and hatchability of poultry eggs. The depressant effect of high temperature on performance often compels the technique of supplementing poultry diets to ensure optimum production. Therefore, it is necessary to adopt effective measures to control heat stress and its adverse effects on livestock. Vitamin C alleviates the side effects of stress, thus increased heat tolerance in birds, and improved response to cell functional immunity. Therefore, ascorbic acid could be included at the rate of 250mg/kg diet, 500mg/kg diet and 400mg/kg diet for day old chicks, Breeders or Layers and broiler chickens, respectively.

# Gout in Poultry



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## Introduction

Gout is a metabolic disease associated with elevated levels of uric acid in blood and tissues where abnormal accumulation of white chalky uric acid occurs in soft tissues of various organs of body. Uric acid is a nitrogenous waste from protein breakdown. It is produced mainly in the liver and is excreted by the kidneys. In mammals, it is converted to less harmful substance with the help of the enzyme uricase. But in birds this enzyme is absent. Hence, uric acid is the final excretory product. High blood levels of uric acid favour its precipitation in tissues. Uric acid is not toxic but precipitated crystals in the form of monosodium urate crystals can cause mechanical damage to tissues like kidneys, heart, lungs, intestines and also in the joints. These crystals severely damage body tissues.

## Significance

Gout is one of the economic important diseases in commercial broilers and it is responsible for a great deal of morbidity and mortality in broilers. The disease is of prime importance in poultry industry due to increased incidence causing production loss, regular mortality and lack of availability of specific treatment (Dhara et al., 2010). Bulbule et al., (2013) reported several outbreaks of gout in commercial broilers in India during 2011–2012 which caused up to 40% mortality in birds resulting in heavy economic losses to the broiler farmers.

## Causes

Gout is multifactorial in origin which can be infectious, nutritional, toxic, poor management or possibly a combination of factors. The nutritional or metabolic causes of gout includes high protein diet, excess salt, excess dietary calcium, low phosphorus, imbalance in Calcium-Phosphorus levels, adulteration of feed

with urea and vitamin A and D deficiency. The prolonged dehydration can trigger urolithiasis in the birds. Water deprivation followed by over dosages of certain drugs like sulphas and the antibiotic aminoglycosides (Gentamycin) often causes gout. Feed contaminated with the mycotoxins and phytotoxins impairs kidney functions leading to gout. Citrinin, ochratoxin and oosporein are the nephrotoxic and also cause gout.

Some managemental stress factors including high brooding temperature, higher level of ammonia concentration in the shed cause high mortality due to gout. Primary infectious nephritis due to bacterial agents does not appear to be common in poultry. *E. coli* and salmonella has occasionally been isolated from cases of pyelonephritis, but the infection is likely secondary. The infectious causes for the development of gout are the nephropathogenic



infectious bronchitis virus (IBV), avian nephritis virus (ANV), chicken astrovirus (CAstV) and infectious bursal disease (IBD) virus (Bulbule et al., 2014).

### Signs and lesions

Gout is characterized by depression, dehydration and sometimes with greenish diarrhea. Affected chicks appear dull with ruffled feathers and moist vent. Mortality among young chicks is high. There is irregular and excessive enlargement of kidney lobules and cutting open the kidney reveals urate crystals chalky white deposition of urate crystals is seen all over the visceral organs like the heart, liver and kidney under the skin etc.

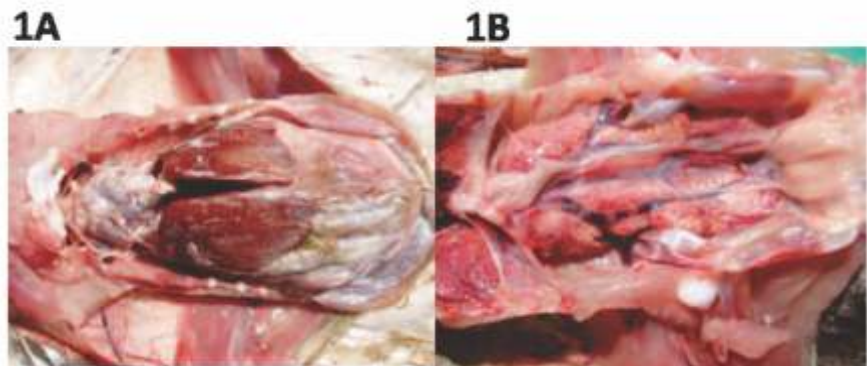
### Types of Gout

Depends upon the site of uric acid deposition, gout is classified as visceral gout and articular gout. A condition in which white uric acid deposits are seen in soft tissues of various organs in body especially in kidney and heart is known as visceral gout and condition in which urate crystals deposits in joints are known as articular gout.

In case of visceral gout, kidneys are swollen and contain urates (Figure. 1). Similarly urate-crystals are seen within tubules with impaction of urater, urater branches and collecting ducts resulting to damage of primary tubules or to back pressure following obstruction of urater and its branches which in turn affects normal excretory function of kidneys. The kidney damage can arise from infection with certain strains of infectious bronchitis, avian nephritis virus, exposure to some mycotoxin or inadequate water intake. High calcium with low phosphorous diet results in precipitation of calcium sodium urate crystals. Excessive Sodium, low vitamin A diet, high protein diet (30%) and water deprivation due to any reason leads to concentration of uric acid in kidney. Hard water with higher metallic salts favors the condition and puts extra load on kidneys. Mycotoxins, ocharatoxins and oosporin, antibiotics excreting through kidneys like sulpham drugs, Gentamycin and Nitrofurans in excess dose cause renal damage. Articular gout (Figure. 2) is rarely seen and it is usually a chronic condition. Kidneys are generally normal

and may become abnormal with white urate deposits if bird gets dehydrated. Main causes are genetic and high protein diet.

need to be avoided. Urine acidifiers like ammonium sulphate (5.0 g/kg BW) and ammonium chloride (10 g/kg BW) increases the acidity of the urine and



**Figure 1A and 1B:** Post mortem lesions showing urate crystal deposits in visceral organs.



**Figure 2:** Post mortem lesions showing urate crystal deposits in joints.

### Treatment

When gout mortality is recognized, the disease cannot be corrected, but treatment may help some birds live with marginal kidney function. Current techniques for reducing gout mortality in pullets and layers rely on acidifying the urine to keep kidney stones dissolved and preserve functional renal mass of affected birds. Reduce the dose of antibiotics if given and also provide plenty of water. Check the hardness of water and it should be desirable.

### Prevention and control

Adequate water should be provided to birds. Regular checking of watering system for height, blockage and adequate flow of water is essential. During transportation of chicks from hatchery to farm ensure proper temperature and humidity to avoid dehydration. Feed with high protein content than the recommended level

helps in uric acid excretion. Meet the dietary calcium and phosphorus level carefully. It is better to provide calcium in the form of grit rather than powder as grit dissolves slowly and helps to maintain blood calcium level. Provide the feed without mycotoxin content and if found positive change the feed or use suitable toxin binders. Judiciously use the drugs which cause kidney damage. Use of electrolytes through water may assist in controlling mortality. In acute cases, potassium chloride (1 g/litre) can be used. Provide broken maize at least for 3 days and jaggery (5 g/litre) for 3-5 days in acute cases of mortality.

### Conclusion

Gout in India is still one of the major causes for huge mortality and morbidity in poultry, causing great monetary losses to the producers. Breeder management along with adequate farm and hatchery management are crucial in preventing incidences of gout. Gout due to water deprivation, particularly in the winter season in India's northern states, should be taken care of by providing optimal brooding temperatures. The producer should be proactive enough to include optimal additives/supplements in water that would aid in cutting down the usual mortality pattern. Any practice that encourages flushing out uric acid crystals should be adopted, the easiest and vital being boosting up water intake, or else the whole effort of providing medications through water can be futile.



# Effect of Supplementing EndoBan to The Feed on The Performance of Broilers



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## Introduction

Endotoxins are potentially toxic compounds from bacterial origin. Once absorbed, endotoxins induce an inflammatory response, thus wasting energy and nutrients meant for growth and production. The most well-known endotoxins are lipopolysaccharides (LPS), which are a component of the cell wall of Gram-negative bacteria. In poultry, the gastrointestinal tract is the most important source of endotoxins and the main risk site where endotoxins can be transferred from the lumen into the bloodstream.

