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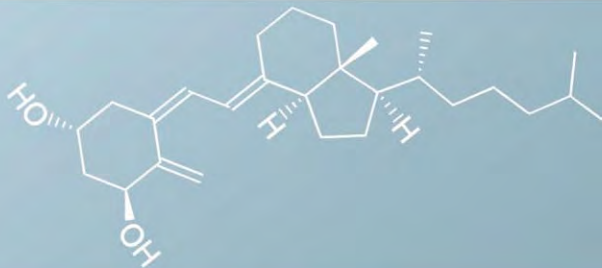
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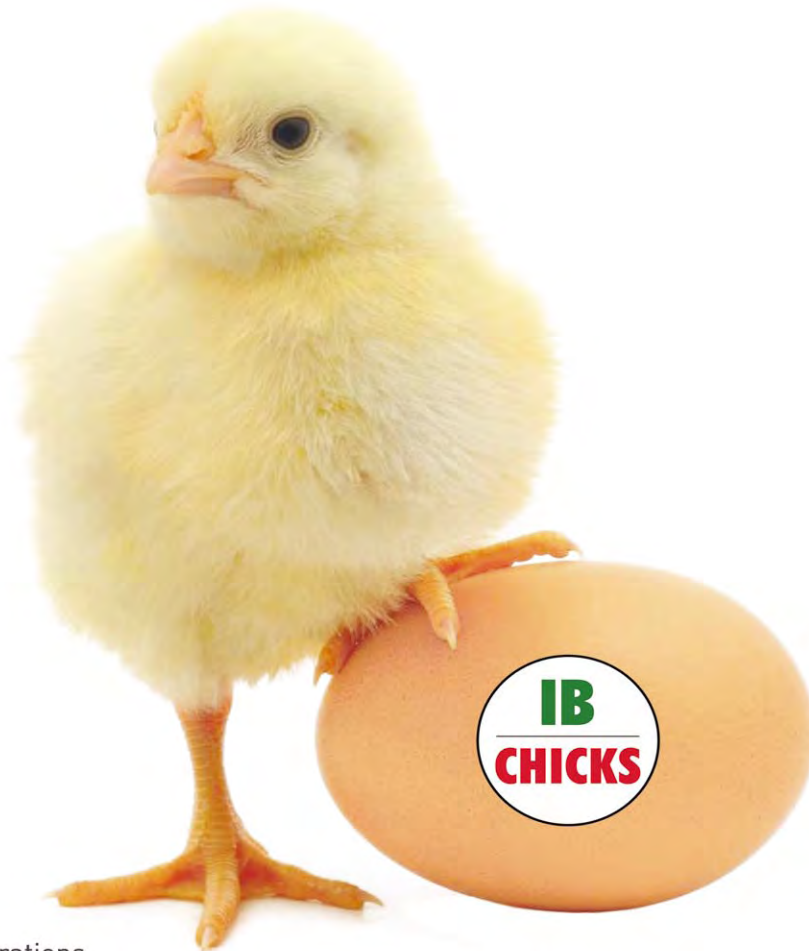
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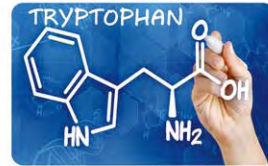
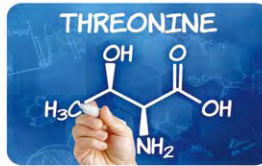
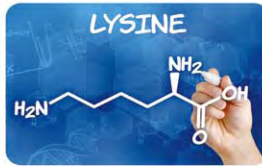
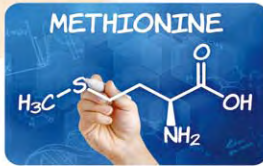
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NIR Forum India showcased customer loyalty and FOSS leadership

2018-11-22

By **Sana Shaikh**

For the very first time, FOSS India organised NIR Forum in Chennai (Southern India) & Ahmedabad (Western India), displaying customer loyalty and manifested our presence in the ever increasing NIR market (particularly the Feed & Forage segment).

The power of NIR

The NIR Forum India was a two-day workshop organised from 12–13 November in Chennai followed by 14–15 November in Ahmedabad. The event saw a good representation of global as well as local key accounts, along with customers, competition instrument users and some upcoming prospects wanting to learn about benefits of NIR. The focus of the forum was to highlight the power and benefits of networks displaying the FOSS Calibrator and our new Digital Service offerings.

Experiences & Expectations

Along with the many presentations about our new products and services, we also energised participants to talk about their experiences of

using FOSS instruments, our after sales support along with their expectations from us. This augured a sense of positivity amongst the audience and helped us strengthen cooperation and relations between customers, distributors and FOSS.

85 participants, presentations & practical sessions

The forum was divided into 2 days of workshops comprised of technical presentations on day one and practical sessions on day two. There were 51 participants at the Chennai event and 34 participants at Ahmedabad forum, which only testified the eagerness from our customers to get more acquainted with the technological developments in FOSS worldwide. The seminar was kicked off by key notes from Dr. Dinesh Bhosale, AB Vista; Dr. Rahul Sawarkar, AB Vista; Dr. Nidhi Madnawat; Cargill India; Ms. Anjali Kapase, Mars Wrigly Confectionary and Ms. Shruti Mehta from Amul Cattle Feed plant.



Christian Tolleback addressing the audience on NIR Management in Feed



Dr. Dinesh Bhosale throwing light on the NIR project between FOSS India & AB Vista India

Customer feedback



Happy customers being provided with certificate of participation & souvenirs

The sessions were well received by the audience with good interaction between all the participants.

One of the aims for this forum was to establish contact between all participants in order to share experiences, learn from each other and strengthen FOSS' position as the number 1 hardware & software solution provider particularly in India.

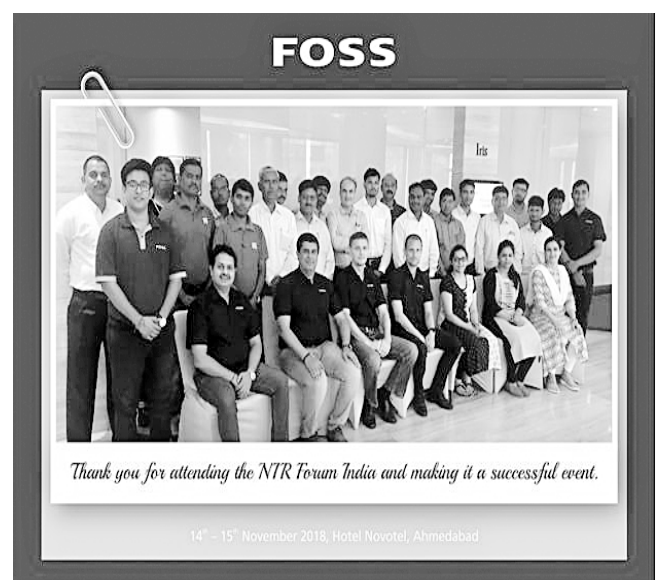
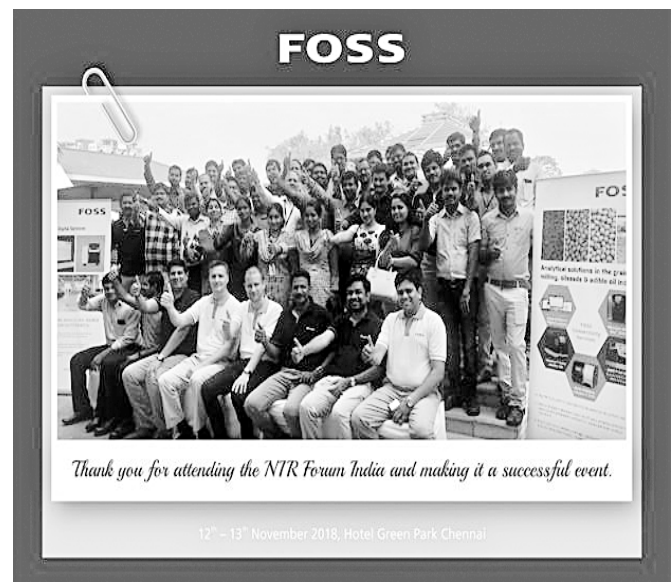
The participants provided a very positive feedback and everyone urged us to organise similar event next year with a promise that they would love to be a part of the forum once again.