Nutrex developed a new innovative feed additive, EndoBan, by combining different strategies to reduce the leakage of endotoxins and improve animal's performance.

The aim of this trial was to investigate the effect of EndoBan on growth performance and LPS absorption in broilers undergoing an intestinal challenge.

## Materials and methods

A pen trial was conducted in which Cobb 430Y male broilers were reared in a poultry house (AgriVet, India) for 42 days. A total of 198 broilers were randomly allocated to 3 treatments (Table 1) with 6 replicates per treatment (11 birds/pen at the start of trial). For all animals, a three phase

dietary program (starter d0-14, grower d15-28 and finisher d29-42) was used in which all diets were fed ad libitum. The composition of the dietary diets is listed in Table 2.

**TABLE 2: NUTRIENT COMPOSITION OF THE DIET**

	STARTER D1-D14	GROWER D15-D28	FINISHER D29-42
Composition (%)			
Corn	56.66	59.52	62.29
Soybean meal I	29.66	22.88	22.04
Full fat soybean	3.66	8.00	8.00
Meat-bone meal	2.50	2.50	2.50
Rape seed meal	2.50	2.45	-
Rice bran	2.00	2.00	2.00
Soybean oil	-	-	0.82
Nutrase BXP 200 TS	0.02	0.02	0.02
Nutrients (%)			
Crude protein	23.0	21.0	20.0
Lysine	1.28	1.15	1.08
Methionine	0.62	0.56	0.54
AME (kcal/kg)	2800	2900	3000

On day 17, birds from the challenge groups were administered with a coccidial suspension consisting of 10000 sporulated oocysts of Eimeriacervulina, Eimeria maxima and Eimeriatenella via oral gavage. After the coccidial treatment, a bacterial suspension consisting of E. coli(1010cfu/bird) was given daily by oral gavage from day 21 till 22. At day 25, blood samples were taken (10 birds/treatment) to analyze the LPS concentration and the concentration

**TABLE 1: DESCRIPTION OF DIETARY TREATMENT**

TREATMENT	CHALLENGE	DOSAGE
Control	-	-
Control	+	-
Control + EndoBan	+	500 g/T



of  $\alpha$ -1-acid glycoprotein (AGP). A schematic presentation of the protocol is shown in Figure 1. Body weight and feed intake were recorded at weekly intervals. Feed conversion was calculated from the measured weight gain and feed intake. Pen mortality was recorded to correct feed intake.

reduced animal performance. At the end of the trial (day 42), the best results were obtained for the non-challenged control group. Nevertheless, challenged birds supplemented with EndoBan could alleviate the negative effects of the challenge and had an improved BW

In this study, an oral coccidial and *E. coli* suspension were used to induce intestinal challenge. Any damage to the intestinal barrier could increase gut permeability and the translocation of endotoxins from the intestinal lumen into the bloodstream. The challenge used in this study led to a higher leakage of LPS molecules into the bloodstream and the production of acute phase proteins (e.g. AGP). Dietary supplementation of EndoBan decreased the LPS concentration in blood compared to the challenged control group and even the non-challenged control group. Moreover, birds fed the EndoBan supplemented diet had significantly ( $p < 0.01$ ) lower serum AGP concentrations compared to the challenged control group.

### Conclusions

The intestinal challenge used in this study was efficient to cause a disturbance in the intestinal barrier leading to reduced growth performance and higher LPS absorption.

EndoBan showed improved or similar responses as the non-challenged group, indicating that EndoBan neutralizes the negative effects caused by the challenge model. Therefore, we see that EndoBan can effectively reduce the translocation of endotoxins from the lumen into the bloodstream and improve animal's performance.

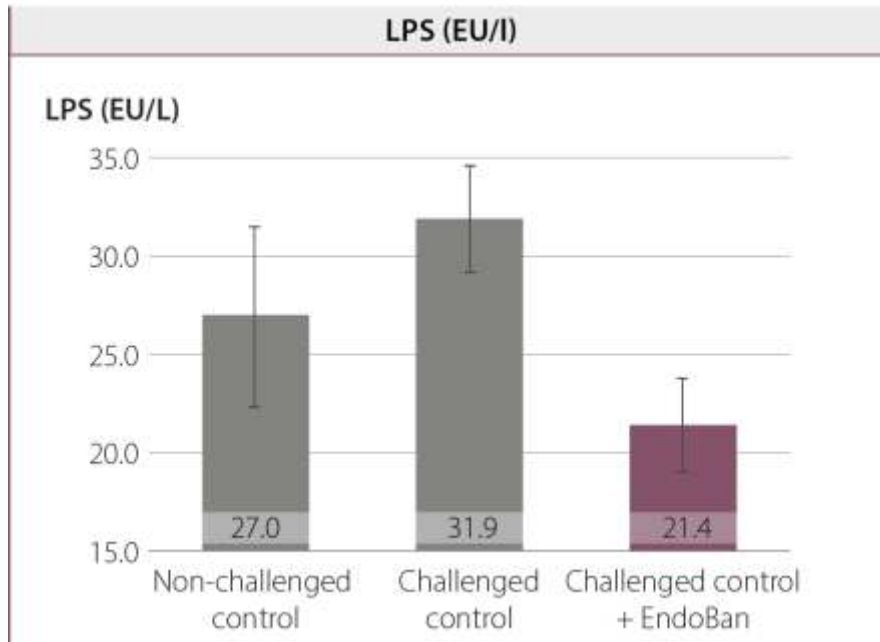
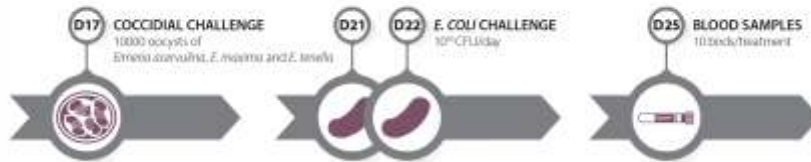
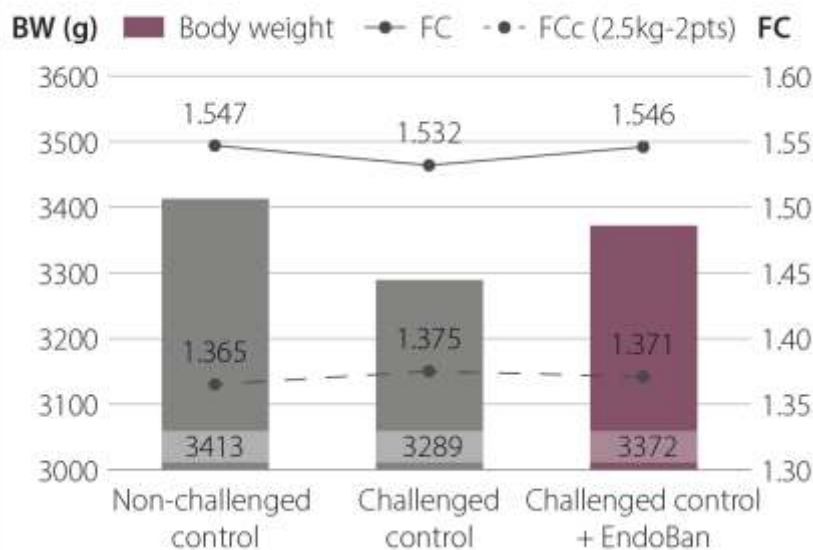


FIGURE 1: SCHEMATIC OVERVIEW OF THE INTESTINAL CHALLENGE



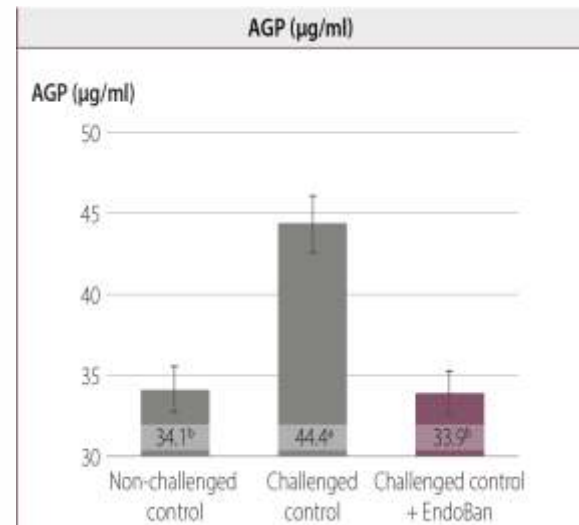
### PERFORMANCE DAY 1-42



### Results

The intestinal challenge resulted in

(+ 83g) compared to the challenged control group.



# Designer Egg: Improvement Towards Modern Health Care



**Shriya Bhatt<sup>1</sup>, Priyanka Bhandari<sup>1</sup>, Manas Arora<sup>1</sup>, Suyesha Kadam<sup>1</sup>,  
Mohit Bharadwaj<sup>2</sup> and B.C Mondal<sup>3</sup>**

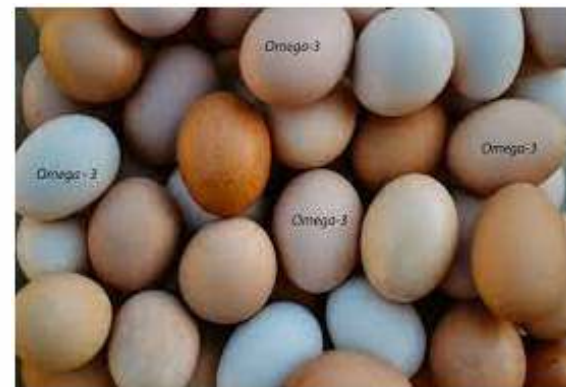
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## Introduction

In the last decades people became highly aware of the connection between food and health that has led to the convergence of their attention on the nutritional quality of foods. The food industry has responded to the demand for foods of superior health benefits by modifying the nutritional profile of foods like eggs. Consumer awareness on the relationship between dietary lipid and the incidence of Coronary Heart Disease (CHD) changed their attitude towards food consumption. Consumers are always in search of newer products with potential health benefits.

Among various foods, egg is an important and easily available food delivering balanced essential nutrients to the body and egg is the

best medium for incorporating health components in it. The designer food approach has been explored widely using egg in providing various essential nutrients to the human body, which are not usually present in required quantity. These are also called as Enriched eggs or Nutritional Enhanced Eggs Designer Eggs, Pre-Ovipositor Value Added Eggs, Health Promoting Designer Eggs or Enriched  $\omega$ -3 Eggs.





### Definition

Designer eggs are those in which the content has been modified from the standard egg in terms of high vitamin and minerals, lower cholesterol, high omega fatty acids & pharmaceutical compounds. Designer egg approach was started in 1934 by Cruickshank. He reported the modification of fatty acid composition in egg yolk by making feed interventions. Omega-3 fatty acids are proved to be beneficial in various disorders such as cardiovascular disease, hypertension, autoimmune, allergic, and neurological disorders. Sim and Sunwoo developed designer egg rich in omega-3 fatty acids and antioxidants by feeding hen with flax seed in which saturated fatty acid in yolk was replaced with 3-poly unsaturated fatty acid (PUFA) i.e. the yolk triglyceride is replaced by linolenic acid and yolk phospholipids are replaced by longer chain omega-3 fatty acids, such as eicosapentaenoic (EPA), dososapentaenoic and docosahexaenoic (DHA) acids.

Fortification of omega-3 fatty acid not only increases the health benefits of designer egg but also reduces the cholesterol content of the egg by replacing saturated fatty acid in egg yolk.

Designer eggs were also developed by replacing yolk cholesterol with conjugated linoleic acid (CLA). CLA is studied for its various health related properties such as anti-adipogenic, anti-carcinogenic, anti-atherogenic and anti-inflammatory. Produced designer egg enriched with CLA by feeding hens with CLA rich diet and found that adding CLA to layers diets rich in omega-3 fatty acids produces CLA enriched eggs. CLA supplementation of egg also increased yolk moisture content, firmness and impaired the sensory quality of eggs.

Cholesterol content of the egg yolk can also be reduced by supplementing hen's feed with chromium at 200–800 ppb concentration (13.9 to 33.7 % reduction). The pharmacological

approach was also studied for reducing cholesterol level in egg by administering egg laying hens with cholesterol lowering drugs. US patent was issued for the method of reducing the cholesterol content of egg by supplementing hen with L-dihydroxyphenylalanine (L-DOPA). Selenium (Se), a micronutrient is essential for preventing cardiac muscle degeneration. Fortify the egg with increasing amount of Se, reduce the risk and prevalence of prostate and colon cancer and it also proved to have a role in prevention of cardiovascular diseases through antioxidant.

### Varieties of Designer Eggs:

- **Shell colour** - Regional consumer preferences determine the shell color. F. Kuhl estimated that half of the designer eggs on the market are brown shelled.
- **Yolk colour**- Yolk color can vary from virtually white to orange depending on the deposition of xanthophylls from the feed. Sources of supplemental



xanthophylls include corn gluten meal, alfalfa, marigold, peppers and spirulina.

- **High vitamin content** - particularly vitamin A and E. Although, the vitamin content of eggs varies with the diet of hen but the hen may also differ in transferring the different vitamins with different efficacy. It is highest for vitamin A (60-80%), vitamin B12, riboflavin, biotin and pantothenic acid (40-50%), vitamin D3 and vitamin E (15-25%). So the attention should be there for the economic production of high vitamin eggs.
- **High mineral content** - Increasing the micro mineral contents of yolk & albumin especially selenium, iodine, zinc, copper and chromium by dietary supplementation. Iodine

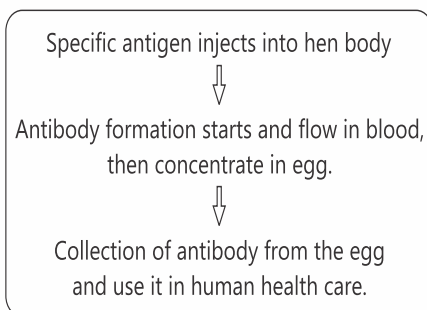
deficiency exists in India, so eggs could be a good source for its supplementation. Selenium level in eggs can be increased by incorporating the selenium yeast in diet of hens.

- **Alteration in the pigment content** -The yolk colour is the indicator of pigment content of egg and varied with dietary supplementation such as plants viz., marigold, chilli or corn, blue green algae spirulina. Recently in a study, it was found that high intake of carotenoids reduced the macular degeneration, a major cause of blindness in the elderly.
- **Low cholesterol**- An average sized egg contains approximately 200-220 mg of cholesterol. Supplementation of chromium to laying hen diets at concentrations of less than 1 ppm have shown to lower egg cholesterol and also improve the interior of the egg. The low cholesterol eggs can be obtained by feeding a all-vegetarian diet rich in protein and fiber fortified with vitamin E.
- **Fats & fatty acids profile** - The omega-3 essential PUFA

include linolenic acid and its derivatives EPA (Eicosapentanoic acid) and DHA. High content of this fatty acid also increases the keeping quality and shelf life of the eggs. Studies have also been conducted on the egg having the lower saturated and unsaturated fatty acid ratio by feeding the hen with canola oil.

- **Pharmaceutical operations** - through biotechnology genetically modified chickens are produced which then produce the eggs containing the desired compound e.g., insulin for the treatment of diabetic patients.
- **Biological compounds** - chicken can also produce antibodies that can neutralize the antigens of bacteria, viruses etc. These antibodies circulate in the blood and transferred to eggs for the protection of chicks.

In India, NABARD-supported Kisan Jyoti Farmers Club (KJFC), WAYFARM like groups are producing designer egg containing Omega-3 Fatty Acids.





# “Joy of Giving Week” by Natural Remedies



Natural Remedies is always looking for ways to give back to the community and support people who do outstanding work for society. This time, they collaborated with Diya Ghar, an NGO that works to develop children from migrant communities. This week-long initiative known as "Joy of Giving Week" was attended by 109 of their employees. This was planned and managed by 24 volunteers from across the organisation. The company received donations of clothing, footwear, toys, stationery, and some monetary donations. All donations (except monetary) received were sanitised in accordance with safety precautions and distributed to the Muneshwara Nagar community's children. The volunteers also visited the community and spent time with the children and Diya Ghar staff to better understand the community support.