Thank you

We would like to express our gratitude & special thanks to Christian Tollebäck, Ronny Pradon,

our distributors & everyone at FOSS India for being a part of the NIR Forum and making it a huge success.

Customer events like this not only helps to maintain high customer satisfaction and loyalty with our current customers, but it also releases a batch of enthusiastic and well informed FOSS ambassadors to spread the word around the industries about our capabilities and new solutions.



Lymphatic System of Poultry

Dr.SurajAmrutkar* and Dr.SuhasAmrutkar**

* Assistant professor, Poultry Science, I.L.F.C., F.V.Sc.& A.H., SKUAST-J, Jammu.

** Subject Matter Specialist, Animal Nutrition, I.L.F.C., Parbhani Veterinary College, Parbhani, Maharashtra.



Dr.SurajAmrutkar

Introduction:

Understanding the physiology and immunology of lymphoid system is handicapped without knowledge of its basic structure. The body of birds is richly served with lymph vessels. Lymph is derived from the body

fluid found within the interstitial space (the space between the important parts of the body). It includes lymph, lymph vessels and lymph nodes. Generally, Lymph flows away from the tissue to lymph nodes and eventually to either the right lymphatic duct or the largest lymph vessels in the body, the thoracic duct. The lymphatic system is a system which collects and returns the interstitial fluid. As with the blood network, the lymph vessels form system all through the body, contrast to the blood, in which the lymph system will be in one direction draining lymph from the tissue and returning it to the blood. This system is a network of capillaries and tubes called "Lymphatics". These lymphatics use up lymph from all over the body. The lymphatic system protects the body against disease by producing lymphocytes. It is also absorbs lipids (fats) from the intestine and transports them to the blood. Lymphatics are found in every part of the body apart from the central nervous system. The major components of the lymphatic system are bone marrow, lymph nodes, spleen, the bursa of fabricus and the thymus gland. The lymphatic system of birds is characterized by a number of morphological features which place it phylogenetically in an intermediate position between the analogous system of amphibian & reptiles and that of mammals. **There are no lymph**

nodes in fowls. Lymph plexuses (an intertwining of the very small lymph vessels) are found instead of mammalian lymph nodes. In the duck and the goose, we recognize two pairs of lymph nodes i.e. the cervico-thoracic lymph nodes and the lumbar lymph nodes. The lymph nodes cervicothoracales are inserted into the vas lymphaceumjugulare of each side. They are situated close against the jugular vein at either the caudal end of the neck or in the cranial part of the body cavity. They are 10-15mm long and 3-5mm thick and have an elongated, spindle shaped structure. The lymph nodes of the birds develop by adaptation of the wall of the relevant lymph vessel, which in this case is the vas lymphaceumjugulare. The Inn.Lumbales are also paired and of similar structure. They are situated immediately under the vertebral column and are incorporated in the ductusthoracicilumbales which accompanies the a. sacralis media. In goose, they measure some 2.5cm in length and 0.5cm in thickness. They extend between the point of origin of the external iliac artery and the ischiatic artery. The lymphatic system has the function of draining the body systems of fluid that is left behind by the blood vessels, although the lymph fluid does ultimately return to the main circulatory system, when the lymph vessels enter the venacava near the heart. In general, lymphatic system is poorly developed when compared with mammals. Unlike the cardiovascular system, the lymphatic system is not closed and has no central pump. The lymph movement occurs despite low pressure due to peristalsis (propulsion of the lymph due to alternate contraction and relaxation of smooth muscle), valves and compression during contraction of adjacent skeletal muscle and arterial pulsation. Anatomically lymphatic vessels or lymph vessels are thin walled, valve structures that carry lymph. Lymph vessels are lined by endothelial cells

and have a thin layer of smooth muscle and adventitia that bind the lymph vessels to the surrounding tissue. Lymph vessels are devoted to propulsion of the lymph from the lymph capillaries which is mainly concerned with absorption of intestinal fluid from the tissues. Lymph capillaries are slightly larger than their counterpart capillaries of the vascular system. Lymph vessels that carry lymph to a lymph node are called the afferent lymph vessels and one that carries it from a lymph node is called the efferent lymph vessels from where the lymph may travel to another lymph nodes, may be returned to a vein or may travel to a larger lymph duct.

Function of lymphatic system:

- i) It serves as system for draining tissue fluid.
- ii) It carries proteins and even large particulate matter away from the tissue spaces.
- iii) It helps in absorption and transportation of fats and vitamin K from the small intestine to the blood.
- iv) It distributes the digested food to the tissues and collects the metabolic waste substances.
- v) It assists in the control of infection.

Lymph:

- i) It is a tissue fluid which has entered lymph capillaries.
- ii) It is a colourless fluid.
- iii) It is practically blood minus the RBCs
- iv) They originate as blind sacs between tissue cells as capillaries and collects fluid not absorbed by venous system.
- v) These vessels pass through lymph nodes and finally join cranial vena cava by thoracic duct.

Lymphnodes:

- i) They are spherical, oval or bean shaped.
- ii) They are grey rosy in colour.
- iii) They vary in size from very minute bodies to the size of lemon.
- iv) The lymphnodes are covered by a connective tissue capsule.

- v) The capsule sends septa or trabeculae inside the node.
- vi) The node is divided into cortex and medulla, which contains large number of lymphnodes.
- vii) They serve as filters for the lymph.
- viii) They act as one of the first body defense against infection.

Thymus:

The thymus is derived from the endodermal pharyngeal pouch epithelium, as are also the parathyroid glands and the ultimobranchial body. In birds, the 3rd, 4th and 5th pharyngeal pouches proliferate distally and initially form a solid column of cells. The avian thymus lies parallel to the vagus



Thymus of chicken

nerve and internal jugular veins. Thymus decreases in size as the bird mature. On each side of the neck, there are 7-8 separate lobes, extending from the third cervical vertebra to the upper thoracic segments. Each lobe is encapsulated with a fine fibrous connective tissue capsule and embedded in adipose tissue. From the capsule, septae invade the thymic parenchyma and incompletely divide the lobe into lobules. The button or bean shaped thymic lobes reach a maximum size of 0.6-1.2 cm in diameter by 3-4 months of age before physiological involution begins. Lymphocytes migrate into the cellular mass from the ingrowing blood capillaries and the surrounding mesenchyme and these cells are then transformed into reticulum cells.

Connective tissue septa divide the thymus into lobules with a cortex consisting of a dense collection of lymphocytes and a medulla made up mainly of reticulum layers. The thymus of birds is embedded into completely isolated lobes and in the fowl, there are 6-8. In duck and pigeon, it is 5-6 of the oval and round, flattened lobes. In young fowls, they measure 8-15mm in length, 7-9mm in breadth and 2-5 mm in depth. The weight of thymus of a hen of about one year of age is 1.50-4.75gm. The organ about is said to attain its maximum weight in young, actively laying fowls but even in 5 years old hens, it still weight about 2 gm. However, the thymus does involute and ultimately it completely disappears in old birds. The thymus is a lymphoepithelial organ and therefore plays an important part in the defense mechanism against infection. It is also believed to exert an influence on the development of other lymphoreticular organs.