Making a Difference



# The Success Story of a Biotech Startup Using Loopworms

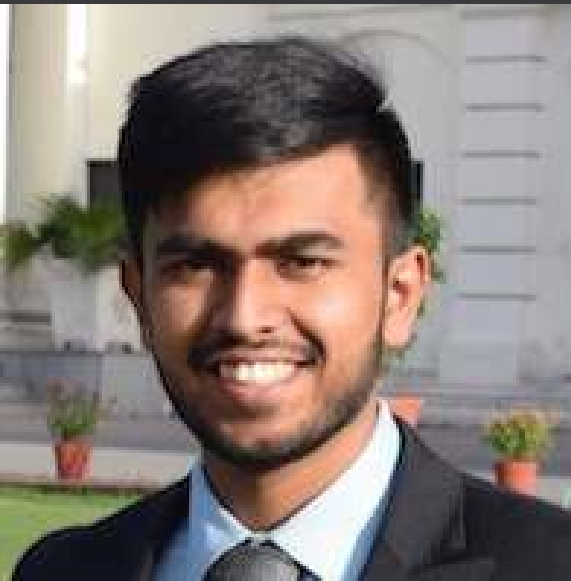


Ankit Alok Bagaria and Abhi Garwi at IIT-Roorkee invested every minute of leisure time in understanding how food waste can be valuable. Their keen interest and enthusiasm in social entrepreneurship developed a concept of 'upcycling' during one of their final year projects. The United Nations, while going through various reports, intrigued the duo.

They came across the concept of producing insect-based protein-rich animal feed, and this concept was already achieving heights in the West. In this process, the insects are left to feed on food waste, making them rich in protein, fats, and nutrients. They are then extracted and used as an alternate protein in animal feed and pet food.

This concept of turning food waste into a valuable resource and bringing it back to the food chain led to the inception of Loopworm in 2019. The Bengaluru-based biotechnology startup developed an indoor-based innovative insect breeding, production, and processing technology. It produced sustainable Black Soldier Fly (BSF) larvae-based proteins and fats.

The food waste collected from processing industries or manufacturers is first converted into high-quality feedstock by thermal, chemical, and biological treatment, and then it is fed to these insects. The protein and fat accumulated in these insects are extracted and used in different products. Loopworm produced B2B products, including protein concentrate, protein powder, insect oil and insect frass. The products derived are used in animal feed and as a raw material in cosmetic products.



## PRODUCTS DERIVED FROM BLACK SOLDIER FLY



The insect frass is used as a soil additive that enhances the soil's immunity.

The duo conducted initial experiments with insects and food waste from their apartment, which was at rent. They used to move around the city and collect food waste. After getting it to the apartment, they experimented with insects and debris. A lot of things are set right to get superior quality protein. The team is now looking at the commercialization of its products by connecting with animal food manufacturers.

Loopworm has secured grants worth Rs 1 crore from the union and Karnataka governments for this pilot project. There are about 350 animal feed and 30 pet food manufacturers, and this duo is working on innovation in feed formulation with food waste and insects. The target is to get revenue of \$1.5 million by the end of 2023. To date, loopworm has diverted 60 tonnes of food waste.

The startup is now looking for equity funding and collaborations. They aim to process 20 tonnes of food waste daily. The vision is to produce 300 tonnes of protein by 2023 while utilizing 7000 tonnes of food by-products.



# AVMA Recognizes Dr. Patricia Turne as the winner of the 2022 AVMA Animal Welfare Award..

**Dr. Patricia Turner has been chosen the laureate  
of the AVMA Animal Welfare Award for 2022.**



*Dr. Patricia Turner*

The American Veterinary Medical Association (AVMA) named Dr. Patricia Turner, corporate vice president of Global Animal Welfare for Charles River Laboratories, as the winner of the 2022 AVMA Animal Welfare Award, in recognition of her decades of dedication to improving farm and laboratory animal welfare through teaching, training, service, research, advocacy, and policy development.

The AVMA Animal Welfare Award honours an AVMA member veterinarian who has made significant contributions to animal welfare through leadership, public service, education, research/product development, and/or advocacy. It's one of the AVMA's three Animal Welfare and Human-Animal Bond Excellence Awards, which are supported by Merck Animal Health's educational financing.

Dr. Turner has spent countless hours volunteering around the world to promote the ethical treatment of animals in science. She has given lectures, seminars, and workshops on a number of issues pertaining to laboratory animal science, animal welfare, and ethics to a variety of veterinary and scientific groups. She has trained hundreds of veterinary colleagues and students as an educator, and she has created three well-regarded post-graduate programmes for veterinarians who specialise in laboratory animal science. Dr. Turner and her team are now working on an in-house animal welfare online certificate programme for laboratory animal technicians.

Dr. Turner's responsibilities at Charles River Laboratories include identifying welfare hazards and implementing animal welfare policies and training for the company's locations in the United States and across the world. Her work has had a direct impact on how animals are raised, cared for, and worked with in many locations throughout the world.



## May 2022

### 1. VIV Europe

**Dates:** May 31 - June 2, 2022  
**Venue:** Jaarbeurs Exhibition Centre  
**City:** Utrecht  
**Country:** The Netherlands  
**Website:** [www.viveurope.nl](http://www.viveurope.nl)

## August 2022

### 1. ILDEX Vietnam 2022

**Dates:** August 3-5, 2022  
**Venue:** SECC, HCM  
**City:** Ho Chi Minh City  
**Country:** Vietnam  
**Email:** [panadda@vnusiapacific.com](mailto:panadda@vnusiapacific.com)  
**Website:** [www.ildexvietnam.com](http://www.ildexvietnam.com)

### 2. Livestock Asia

**Dates:** 10 – 12 AUGUST 2022  
**Venue:** MITC Complex  
**City:** Melaka  
**Country:** Malaysia  
**Email:** [livestockmalaysiamy@informa.com](mailto:livestockmalaysiamy@informa.com)  
**Website:** [www.livestockmalaysia.com](http://www.livestockmalaysia.com)

### 3. Livestock Philippines 2022

**Dates:** August 23 - 25, 2022  
**Venue:** World Trade Center  
**City:** Pasay city  
**Country:** Phillippines  
**Email:** [rita.lau@informa.com](mailto:rita.lau@informa.com)  
**Website:** [www.livestockphilippines.com](http://www.livestockphilippines.com)

## September 2022

### 1. Victam Asia 2022

**Dates:** 7 - 9 September 2022  
**Venue:** IMPACT Exhibition Center  
**City:** Bangkok  
**Country:** Thailand  
**Website:** [www.victamasiasia.com](http://www.victamasiasia.com)

## October 2022

### 1. Sommet-elevage, France

**Dates:** 4 - 7 October 2022  
**Venue:** Grande Halle Showgrounds  
**City:** Clermont- Ferrand  
**Country:** France  
**Website:** [www.sommet-elevage.fr](http://www.sommet-elevage.fr)

### 2. VIETSTOCK 2022

**Dates:** 12 - 14 October 2022  
**Venue:** Saigon Exhibition & Convention Center (SECC)  
**City:** Ho Chi Minh City  
**Country:** Vietnam  
**Website:** [www.vietstock.org/en-us](http://www.vietstock.org/en-us)

## November 2022

### 1. EuroTier

**Dates:** 15 - 18 November 2022  
**Venue:** Deutsche Messe AG  
**City:** Hannover  
**Country:** Germany  
**Website:** [www.eurotier.com/de](http://www.eurotier.com/de)

## December 2022

### 1. Agri Livestock

**Dates:** 02 - 04 December 2022  
**Venue:** Myanmar Expo Hall  
**City:** Yangon  
**Country:** Myanmar  
**Website:** [www.agrilivestock.net](http://www.agrilivestock.net)

# Merck Animal Health provides \$270,000 in scholarship support to 54 veterinary students in North America



Since 2013, Merck Animal Health has collaborated with the American Veterinary Medical Foundation (AVMF) to provide scholarship support to hundreds of veterinary students. This year, the Merck Animal Health Veterinary Student Scholarship Program awarded scholarships to 54 veterinary students. Each of the chosen second- and third-year students pursuing careers in companion animal or large animal medicine will receive a \$5,000 scholarship to help fund their education.

*"This annual scholarship is especially meaningful to us because of the broad impact it has on veterinary students," said Scott Bormann, Merck Animal Health's Senior Vice President, North America.*

*"This year, we're pleased to support 37 companion animal veterinary students and 17 large animal veterinary students as we continue our unwavering commitment to the veterinary profession," he added.*

Academic excellence, financial need, leadership, and area of interest within the profession were used to select award recipients from accredited veterinary schools in the United States, Canada, and the Caribbean.

For more than five decades, the American Veterinary Medical Association's charitable arm, the AVMF, has supported veterinary students.

Niharika  
weds Harshvardhan

Congratulations!

It was a joyous moment for Smt. Kiran Singh and Shri Narendra Singh Ranawat, Head of Business Development and Sales at Big Dutchman International GmbH India resident of Th. Shahpura (Bhilwara) as their daughter married Harshvardhan, son of Smt. Maldeo Singh Bhati and Sunita Rajawat of Th. Chattangarh (Jaisalmer) on April 22, 2022 in a grand ceremony held at Maharani Mahal, Ram Bagh Palace, Jaipur.

Shri Kalraj Mishra, Governor of Rajasthan State, and his wife, graced the celebration and blessed the newlyweds. The attendees included many stalwarts from the poultry industry including Mrs. & Mr. Janjaap van der Mark, Joint Managing Director at BD Agriculture (Malaysia) Sdn. Bhd. and Mr. Coen Boonstra Sales Director BU Poultry, Asia.

We congratulate the newlyweds and wish for a bright, prosperous and happy future for them.



# NECC Appeals to Govt. of India to Allot 2 Million Tons of Grain for use in Poultry Feed

**National Egg Coordination Committee (NECC)** has appealed to the Government of India to allot at least 2.0 million tons of damaged Wheat, Paddy and/or Broken Rice - unfit for human consumption - for use in poultry feed, as a partial substitute for maize so as to enable the farmers to tide over the unprecedented crisis caused due to acute shortage and steep increase in the price of maize and soya meal in the domestic market. It's one of the worst crisis in the History of the Poultry Industry.

NECC sources said that during the past few years, and particularly during the past one year, there was a significant increase in the price of Maize due to various reasons beyond the control of farmers, such as increased volume of exports and diversion of significant volumes of maize for production of bio-fuel in Bihar, which is a major maize-producing State.

The price of maize in the domestic market has increased from Rs.18,000/- per ton during the last year, to approximately Rs.25,000/- per ton presently - and" it is expected to increase further to Rs.30,000/- per ton.

NECC has stated that due to such increase in maize price, the average cost of production has gone up from Rs.4.00 per egg last year, to Rs.4.75 - Rs.5.00 presently. However, average farmgate price is hovering around Rs.3.50 per egg. thus resulting in a net loss of Rs. 1.50 to 1.75 per egg for the farmers.

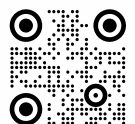
Unable to withstand such continuous losses, thousands of small and marginal farmers, and even breeders have already shut down or suspended or scaled down their operations. Most of the farmers and breeders are on the verge of insolvency.

Under these circumstances partial substitution of maize with other cheaper commodities is the only viable option to help the farmers to retain their means of livelihood, as well as to ensure that eggs and chicken would continue to be available to the poorer sections of the consumers at an affordable price.

NECC sources said - "we are hopeful that the Government would respond favourably to our appeal and come to the rescue of farmers and allot the damaged grains for production of poultry feed, and enable the farmers to tide over the crisis and continue to retain their only means of livelihood"



**NATIONAL  
EGG CO-ORDINATION  
COMMITTEE**





Ribbon cutting ceremony

# Novus International Announces New Corporate Office in India

***The new office in Bangalore opened on 21 April 2022.***

BANGALORE, INDIA (21 April 2022) – Novus International’s Asia leadership team in India inaugurated its new corporate office in the country in April.

The new space was officially opened on 21 April 2022 in Bangalore, the capital and largest city of the Indian state of Karnataka located in the country’s southwestern region. Having a corporate office in Bangalore has the advantage of being in proximity to many customers. While a large city that is home to more than 8 million people, Bangalore is centrally located with major livestock and poultry hubs like Coimbatore, Namakkal, Hospet, Hyderabad, Pune, etc., contributing more than 60 percent of the poultry and dairy markets. The location also facilitates frequent engagement with customers, which will

result in enhanced customer intimacy, improved services, and business growth.

On the 20th of April, Novus South Asia team hosted the customer meet-and-greet featuring Sr. Director of Global Strategy Marketing Abishek Shingote and Vice President and Asia Managing Director Dr. Vaibhav Nagpal from Novus Headquarters in the U.S. The evening started with the welcome address by Neeraj Kumar Srivastava, managing director for South Asia & Southeast Asia, followed by the leadership messages from Dr. Nagpal, Shingote, Sr. Vice President and COO Ed Galo, and the company’s CEO and President Dan Meagher.

In his speech, Srivastava highlighted the importance of shifting the corporate office to Bangalore and he thanked all





**Nagpal.Vaibhav**



**Dan Meagher**



**Ed Galo**



**Abhishek Singote**



**Neeraj Kumar Srivastava**

customers and business partners for their support. He spoke about growth, collaboration, trust and new beginning for Novus in the region. He also emphasized the opportunities in the region and the commitment of Novus to serve its customers with the right solutions and services.

Galo thanked all customers and business partners for their continuous support, stating that Novus has built a sustainable business over the years in the Indian market, and company leadership is pleased and proud of its position in the country.

"In return, we are committed to supporting the market to help feed the world and continue bringing nutritional health and solutions for best-in-class animal protein production to the

market," Galo said.

Meagher congratulated Srivastava and the entire team of Novus South Asia for their renewed commitment to country and its animal protein producers.

"The commitment of Novus's office in India demonstrates the importance of the Indian market to Novus," Meagher said.

Dr. Nagpal mentioned the evolution of Novus in India over the last 15 years and spoke to the global development, innovation and focus of the company. He also added the importance of customers and business partners for the growth of any organization.

"Customers are the backbone of any business," Dr. Nagpal said.

Many prominent animal nutrition

and health companies are located in and are operating out of Bangalore. The area is also a hub for the software and biotechnology-related industry in India and is known as the "Silicon Valley & Biotech Capital of India." Recently, Bangalore has emerged as the start-up capital with almost 32 entrepreneurial companies located there. With this investment in the city, Bangalore has an advantage over other cities in attracting and retaining talents.

Bangalore is also demographically diverse and the second fastest-growing major metropolis in India as per the Centre for Science and Environment. Bangalore is called the most livable city in India due to its economic ability and opportunities.



*FY22 leadership award*



*Lightning of lamp*



*Novus team with media*



*Novus South Asia team*



*Special Guests*

For more information, visit [novusint.com](http://novusint.com) or call: +91 80 6768 2323

**Novus International, Inc.** is a leader in scientifically developing, manufacturing, and commercializing animal health and nutrition solutions for the agriculture industry. Novus's portfolio includes ALIMET® and MHA® feed supplements, MINTREX® chelated trace minerals, CIBENZA® enzyme feed additives, NEXT ENHANCE® feed additive, ACTIVATE® nutritional feed acid, and other specialty ingredients. Novus is privately owned by Mitsui & Co., Ltd. and Nippon Soda Co., Ltd. Headquartered in Saint Charles, Missouri, U.S.A., Novus serves customers around the world. For more information, visit [www.novusint.com](http://www.novusint.com).



# Kemin Conducts Predictions on Feed Raw Material Quality and Availability -Webinar



**Kemin Agrifoods India** team held a webinar on “Predictions on Feed Raw Material Quality and Availability” on March 24th, 2022. More than 400 participants from across South Asia have participated and interacted during this webinar.

**Mr. Sachin Wadhwa**, Head-Research Softs at National Commodities Management Services Limited (NCML), and **Dr. RC**, Regional Director-Technical Services, Kemin were the presenters for this webinar which was hosted by **Dr. Prateek Shukla**, Product Manager, Kemin, and **Dr. Partha Das**, Head-Technical, Nutrition, Kemin

Mr. Sachin Wadhwa shared his observations on the global and domestic outlook on the major feed raw materials (Maize and Soya). Whereas Dr. RC shared his field experiences over recent quality challenges in feed and competent ways to optimize feed quality and performance in the coming months.