Bursa of Fabricus:

The bursa of fabricus develops initially as a solid protuberance on the dorsal wall of the urodeum of cloaca. Only when the epithelium lined lumen develops and forms into a pouch or bursa, it communicates with the proctodeum. In a fowl of about 8 weeks of age, it is round or pear shaped and about 1.5-2cm in length and 0.8cm in width. In chicken, bursa of fabricus has the shape and size of a chest nut and is located between the cloaca and the sacrum. A slot like bursal duct provides a

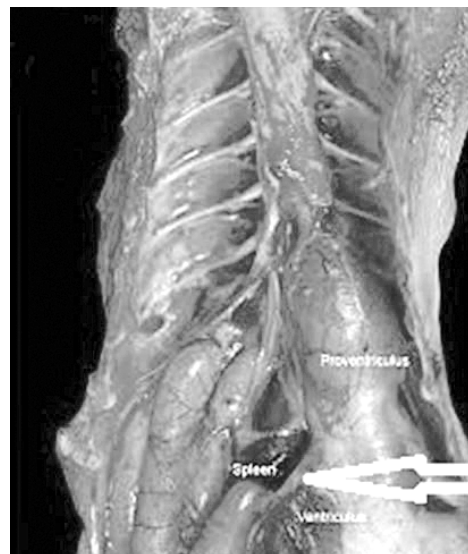
continuous and free communication between the proctodeum and the bursal lumen. The bursa reaches its maximum size at 8-10 weeks of age, then like the thymus it undergoes involution. By 6-7 month, most bursa are heavily involuted. With the onset of sexual maturity, it regresses and finally disappears. Its lumen is lined by simple columnar epithelium. Numerous tubules arise from it and between them are lymphoid follicles whose number increases during development. Removal of this lymphoreticular organ leads to a reduction of the defense mechanism against infectious diseases. The bursa of fabricus is sometimes referred to as the "cloacal thymus", for there are certain structural and functional resemblances between these two organs, both contain numerous lymphoid cells and are important in immunological mechanisms.

Spleen:

The splenic primordium first appears as a mass of mesenchymal cells in the 48 hrs embryo. In contrast to that of mammals, the avian spleen is not considered a reservoir of erythrocytes for rapid release into the circulation. Spleen has an important role in embryonic lymphopoiesis. At the time of hatching, the spleen becomes a secondary lymphoid organ which provides an indispensable micro-environment for interaction between lymphoid and non lymphoid cells. The contribution of the avian spleen to the immune system, as a



Bursa of fabricus



Spleen of chicken

whole may be more important than in mammals because of the poorly developed avian lymphatic vessels and nodes. The chicken spleen is a round or oval structure lying dorsal to and on the left side of the proventriculus. The spleen is surrounded by a thin capsule of collagen and reticular fibre, poorly developed connective tissue from the capsule. In fowl, it is round or egg shaped. In the aquatic birds, it is more triangular with a flattened dorsal and a convex ventral surface, in the pigeon, it is oval. The spleen weight of the fowl and duck weight 1.5-4.5 gm, the goose 4-8 gm and that of the pigeon is 0.2-0.4 gm. It lies against the dorsal surface of the right lobe of the liver in a space formed dorsally by the gonad, ventrally by the liver and laterally by the gizzard. The normal spleen is about 0.75 inch in diameter, located near the gizzard in the body cavity. Histologically, it is composed of red and white pulp. The function of spleen include phagocytosis of worn out erythrocytes in red pulp. Lymphocyte production in white pulp and antibody production in both the red and white pulp. Structurally and functionally, the spleen belongs to the blood forming organs and at the same time, it is also an important component of the reticulo-endothelial system which serves as a

defense against noxious substances. In the embryo, it produces both red blood cells (RBC) and white blood cells (WBC) and it retains lymphatic ability throughout life. The spleen also removes erythrocytes which are no longer viable from circulation. Some components of the blood pigments are passed to the liver for further while iron is deposited in the spleen in the form of ferritin.

Bone marrow:

In adult birds, the medullary cavity (*cavum medullare*) of the long bones and the medullary spaces (*cellulae medullares*) of the spongy bone are only partly filled by the blood forming bone marrow. The first blood cells, and also the endothelial cells lining of the blood vessels arise from mesenchymal elements called angioblasts which are situated in the blood islands of the area vasculosa of the germinal vesicle and wall of the yolk sac. Other sites of blood formation during development are the liver, spleen and thymus but the bone marrow finally becomes the blood formation in the higher vertebrates. However, lymphocyte production in birds also takes place in all types of lymphatic tissue, including the lymph nodes in duck and geese.

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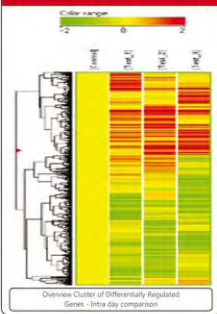
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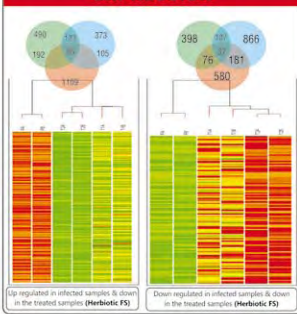
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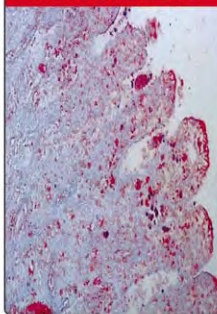
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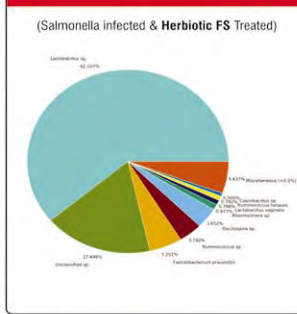
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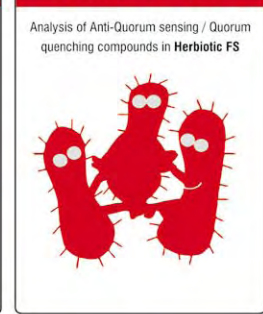
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Important Guidelines on Winter Management in Poultry

Compiled By: **Dr. Sanjay Gapat & Dr. Rupesh Rane**

Alivira Animal Health Limited, Thane.

Winter season has great effect on poultry production by lowering the temperature of surrounding. During winter when temperature goes down below 55°F, various problems like reduction egg production, reduction in water intake, reduction in fertility and hatchability etc occurs.

Therefore, the management of poultry during winter is an important concern for poultry farmers. The following points should be considered to get better production from poultry during winter season:

1. Orientation of house,
2. Ventilation
3. Litter Management,
4. Feed Management
5. Water Management

1. Orientation of House

Poultry house should be designed in such a way to provide all the comfort required by birds during winter. Orientation of a building with respect to wind and sun consequently influence temperature, and light on different external surfaces. In winter the arc of the sun's visible path is shortened, an east west alignment of a rectangular house provides a maximum gain solar energy in winter.

House should be designed in a way that maximum sun light enters the shed during day time. Birds should be protected from chilled winds, for this gunny bags should be hanged at the places from where the cold air enters. These gunny bags should be hanged down as soon as sunlight goes in the evening till the arrival of sunlight next morning.

2. Ventilation

During winter season it is necessary to keep the house draft free but with plenty of ventilation. Birds release a lot of moisture in their breath and droppings which adversely affects their health, if there is restricted ventilation it causes ammonia build up in the air which cause respiratory problems. So, they need plenty of fresh air circulating around the house. For the purpose sliding windows are useful as they can be opened during day and

closed during night. There should also be arrangement of exhaust fans to remove impure air.

3. Litter Management

Prior to chick being placed in house, the surface of floor should be covered with a bedding material called litter. It gives comfort to the birds. a good quality litter serves as an insulator in maintaining uniform temperature, also absorbs moisture and promotes drying. It dilutes faecal material thus reducing contact between birds and manure. It also insulates the chicks from the cooling effects of the ground and provides protection cushion between bird and floor. Around six inches of litter is needed in houses during winter. The litter gives warmth to the birds during winter. If litter management is proper, it will be felt quite warm when taken in hand.

4. Feed Management

1. Poultry uses food for two main purposes i.e. as an energy source to maintain body temperature and to carry on normal physiological activities and as building material for development of bones, flesh, feather, Egg etc.

2. The variation in feed consumption is smaller for each degree Fahrenheit change in temperature when the weather is cold than when it is hot. Low temperature causes more feed intake and higher oxygen demand. Therefore, when the weather gets colder, it is essential to give the chicken plenty of food as they require extra energy for maintaining body temperature.

3. Consumption of calories of ME/bird/day varies as the ambient temperature changes. Normally these differences are as follows:

i) When bird eat more feed, along with energy, other nutrients are also consumed more which are not needed and they become a waste. To avoid this waste during winter energy rich sources like oil/fat should be added to the diet or level of other nutrients may be reduced keeping the energy at same level.

ii) in winter season, the number of feeders should be increases as compared to summer.

iii) Feed should be available to bird whole of the day. it has been experimentally proved that for proper growth of broiler during summer, diet containing 23% protein and 3100 Kcal ME/kg diet is needed. While in winter, 3400 Kcal/kg ME and 23% protein is needed.

5. Water Management

1. During winter season birds take less water so far maintenance of water in the body, it is necessary to give continuous supply of fresh water which can be taken by the bird.

2. Water must be fresh and clean. If water is cold enough, then it should be given to chicken after adding hot water to it, so that the water comes to normal temperature.

3. In ice falling areas, blockage of pipe is a big problem due to freezing of water during winter season. When temperature goes below 0°C routine inspection of pipeline should be done to avoid blockage of water.

4. Many medicines are given to poultry through water. As water consumption of bird is reduced during winter season. Therefore, care should be taken that drinkers are removed few hours prior to water medication and medicine/vaccine is given in less amount of water so that birds can consume total water and each bird get benefit of medicine/vaccine or other supplements.

Strategies to overcome winter impact

Alivira provides the quality solutions for management of winter.

1. Mineral, Protein and Amino acid Balance

Excess sodium leads to water excretion so lowering down of sodium level in the feed is mandatory. For example, 0.19 % for starter and 0.15 % for finisher.

Amino acids play important role by putting less pressure on GIT and reduce ammonia production in the shed. Which helpful in better performance of birds.

Vitaminoacido a product of Alivira is a complete blend of essential vitamins and amino acids fortified with vegetal proteins helps in absorption of nutrients and exert less pressure on GI tract leads to reducing moisture in faecal matter.

2. Inclusion of enzyme preparation in feed

Excess of nitrogen quality will disturb the litter quality so inviting gut related issues so dealing to ammonia production in the shed better to go with low crude protein value feed. To avoid wet drooping's associated with some feeding ingredients NSPs are to be countered by commercially available enzyme preparation in the diet. Product of Alivira **Enerzyme Combi Pro** a multi enzyme formula with extra efficiency useful in reduction in digesta viscosity, enhanced digestion and absorption of nutrients especially fat and protein, reduced water intake, reduced water content of excreta, reduced production of ammonia from excreta.

3. Control of Respiratory Distress and Diseases

Due to poor ventilation and ammonia production winter is responsible for respiratory distress and diseases which leads to heavy economical losses. To combat these problems, prefer our natural therapy **Alvimint** mixture of essential oils of eucalyptus, menthol & Emulsifier. Useful in effective management for respiratory ailments. Acts as anti-inflammatory and decongestant helpful to soothe respiratory tract. Also enhances immunity and prevents post vaccination stress.

In most cases when the cold conditions are extreme, the birds become stressed and this affects their production and ability to withstand diseases through immunosuppression leading to reduction in production. In such condition to prevent and control losses due to infection **Selvo BH** is highly recommended. It exhibits pronounced bactericidal activities including Enterobacteriaceae. Helps to liquefy thick mucus into thin mucus for easy expulsion from system. It attains peak plasma concentration within one to two hours of application.

Note: References are available on request

Postmortem Techniques of Poultry

Hari R., B.K. Ojha*, A.K. Singh and J.S. Rajoriya
College of Veterinary Science and Animal Husbandry, Rewa

The diseases of poultry cause heavy economic loss to the poultry farmers since the chicken are flocked together. When a disease affects a few chickens it spreads horizontally very quickly. Therefore, it is very essential to identify the disease at the earliest so that immediate action can be taken to control/prevent the disease. The diagnosis most of the time should be made at the farmers place based on the autopsy lesions. Therefore, one should be well versed with the lesions so that diagnosis can be made on the spot and proper advice can be given to the farmer. The art of diagnosis of poultry diseases by doing an autopsy should be made simple and effective. With this objective a diagnostic protocol is documented in this paper.-

- Dip the dead bird in antiseptic solution or in water to avoid feather contamination
- Keep the bird on postmortem table and look for any lesion or parasite on skin.
- Examine the eyes, face and vent.
- Adduct both the legs by dislocating the hip joint.
- Remove the skin through a cut with knife and with the help of fingers. Expose thymus, trachea, and esophagus in neck.
- Cut on lateral side of chest muscles and lift the sternum dorsally and break the bones at joint with thorax.
- Cut the bones at both sides. Remove muscles and bones to expose the thorax and abdomen.
- Examine different organs.
- Cut proventriculus and pull the organs of digestive tract out. Separate spleen, liver, intestine, caecum, proventriculus, gizzard etc.
- Lugs, heart, kidneys, ovary, oviduct, testes can be examined insitu.
- Expose bursa just beneath the cloaca.
- Cut beak at joint, examine mouth cavity and expose esophagus and trachea.
- Remove skin of head and make a square cut on skull on expose brain.
- Take a forceps and place ion between thigh muscles remove fascia and expose the sciatic nerve.
- Separate each organ and examine them for the presence of lesions.

OBSERVATION

Nasal catarrh, sinusitis, conjunctivitis with or without the presence of caseous mass

Tracheitis; bronchitis, with or without air sac involvement.

Air sac infection

Peticheae on the heart, pericardium & peritoneum

Enlarged liver and spleen.

Perihepatitis, pericarditis, Haemorrhagic ovaries.

DISEASE TO BE SUSPECTED

CRD, Fowl pox, Nutritional roup, infectious coryza.

ILT, IB, RD, Aspergillosis, Fowl pox, pasteurellosis, Fowl plague, CRD.

IB, Complicated CRD, Coli infection

RD,.,Pasteurellosis, Pullet disease, spirochaetosis.

Spirochaetosis, Fowl typhoid Leucosis, Marek's disease, TB.

Coliform infection, Fowl plague, RD, Fowl typhoid, pullorum disease, spirochaetosis.

Degenerated ovaries

Unabsorbed yolk .in chicks

Caseous exudate in the mouth or scab like lesions in the corner. of the mouth and eyes

Pseudomembraneous inflammation and ulceration in the oesophagus and crop.