Overall, the webinar answered some of the burning topics;

- The price and availability dynamics of major feed raw materials like; Maize and Soya
- The impact of the ongoing Russia-Ukraine war or “La Nina” on the South-Asian feed industry
- The best possible alternate Raw materials for energy and protein
- The impact of alternate Raw materials on the quality and performance of commercial poultry

for more details write to us at [mail.india@kemin.com](mailto:mail.india@kemin.com)



# Biosint Nutraceuticals Welcomes Dr Prasad Kulkarni

**BIOSINT**<sup>®</sup>  
NUTRITIONAL INNOVATIONS

**Dr Prasad Kulkarni** is associated with animal nutrition industry since last 21 years and carry technocratic view of an animal farming business. His expertise and experience in the different domains of farming business alike breeding business, feed supplements, disinfectants, diagnostics & biological products helped him to build his technocratic perspective.

Being a veterinarian and passionate for animal agriculture, pursued good techno-commercial insight for farming business while working with leading poultry breeding companies like Venky's and Suguna. His work experience with Globion India Private limited & CevaSanteAnimale, helped him to promote laboratory diagnostics tools like Elisa kits (BioChek) in order to support poultry health consultants. This strategy helped farmers controlling various disease outbreaks through sero-profiling services and further designing the appropriate vaccination schedule for disease prevention. His expertise on farm management, while working with Ceva-Polchem helped them designing & executing the appropriate biosecurity protocols of hatchery, breeder, broiler and commercial layer farms. His caliber of Project management is well utilised by Camlin Fine Sciences launching and running the feed supplement project successfully.

We at Biosint Nutraceuticals are strong believers of exploring and optimizing the potential of each nutrient for specific purpose through our Research and Developments farms. Today our state of art manufacturing facility and service support are imprinting our quality footprint in southern India & Singapore as well. Professionals like Dr Prasad Kulkarni further will expand this expertise to Asia and other continents of the globe.

We Welcome **Dr Prasad Kulkarni** onboard as a director, sales and marketing and wish him all the luck in taking these product solutions to the animal farming community for improving productivity, through his technical expertise and leadership skills.

# Olam Group Appoints **Maya Hari** as CEO of Climate-Tech Venture Terrascope



*Maya Hari*

Maya Hari has been appointed as Chief Executive Officer (CEO) of Terrascope, the climate-tech venture of Olam Group. Terrascope which helps companies to manage and reduce their carbon emissions through its carbon management platform is headquartered in Singapore. Maya will be working directly under Suresh Sundararajan, CEO of Olam Ventures.

Maya earlier served as Vice President of Global Strategy and Operations, and as Vice President and Managing Director of Asia Pacific (APAC) with Twitter Inc.

Maya has 20 years of experience managing teams and leading international businesses with a robust track record in leading high growth mobile, data and commerce businesses.

Terrascope addresses a very real problem many companies face in their climate action strategies. While a growing number are commendably committing to net zero, most are unable to make a real impact because they underestimate the challenges in measuring, managing and reporting their data along the way. Terrascope simplifies that journey for them.

Olam Group is a food and agri-business company that operates in 60 countries.



# WELCOME TO THE TEAM

**Dr. Mike  
Blair**

**Poultry  
Nutritionist**



**DEVENISH™**

## ***Mike Blair Joins the Devenish Team on May 1st, 2022 !***

Dr. Mike Blair has joined Devenish's North American Poultry Team as a Poultry Nutritionist.

Mike brings a wealth of knowledge and experience from his time working for poultry integrators as well as in the allied industry.

Mike earned his B.S. in Animal Sciences from Purdue University and his M.S. and Ph.D. in Poultry Nutrition from Virginia Tech, where he worked with Dr. Larry Potter on turkey nutrition. Dr. Blair has worked for Central Soya Company in the feed and premix divisions, Evonik and Adisseo as Director of Technical Services in feed additives, Pilgrim's as Senior Director of Nutrition in broiler integration, and Phibro Animal Health Corporation as Director, Global Antimicrobials. In 2016, Dr. Blair founded A&J Nutrition, a nutrition consulting firm.

## Boehringer Ingelheim U.S. Animal Health Poultry Vaccine Manufacturing Facility Certified as Carbon Neutral



Boehringer Ingelheim U.S. Animal Health announced that its poultry vaccine site in Gainesville, Ga., has received carbon neutral certification, the first of its U.S. sites to earn this designation. The site, which produces nearly 60 billion poultry vaccines every year, is Boehringer Ingelheim's first major manufacturing facility site in the U.S. and its third site globally to become carbon neutral.

The Gainesville site has been working toward more sustainable operations since 2017. To reach carbon neutral status the site team:

- Installed solar panels over the parking lot to harness the power of the sun,
- Replaced fluorescent lightbulbs with energy-efficient LED bulbs,
- Installed dimmer switches and occupancy sensors that turn off the lights when rooms are not in use,
- Purchased an electric vehicle for use around the site and installed a charging station,
- Installed smart meters to measure electrical consumption, and
- Replaced insulation on equipment to reduce heat and energy loss.

To offset the few remaining carbon emissions, the company purchased environmental project carbon credits from Climate Seed. Employees at the site chose to invest in the Noles South Avoided Conversion Forest project in

North Carolina and a reforestation project in Kasigau Corridor in Kenya.

Germany-based TÜV, an independent third-party certification services company, reviewed and certified the site for carbon neutrality. The company received the carbon neutral certification on April 11 for 2021. The certification must be reviewed annually and is based on the previous year's emissions.

## Abhay Hanjura features in GQ's 30 Most Influential Young Indians of 2022



Another feather in the cap for Abhay Hanjura to have featured in the GQ's 30 Most Influential Young Indians of 2022 right after appearing on The Economic Times list of India's top 40 leaders under the age of 40.

Abhay Hanjura with partner Vivek Gupta started an e-commerce platform Licious started an e-commerce platform Licious focused on meat in 2015. Licious went on to become India's 30th unicorn in 2021, and the first D2C startup to enter the club.

Licious disrupted the meat and seafood category, which was largely unorganized and underserved. They have demonstrated high levels of customer-centricity and an unparalleled focus on the supply chain necessary for a perishable product. The focus is on product quality, freshness, and innovation and it has created a strong brand making them the undisputed leader in this segment.

## 0.55-mt GM soymeal to be imported before September 30, 2022

The government has approved the import of about 0.55 million tones (mt) of

GM soymeal, to improve the availability of key ingredients for poultry feed.

The shipments of soymeal have to be imported before September 30, 2022. The government had earlier allowed the import of 1.2 mt of GM soymeal to bring down the higher feed prices but only around 0.6 mt could be imported due to time constraints.

Soybean Processor Association of India (SOPA) had a different view and held that the import of soymeal would be 'counter-productive' and would pull down the domestic price of soybean.



Currently, soybean prices, are ruling at around Rs 6,800 a quintal against a minimum support price (MSP) of Rs 3,950 a quintal.

18% production of soybean is extracted as an oil and 81% is used as soymeal and the rest is production losses. Current domestic prices are significantly higher at Rs 68,000 a tonne compared with Rs 58,000 a tonne including 16% import duties of imported soymeal.

## Kenya relaxes GMO import ban because of soaring animal feed and food prices

The government last month announced its move to relax conditions on import of genetically modified organisms (GMO) materials for animal feed manufacture. The Ministry of Agriculture decided to review the framework on import of yellow maize by lowering the requirement to 99.1 per cent GMO free from 100 per cent. This means that imports would be allowed to have traces of genetically modified organisms in bid to resolve the shortage of feeds. However, the ministry is yet to publish

the notice that would make the review operational.

The manufacturers have refused to import the produce under the current total GMO purity requirement for fear that the shipments will be confiscated by Kenyan authorities since it is difficult to find stocks that are free from genetic modification.

## China bird flu news not problematic for India



A 4 year old boy in the central Henan province of China tested positive for H3N8 strain of bird flu virus. The patient has been in contact with poultry but doctors have ruled out any chance of human to human spread of the virus.

It is not a matter of concern right now for India because the summer months do not pose any serious threat of spread of avian influenza as migratory birds do not generally come to India during this period.

Senior government sources said that while this was not bird flu season, all efforts would be taken to ensure quick reporting of any suspicious case.