Haemorrhage in proventriculus

Haemorrhage in caecum

Nervous symptoms

White spots in comb

Weakness of legs

Enlarged nerves

Nodules in small intestine

Nephritis with chalky white deposits

Swollen head and wattle

Distended gall bladder

Haemorrhage in abdominal cavity and blood clot

Pullorum infection, Fowl typhoid egg peritonitis

Pullorum disease, chills, Mushy chick disease.

Vitamin A deficiency. Fowl pox. thrush, Biotin & pantothenic acid deficiency

Thrush, Trichomonas infection.

RD, Spirochaetosis, Sulphadrug poisoning

Coccidiosis

RD/ vaccination reaction (respiratory and other symptoms will also be seen), fowl paralysis (enlarged sciatic nerve), AE (with muscular dystrophy), Vitamin E and B2 deficiency

Favus

Fowl paralysis, Vit D deficiency, Thiamine, choline and Mg deficiency and Riboflavin deficiency

MD

TB, coligranuloma, nodular taeniasis and leucosis

Vit A deficiency, Visceral gout and salt poisoning

Chronic pasteurellosis, coryza, fowl pox

Fowl typhoid, pullorum disease

Fatty liver, Bangkok Haemorrhagic Disease

Collection, Preservation and Despatch of Clinical Materials

A pathologist by conducting a postmortem examination of a carcass diagnoses a case provisionally but for the confirmation of the condition many laboratory tests are required. For this depending upon the gross lesions we have to send the materials to the laboratory. Here one important point is the postmortem and collection of materials for the laboratory tests should be made as early as possible because immediately after the death of the animal the putrefactive changes will start and if advanced putrefactive changes take place the results will change. So

the collection and the preservation of the materials should done without further damage to the tissues. This mechanism of preservation of tissues is called fixation. The material used to preserve the tissues is a fixative. Usually 10% formalin is a commonly accepted fixative. Fixation means preserving the tissues collected as it was in the body or preventing further autolytic changes.

Blood smear : Prepare thin smears, dry on air and pack it carefully. Apply pieces of broom stick in between the slides to avoid rubbing each other and pack neatly with cotton and then final packing and write on the cover "glass handle with care.

Tissues for histopathology

Histopathological examination is very important in diagnosing many lesions. For this we have to collect the tissues. The sample collected should be representing and along with the lesion a portion of normal tissue also should be taken. This is to facilitate the identification of the tissues. Tissues may have the size of 1 x 1 x 1 cm. Big pieces are not advised because this will harden and become difficult to take out from the bottle as well as big pieces will prevent easy penetration of the fixative and proper fixing of the tissues.

The other points are the bottle should be a wide mouthed one. There should be ten times volume of the fixative to the tissues. Cork the bottle properly and give a detailed history of the case and label the bottle. Each tissue need not be labelled, put all the tissues together in a bottle and write on the label what all tissues are collected.

The other materials like urine sample, cerebrospinal fluid etc can be collected and send to the lab if it is necessary. Few drops of formalin or one crystal of thymol can be added to this if the lab is not near.

In suspected cases of poisoning examine the entire alimentary canal and its contents. Collect the contents in a bottle and send to the laboratory. This is done without preservative and pieces of liver or kidney can be preserved in spirit and send a free sample of the spirit also with the full history. The request toxicological analysis should indicate the following details.

1. History of the case
2. Suspected poison
3. Whether the animal is live or dead

Whenever possible include the suspected source of poison like feed or grass etc also. Materials can be sent directly to the department of pharmacology.

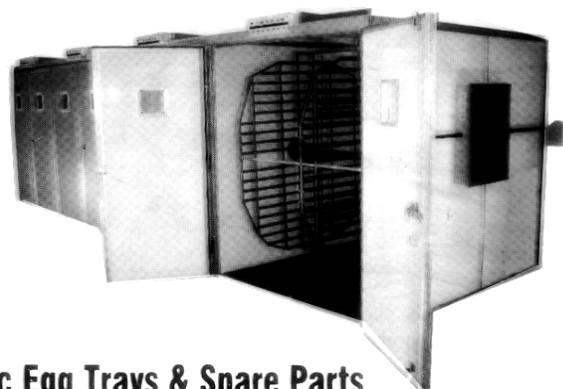


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Egg shell-an important poultry by-product

Dr. Nazir Ahmed¹, Dr. Maria Abbas²

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²Junior Research Fellow in CWDB Project at Kargil, Ladakh-SKUAST-K

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Dr. Nazir Ahmed

The egg consists of nine different items, which are egg shell (the outer covering of the egg), air cell (the pocket of air at the end of an egg), shell membrane, thin albumen, thick albumen, chalazae (anchor yolk),

vitteline membrane, germinal disk and egg yolk. An eggshell is the outermost covering of an egg. The shell color of an egg is representative of the breed of hen that produces the egg. White hens produce white eggs and brown hens produce brown eggs. In an average laying hen the process of shell formation takes around 20 hours. Eggshell serves to protect the egg against damage and microbial contamination, prevention of desiccation, regulation of gas and water exchange for the growing embryo and provides calcium for embryogenesis. The shell makes up 9-12 percent of an egg's total weight. It contains 27 essential microelements. Shell contains calcium carbonate (94%), magnesium carbonate (1%), calcium phosphate (1%) and organic matter (4%). It also contains trace amounts of sodium, potassium, zinc, manganese, iron, copper, sulphur, water, protein, crude fat, ash, alanine, arginine, aspartic acid, cysteine, histidine, leucine, lysine, isoleucine, tyrosine, valine, phenylalanine, proline, serine and threonine.

India ranks fifth in the world with annual egg production of 1.61 million tones. Andhra Pradesh is the largest egg producing state in India. Eggshell acts as a waste material from different domestic sources such as poultry farms, egg producing factories, hatcheries, homes and restaurant and

results in increases pollution problems. Most eggshell waste is discarded without further processing by sending to landfill at a very high cost which is a very big issue. It is necessary to find an alternative method which would transform the waste eggshells into a valuable item, giving financial benefits to the competitive egg processing industry, apart from giving manufacturers a new profit stream. Egg shell can be used in variety of ways.

Egg shells are used to enhance the soil fertility as it quickly decomposes and adds valuable calcium and other minerals to the soil. Crushed eggshell is scattered around the plants and flowers, which protect it from plant eating slugs, snails and cutworms, without using eco-unfriendly pesticides. Biodegradable eggshell halves are filled with potting soil and one or two seeds are added to each shell to start seedlings for the garden. It is one of the simple way to start a seedling in shells. When the seedlings are big enough for transplanting outside, the shells are cracked at the bottom and seedlings are planted.

Eggshells contain 95% calcium, and hens need calcium to lay eggs that have those strong shells. If shells have been sterilized to kill bacteria they can be fed to laying hens.

Egg shells are used as a coating pigments for ink-jet printing paper and are also used for various decorative purposes by using paint. It can be used as food additive in coffee in the filter which reduce the bitterness in coffee.

It can also be used as a nontoxic abrasive on pots and pans. It acts as a natural drain cleaner. A couple of crushed eggshells can be kept in kitchen sink strainer. At all times it traps additional solids and they gradually break up and help to naturally



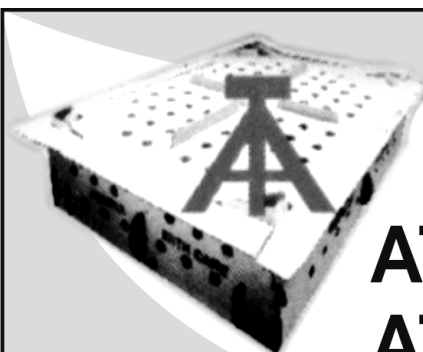
clean pipes on their way down the drain. Egg shells also act as laundry whitener. These if scattered in areas most prone to cats, also help in keeping cats away. Eggshell particles are used in toothpaste as an anti-tartar agent.

Egg shell is having important medicinal uses such as healing cuts, treating ingrown toenails, skin irritations, itchy skin, skin-tightening and facial. Eggshells are dissolved in a small jar of apple cider vinegar (takes about two days) and the mixture is used to treat minor skin irritations. It also acts as a facial in which dried egg shells are ground with the help of mortar and pestle, mixed with egg white and the mixture is applied on face and then rinsed.

Egg shell is used as **pet food**. Dry eggshells are taken in oven at 250°C, for 30 minutes and then put in a plastic zipper bag, sealed and the shells are crushed with a rolling pin until they are a fine powder. This is added in to dog's food as a great calcium supplement to help in its bones and teeth growth. In addition, calcium carbonate from eggshell has an advantage for not containing toxic elements like calcium carbonate from oyster shells, which contains lead as well as other potential toxic elements such as aluminum, cadmium and mercury. Because of this property egg shell is used as a source of calcium supplement in animal and human. This supplement leads to increased bone density, less arthritic pain and even stimulates cartilage growth in man and animals. Egg shells are also used in as a calcium supplement in orange juice. Eggshell consumption helps stop bone loss in postmenopausal women.

Applications of eggshells in the form of calcium lactate has been used as a firming agent, a flavor enhancer, a flavoring agent, a leavening agent, a nutrient supplement, a stabilizer and thickener.

Eggshells have thus nearly as many uses as the eggs themselves. Egg shells can thus be used in such a way which may help to overcome the global eggshell waste problem, high disposal costs and environmental concerns.



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NATIONAL EGG CO-ORDINATION COMMITTEE

DAILY / MONTHLY EGG PRICES DECLARED BY NECC AND PREVAILING PRICES AT VARIOUS PRODUCTION CENTRES (PC) AND CONSUMPTION CENTERS (CC) NOVEMBER 2018

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	
NECC Prices																																
Ahmedabad	428	430	432	434	434	437	442	447	447	447	450	450	450	450	450	450	450	450	452	454	456	456	435	435	-	-	-	-	-	-	-	444.41
Ajmer	400	400	395	395	395	405	410	415	420	423	420	420	417	418	418	410	410	405	405	405	405	390	390	382	-	-	-	-	-	-	406.37	
Banglore (CC)	407	410	413	417	417	422	425	425	430	430	433	433	433	433	433	433	433	433	433	433	433	433	433	433	420	-	-	-	-	-	426.87	
Chennai (CC)	415	420	420	425	425	430	430	430	435	435	440	440	440	440	440	440	440	440	440	440	440	440	440	440	-	-	-	-	-	-	434.37	
Chittoor	408	413	413	418	418	423	423	423	428	428	433	433	433	433	433	433	433	433	433	433	433	433	433	433	-	-	-	-	-	-	427.37	
Delhi (CC)	421	423	423	423	423	425	430	435	445	450	450	450	450	450	440	440	440	440	440	440	440	440	430	425	418	-	-	-	-	-	435.45	
E.Godavari	398	400	402	402	402	402	404	406	407	407	407	407	407	407	407	407	407	407	407	407	402	402	392	392	-	-	-	-	-	-	403.66	
Hyderabad	387	389	391	393	396	401	404	406	408	410	410	410	410	410	410	410	410	410	410	410	410	410	390	370	-	-	-	-	-	-	402.7	
Miraj	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mumbai (CC)	442	444	446	448	448	451	456	461	463	465	467	467	467	467	467	467	467	467	467	467	467	467	467	447	-	-	-	-	-	-	460.08	
Mysore	414	414	419	419	424	424	424	429	429	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	412	-	-	-	-	-	427.33	
Nagapur	390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400	400	398	398	398	395	395	-	-	-	-	-	-	-	-	396.75	
Namakkal	400	400	405	405	410	410	410	415	415	420	420	420	420	420	420	420	420	420	420	420	420	420	420	400	-	-	-	-	-	-	414.58	
Pune	437	439	442	446	446	451	456	463	463	467	469	469	469	469	469	469	459	450	450	450	450	450	440	430	-	-	-	-	-	-	454.29	
Punjab	396	396	396	397	397	399	403	411	420	424	424	-	-	-	-	415	413	409	409	406	406	406	406	-	-	-	-	-	-	-	407	
Vijayawada	398	400	402	402	402	402	404	406	407	407	407	407	407	407	407	407	407	407	407	407	402	402	392	392	-	-	-	-	-	-	403.66	
Vizag	401	403	405	405	405	407	408	409	409	409	409	409	409	409	409	409	409	409	409	409	402	402	389	389	-	-	-	-	-	-	405.54	
W.Godavari	398	400	402	402	402	402	404	406	407	407	407	407	407	407	407	407	407	407	407	407	402	402	392	392	-	-	-	-	-	-	403.66	
Warangal	387	389	391	393	395	398	403	406	408	410	412	412	412	412	412	412	412	412	412	412	412	412	392	-	-	-	-	-	-	-	405.33	
Prevailing Prices																																
Allahabad (CC)	438	438	428	438	438	443	462	462	467	467	462	462	457	452	448	443	438	428	433	433	433	428	428	419	-	-	-	-	-	-	443.54	
Barwala	400	400	400	400	401	405	411	417	425	427	427	415	415	415	415	415	405	407	410	405	390	390	382	-	-	-	-	-	-	-	408	
Bhopal	405	410	410	415	420	430	440	440	440	450	450	450	450	440	440	430	415	415	420	420	420	420	415	410	-	-	-	-	-	-	427.29	
Hospet	372	375	378	382	382	387	390	390	395	395	395	395	395	395	395	398	398	398	398	398	398	398	398	385	-	-	-	-	-	-	391.25	
Indore	410	420	420	421	421	425	435	438	440	450	446	445	443	435	435	425	415	413	410	420	425	420	422	410	-	-	-	-	-	-	426.83	
Jabalpur	407	410	414	420	425	430	435	445	445	450	445	445	440	435	435	430	425	425	425	425	425	425	417	407	-	-	-	-	-	-	428.54	
Kanpur (CC)	428	428	428	428	428	438	438	438	448	457	457	457	457	457	457	457	457	448	448	448	448	448	448	448	-	-	-	-	-	-	445.58	
Kolkata (CC)	434	432	432	432	440	444	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	441	441	441	-	-	-	-	-	442.79	
Luknow (CC)	450	450	457	457	457	457	460	470	470	483	483	483	483	483	483	477	477	477	473	473	467	467	463	-	-	-	-	-	-	-	469.04	
Raipur	405	411	417	425	425	430	430	430	430	451	454	456	453	440	440	440	425	418	418	418	420	420	418	410	-	-	-	-	-	-	428.5	
Varanasi (CC)	450	450	450	457	457	460	463	467	473	477	477	477	470	473	473	467	467	467	467	460	460	453	453	450	-	-	-	-	-	-	463.25	