The H3N8 strain is in circulation since 2002 and affects dogs and horses too. India has never isolated this strain, and bird flu is mostly seasonal with cases dipping significantly post February.

A report from the World Organization for Animal Health (WOAH) shows that majority of the outbreaks in the past

were attributed to H5 or H1 strains of the virus. In the month of March and April, all the outbreaks worldwide were attributed to H5N1 or H5N8 subvariants. At present, 440 outbreaks in 16 countries have been reported worldwide.

## Dabur India announces induction of 100 Electric Vehicles for last-mile product distribution



World's largest Natural and Ayurvedic Healthcare Company, Dabur India Ltd has announced its plan to induct a fleet of 100 Electric Vehicles in its Supply Chain for last-mile product distribution. This initiative would make Dabur India the first domestic consumer goods company to have a fleet of electric vehicles for distribution and supporting the company move closer to its mission of achieving Carbon Neutrality in its Operations.

The first group of the new Electric Vehicles of Dabur India has been inducted into its fleet in North India and has started deliveries in Haryana's Sonapat area. All the 100 vehicles would be inducted within the next 12 months across the nation. The move will result in a sizeable decrease of carbon emissions annually. The move comes close on the heels of Dabur achieving Plastic Waste Neutrality in India.

As a Responsible Corporate Citizen, Dabur is recognized for its commitment towards environment sustainability. This strong environment strategy would upgrade the brand reputation and play an important role in building the consumer loyalty. Every action at Dabur is a step towards a sustainable and healthy future and this is one more step forward in this direction.

## IVRI scientist launches plant dye-based meat testing kit



Now, you can check the quality of meat before starting to cook it and , for this, Bareilly's Indian Veterinary Research Institute (IVRI) says it has developed the country's first plant-material based kit that is capable of monitoring the freshness of meat and its products.

Dr Suman Talukder, the scientist behind this innovation said that this kit consists of a paper strip coated with plant dye and has to be placed on the surface of the meat or inside a packet to check its quality.

The colour of the strip will change to crimson if the meat is fresh, will become pink if the quality is intermediate and turn green if it is spoiled. The colour changes after the strip reacts with volatile gases that emanate from the meat when its quality deteriorates, the scientist says.

The institute is also in talks with several meat selling companies that may use this domestic-developed kit as to ensure that only the best quality of meat is sold and consumed. The kit was ready for launch in April 2022 and is now set to hit the market.

## UK chicken could soon cost as much as beef courtesy rising feed cost

UK's biggest food retailers have warned that chicken could soon be as pricey as beef as production costs rising steeply.

Feed costs had become a huge challenge for the poultry industry. Labour shortage and commodity price rise result in higher prices. This higher priced chicken will have a major impact on lower income families.



This inflationary picture has deteriorated due to the rising prices caused by the Russia-Ukraine war. Ukraine and Russia are the major producers of sunflower meal (a byproduct of sunflower oil) and wheat, the ingredients that go into chicken feed.

Office for National Statistics data shows the average retail price of chicken has increased by nearly 12% in the last 12 months.

## Amlan International introduces New natural alternatives to Antibiotics for poultry and livestock

The removal of in-feed antibiotics from hen and cattle manufacturing has left a large hole within the protection of animals from the

devastating consequences of enteric sickness. To help producers recapture this safety, Amlan worldwide, the animal health business of Oil-Dri® company of the United States, has launched two new herbal products — Phylox® Feed and NeutraPath® — that help to optimize intestinal fitness and production economics in the absence of antibiotics.

Phylox Feed is a natural alternative to anticoccidial drugs and vaccines which can assist manufacturers to increase profitability. Coccidiosis, caused by Eimeria species, is an enteric disorder that could have a full-size monetary impact on animal protein manufacturing. The synergistic combination of bioactive phytochemicals in Phylox paintings together with multiple modes of motion to harm Eimeria cell structure and function while strengthening intestinal integrity and boosting immunity. Phylox can be powerful for full-time use or in

rotation, and/or in a bio-shuttle program when resistance is a concern.

In addition, Phylox does not need to be withdrawn from feed prior to slaughter. Phylox is a great solution for all poultry species, which includes broilers, egg layers, and broiler breeders, all of which may be touchy to fungal and bacterial toxins during grow-out and egg production whilst uncovered to fecal oocysts which are being shed as coccidia cycle. Research has proven that Phylox may be fed simultaneously with anticoccidial vaccines, preventing disease breakthrough even as immunity is being advanced by way of the fowl without interfering with vaccine efficacy.

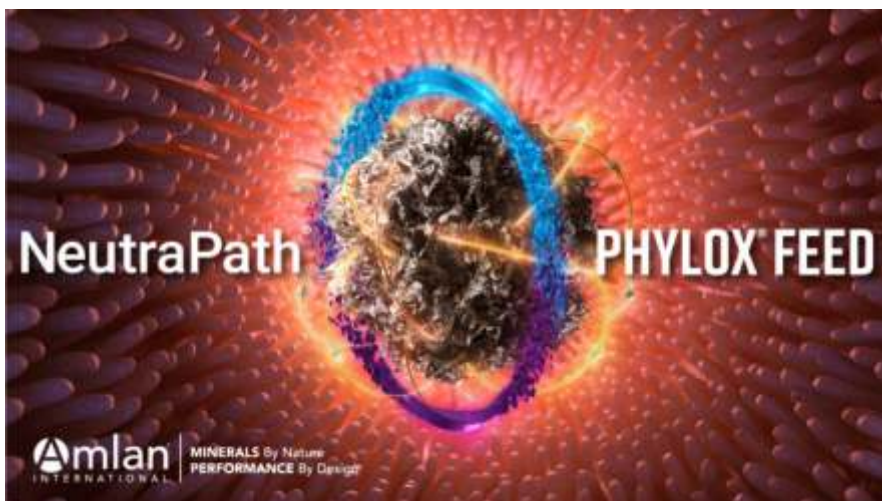
“An important goal for manufacturers is to keep the animal healthy. Producers grow animals to a certain size, and they don’t want to lose them in the last few days of their growth development,”

stated Fred Kao, VP of Global Sales for Amlan.

NeutraPath is a natural pathogen control product for antibiotic-free manufacturing that uses more than one mode of action to boom livability and enhance feed conversion. By using a proprietary and co-energetic mixture of essential oils, fatty acids, and Amlan’s proprietary mineral technology, NeutraPath reduces pathogenic bacterial load and colonization and improves intestinal health and structural integrity, all of which contribute to improved performance and increased production yields. NeutraPath can be used to guard the intestinal health of all farm animal species.

Both of the new products can be used individually or in a program with Amlan’s mineral-based products, like Calibrin®-Z and patented Varium® and NeoPrime®, to help support gut health and improve productivity and efficiency.

**Amlan International is the animal health business of Oil-Dri Corporation of America, leading global manufacturer and marketer of sorbent minerals. Oil-Dri leverages over 80 years of expertise in mineral science to selectively mine and process their unique mineral for consumer and business-to-business markets.**