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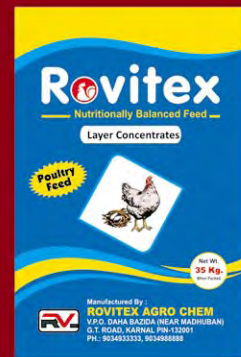
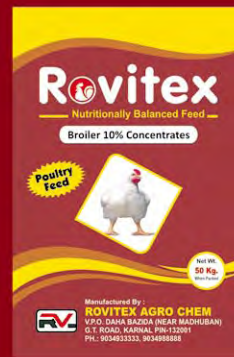
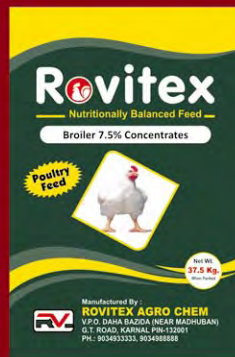
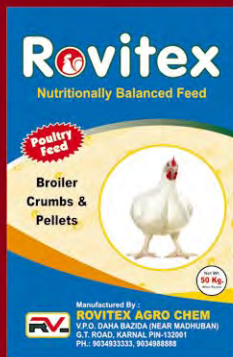
- ❖ Broiler 10% Concentrates
- ❖ Broiler 7.5% Concentrates
- ❖ Broiler 5.5% Concentrates
- ❖ Broiler 3.5% Concentrates
- ❖ Broiler 2.5% Concentrates
- ❖ Broiler 1.5% Concentrates

Layer Concentrates:

- ❖ Layer 5% Concentrates
- ❖ Layer 10% Concentrates
- ❖ Layer 25% Concentrates
- ❖ Layer 35% Concentrates

Broiler Crumbs/Pellets:

- ❖ Broiler Pre-Starter Crumbs
- ❖ Broiler Starter Crumbs
- ❖ Broiler Finisher Pellets



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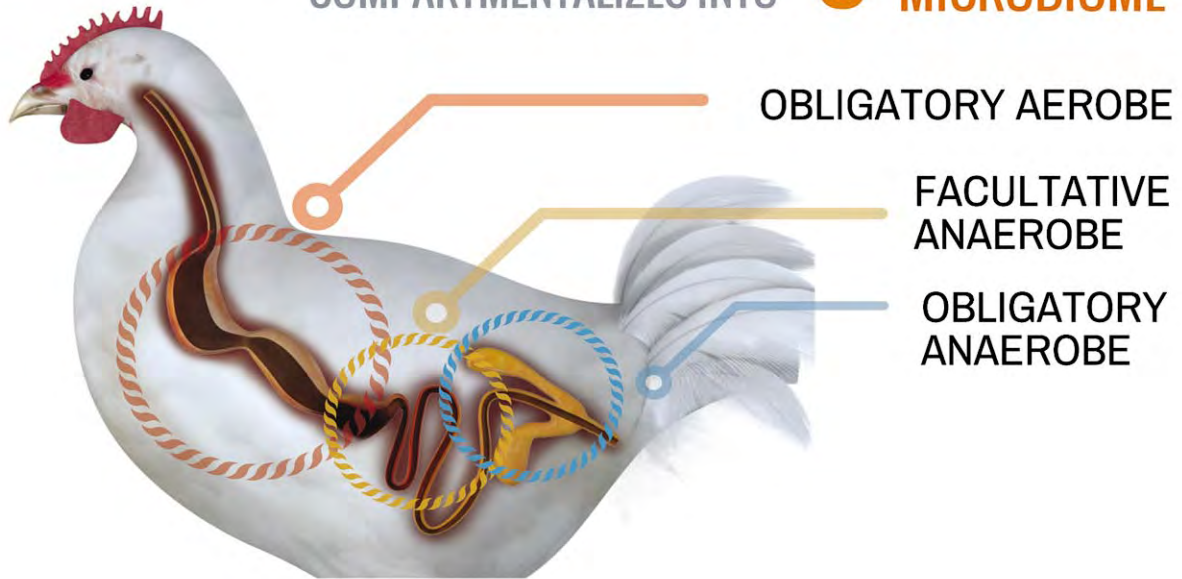
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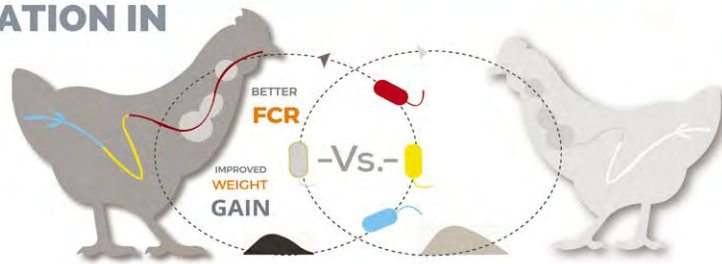


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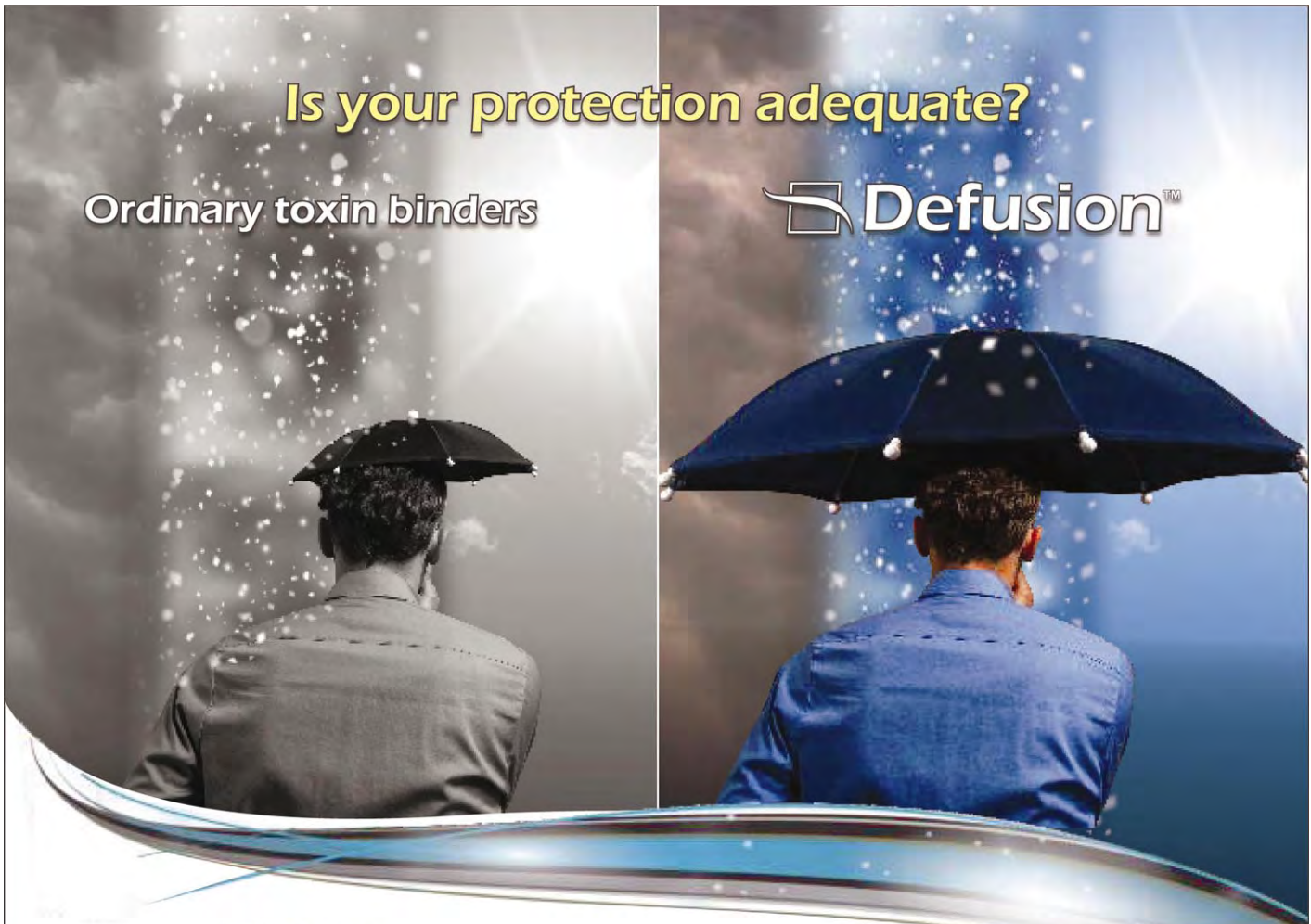
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Improving Broiler Performance on Top of an Antibiotic Growth Promoter regimen in India

Luis VALENZUELA, Product Manager and Dr.Gangga WIDYANUGRAHA,
Regional Technical Sales Manager – Poultry

The results of an Indian broiler trial demonstrates that a well-defined, poultry-specific, multi-species synbiotic improves performance.