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salesindia@huvepharma.com

# EGG Daily and Monthly Prices of April 2022

Name Of Zone / Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Average	
<b>NECC SUGGESTED EGG PRICES</b>																																
Ahmedabad	400	400	400	400	400	405	410	420	425	430	435	435	435	435	435	400	400	400	400	400	400	400	380	380	380	380	385	388	390	390	390	404.27
Ajmer	351	331	331	331	331	334	351	365	365	365	358	350	340	340	340	330	325	320	330	330	315	300	300	303	307	313	324	319	300	300	329.97	
Barwala	333	333	333	333	333	337	355	368	370	370	370	350	350	350	350	327	320	310	318	315	315	300	295	297	302	307	307	300	285	280	327.10	
Bengaluru (CC)	400	400	400	400	400	400	405	425	435	440	445	450	455	455	455	435	435	435	420	405	405	390	375	375	375	375	380	390	390	413.50		
Brahmapur (OD)	378	380	380	383	386	396	420	428	440	450	450	450	450	450	425	425	400	400	400	400	400	375	375	330	330	330	337	347	347	347	340	391.63
Chennai (CC)	430	430	430	430	430	430	430	450	460	470	470	475	475	475	475	460	460	460	460	460	460	435	435	400	400	400	400	400	410	410	440.83	
Chittoor	423	423	423	423	423	423	443	453	463	463	468	468	468	468	468	453	453	453	453	453	428	428	393	393	393	393	393	393	403	403	433.83	
Delhi (CC)	350	350	350	350	350	350	365	380	390	390	390	390	380	380	380	380	365	350	340	340	340	340	330	330	330	330	340	340	330	310	354.67	
E. Godavari	365	365	365	365	365	368	393	403	413	423	423	423	428	428	400	400	380	380	380	380	360	360	325	325	325	327	332	332	332	315	372.67	
Hyderabad	350	350	350	350	355	360	373	385	395	400	405	410	415	415	385	385	385	385	355	340	320	320	320	300	305	310	315	320	320	320	356.60	
Ludhiana	333	333	333	333	333	333	339	361	367	367	367	359	356	350	350	338	335	328	321	321	321	311	301	301	301	304	308	308	308	301	330.70	
Mumbai (CC)	415	415	415	415	415	420	425	435	450	460	465	470	475	480	480	450	450	450	450	420	405	385	385	385	385	385	385	385	385	385	424.17	
Muzaffarpur (CC)	390	386	386	390	390	390	393	410	429	429	429	429	414	410	405	405	400	386	381	376	371	367	367	357	390	357	357	362	362	352	389.00	
Mysuru	400	400	400	400	400	400	420	440	440	445	450	452	457	457	457	435	435	435	420	407	407	390	375	375	375	375	382	394	394	415.80		
Nagpur	350	360	360	360	360	365	375	375	400	421	421	421	390	375	375	370	370	370	375	375	375	370	350	340	340	350	360	360	360	350	370.77	
Namakkal	400	400	400	400	400	400	420	420	435	435	445	445	445	450	450	430	430	430	430	430	410	410	380	380	360	360	360	380	380	380	409.83	
Patna	390	386	386	386	386	386	390	405	419	419	419	415	410	405	405	400	400	386	381	371	371	367	362	357	357	357	357	362	362	348	384.83	
Pune	400	400	400	400	400	402	405	420	440	450	455	455	460	465	465	450	450	450	450	430	410	390	370	370	370	375	375	375	380	380	414.73	
Ranchi (CC)	400	400	400	400	400	400	410	429	429	429	429	414	414	410	410	410	390	390	381	381	371	371	367	357	367	367	367	367	357	393.90		
Vijayawada	365	365	365	365	365	368	393	403	413	423	423	423	428	428	400	400	380	380	380	380	360	360	325	325	325	327	332	332	332	315	372.67	
Vizag	380	380	380	382	382	385	400	410	420	430	430	430	430	430	430	430	430	400	400	400	400	375	375	375	375	375	375	375	375	375	397.80	
W. Godavari	365	365	365	365	365	368	393	403	413	423	423	423	428	428	400	400	380	380	380	380	360	360	325	325	325	327	332	332	332	315	372.67	
Warangal	352	352	352	352	357	362	375	387	397	402	407	412	417	417	387	387	387	387	357	342	322	322	322	302	307	312	317	322	322	358.60		
<b>Prevailing Prices</b>																																
Allahabad (CC)	381	381	381	381	381	386	395	400	410	410	410	405	400	400	400	395	390	386	376	376	367	362	362	362	362	362	362	362	357	352	383.07	
Bhopal	355	355	355	355	355	355	355	375	382	410	410	410	385	385	370	360	360	360	360	350	350	350	350	345	345	345	345	320	345	325	360.73	
Hospet	360	360	360	360	360	360	365	385	395	400	405	410	400	415	415	415	395	395	395	380	365	365	350	335	335	335	335	340	350	350	373.00	
Indore (CC)	350	350	350	350	355	355	375	385	385	390	390	380	370	370	360	360	360	350	350	350	345	340	340	345	345	350	350	350	325	345	357.33	
Jabalpur	365	365	365	365	357	361	365	387	402	408	408	408	395	375	375	375	345	345	348	350	350	335	335	335	335	340	342	342	342	327	361.57	
Kanpur (CC)	371	371	371	371	371	381	395	400	400	400	400	386	386	386	386	371	371	371	371	357	357	362	357	357	357	357	357	357	357	357	373.50	
Kolkata (WB)	420	420	420	420	420	423	473	475	480	480	480	480	480	480	450	450	445	445	445	430	420	420	400	390	390	395	400	400	400	390	434.03	
Luknow (CC)	403	393	393	393	393	393	393	400	417	417	417	417	417	417	410	410	410	400	400	400	400	400	400	390	390	390	390	390	380	380	400.10	
Raipur	355	355	355	355	355	355	355	380	390	400	405	400	395	395	395	395	395	370	370	370	360	345	345	345	335	335	338	343	343	343	365.90	
Surat	410	410	410	410	410	415	420	430	445	455	460	460	460	460	440	410	410	410	410	410	410	400	400	400	400	400	400	400	400	400	418.50	
Varanasi (CC)	400	400	390	390	390	390	400	417	417	417	417	417	400	400	400	400	383	367	367	373	373	367	357	357	367	367	367	367	357	350	385.47	

# Editorial Calendar 2022

Publishing Month: <b>January</b> Article Deadline : <b>30<sup>th</sup>, Dec. 2021</b> Advertising Deadline : <b>3<sup>rd</sup>, Jan. 2022</b> Focus : <b>Disease Prevention</b>	Publishing Month: <b>February</b> Article Deadline : <b>30<sup>th</sup>, Jan. 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, Feb. 2022</b> Focus : <b>Nutrition Management</b>	Publishing Month: <b>March</b> Article Deadline : <b>28<sup>th</sup>, Feb. 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, March 2022</b> Focus : <b>Vaccination</b>	Publishing Month: <b>April</b> Article Deadline : <b>30<sup>th</sup>, March 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, April 2022</b> Focus : <b>Heat Stress</b>
Publishing Month: <b>May</b> Article Deadline : <b>30<sup>th</sup>, April 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, May 2022</b> Focus : <b>Cold Chain Mgmt.</b>	Publishing Month: <b>June</b> Article Deadline : <b>30<sup>th</sup>, May 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, June 2022</b> Focus : <b>Feed Production</b>	Publishing Month: <b>July</b> Article Deadline : <b>30<sup>th</sup>, June 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, July 2022</b> Focus : <b>Layers, Cages, Eggs</b>	Publishing Month: <b>August</b> Article Deadline : <b>30<sup>th</sup>, July 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, August 2022</b> Focus : <b>Genetics &amp; Breeding</b>
Publishing Month: <b>September</b> Article Deadline : <b>30<sup>th</sup>, August 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, September 2022</b> Focus : <b>Biosecurity</b>	Publishing Month: <b>October</b> Article Deadline : <b>30<sup>th</sup>, September 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, October 2022</b> Focus : <b>Winter Management</b>	Publishing Month: <b>November</b> Article Deadline : <b>30<sup>th</sup>, October 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, November 2022</b> Focus : <b>Environment Control</b>	Publishing Month: <b>December</b> Article Deadline : <b>30<sup>th</sup>, November 2022</b> Advertising Deadline : <b>3<sup>rd</sup>, December 2022</b> Focus : <b>Industry Outlook</b>

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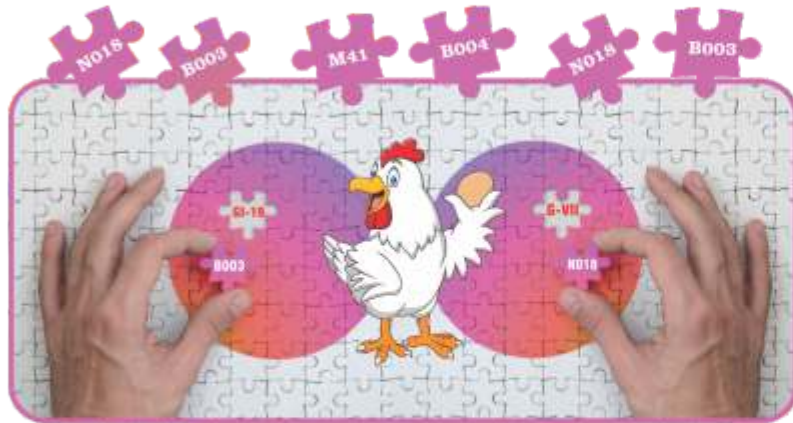


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