The most prevalent issues in poultry industry are diseases (e.g. dysbiosis, coccidiosis, necrotic enteritis, lameness caused by Bacterial Chondronecrosis with Osteomyelitis (BCO), and Gram-negative pathogens like *E.coli*), regulatory issues, food safety (e.g. Salmonellosis and Campylobacteriosis) and antibiotic growth promoter (AGP)-free poultry production.

Key to success

The main objective in poultry production is to achieve high quality products at high levels of productivity. The key for producers to achieve this goal is to avoid bacterial challenges e.g. from feed, water, environment, gastrointestinal tract and to mitigate mycotoxins. Doing so without the use of antibiotic growth promoters (AGPs) requires different strategies that focus on prevention and promote good gut performance.

AGP exit

Traditionally, AGPs have been supplemented in poultry feed to improve performance and mitigate the negative effects of pathogens that colonise the gastrointestinal tract (GIT). Most of these pathogens are Gram-negative bacteria that have a lipopolysaccharide (LPS) or endotoxin layer. The release of LPS in an animal's bloodstream can cause severe health problems in poultry and aggravate the effects of heat stress. Concerns about potential development of antibiotic resistance due to excessive and unregulated use of AGPs have led to regulations banning their use in Europe and consumer pressure with the same objective in North America. The ban on AGPs in poultry diets has been accompanied by an increased incidence of certain diseases, raising interest on alternatives to be used in poultry production.

Beneficial bacteria for poultry

The use of probiotics can be an alternative way to increase the performance of production in poultry. Several microorganisms are currently used as probiotics in animal nutrition with remarked differences regarding their properties, origins and modes of action. They can be divided into three main groups: Lactic Acid Bacteria (LAB), Bacillus spore formers and yeasts. Genera like *Lactobacilli*, *Pediococci* and *Enterococci* which belong to the group of LAB and *Bifidobacteria*, are currently very well-studied probiotics and considered as drivers of gut health. LAB are part of the indigenous microflora that permanently colonize the intestinal tract whereas Bacilli and yeasts are considered as transient microflora.

How probiotics support gut health

Supplementation with the right probiotics favorably influences the microbial community in the gut, and aid the bird to establish or re-establish the state of eubiosis, thus enhancing gut health and productivity. In general, the following modes of action of probiotics are proposed:

- Competition with pathogenic bacteria for space, intestinal adhesion sites and nutrients (competitive exclusion)
- Enhancement of epithelial barrier integrity
- Production of antimicrobial substances
- Change of environmental conditions in the intestine by lowering of pH through increased production of acids
- Enhancement of intestinal immune function

The main goal of probiotics is to influence the intestinal microflora in a positive way, either by promoting its development, maturation or stabilization. A well-established intestinal microflora is crucial for the health of our animals, especially if we expect high production performance. It is

extremely important to the most for their ability to fight off infections with enteric pathogens and for guaranteeing a well-functioning end effective digestion of nutrients, resulting in good growth performance parameters.

The right probiotic bacterial strains block receptor sites in the intestinal wall, thus preventing pathogenic bacteria from establishing themselves in the gut. This principle is known as 'competitive exclusion.' These beneficial microbes produce lactic acid (and other metabolites, i.e. short chain fatty acids), that reduce the pH in the animal's gut and make it less favorable for opportunistic/pathogenic bacteria to grow or proliferate.

Probiotic supplementation of the intestinal microflora will also enhance the gut barrier, primarily by preventing colonization by pathogens and by acting indirectly as adjuvant-like stimulation of innate and acquired immune functions. However, evidence for probiotic-mediated enhancement of immunity requires further research.



PoultryStar® for better efficiency and performance

A study conducted at broiler farm, Hyderabad, India confirmed positive effects of combination of probiotic and prebiotic (PoultryStar®, BIOMIN Holding GmbH, Austria) on live body weight, FCR and mortality. The trial was conducted using 9,770 Cobb day-old chicks, divided into two groups where the birds were housed in broiler sheds. Commercial crumbles chick feed was provided for the first 20 days, followed by commercial full mash broiler feed until the end of the trial. Colistin sulphate and doxycycline were used as AGPs in feed throughout the trial period in both groups. Feed and water were provided ad libitum.

Both trial groups had received the same water treatment:

- Water sanitizer throughout the trial period
- Water acidifier for the first 15 days of the trial with inclusion rate of 300 mL/1,000 birds
- Liver tonic with inclusion rate of 100 mL/1,000 birds at Day 6, 7 & 8
- Enrofloxacin with a dose of 100mL/1,000 birds at Day 28, 29 & 30

All the birds were vaccinated against Newcastle and Gumboro disease viruses.

Trial groups:

1. Negative control group (NC): commercial feed, no feed additive.
2. NC + PoultryStar® sol (soluble): with inclusion rate of 2 g/1,000 birds/day via drinking water throughout the 40 days production cycle.

The birds were kept under observation for 40 days and the performance parameters; body weight gain, feed intake, feed conversion ratio (FCR) and mortality rate were measured and calculated.

The study showed higher live body weight in the PoultryStar® group by 80 grams, FCR was lower than the control group with (-0.08) difference and mortality rate was 0.27% than the control (Table 1).

Table 1. Effect of PoultryStar® on performance parameters

	Control	PoultryStar®	Difference
No. of Birds	4,885	4,885	
Slaughter Days	40	40	
Live Body Weight (grams)	1,830	1,910	80
Feed Intake (grams)	3,354	3,340	-14
FCR	1.83	1.75	+0.08
Mortality (%)	4.48	4.21	-0.27

Conclusion

The aim of this trial was to investigate the effects of PoultryStar® on growth parameters of broiler chickens under Indian farming conditions, and how that can affect the farm performance. The results of the trial showed that PoultryStar® is effective in improving broiler performance. Compared to the negative control, it increased the final live weight and broiler productivity index by 4.4% and 9.5%.

Non-Destructive scientific tools for quality evaluation of foods of Animal Origin

Anshul Khare (M.V.Sc. PhD), Veterinary Assistant Surgeon (V.A.S)
(Department of Animal Husbandry, M.P Government)



Introduction

Meat in its fundamental form is generally modelled by way of three-compartment model comprising of fat, water & protein. Meat is prone to spoilage as it provide suitable medium for microbes to grow. One challenge facing the meat industry is to obtain reliable information on meat quality throughout the production process, which would ultimately provide a guaranteed quality of meat products for consumers. To meet this challenge requires fast, accurate and non-invasive techniques for predicting technological and sensory qualities. Over the last few years, a number of methods have been developed to objectively measure meat quality traits. The majority of these methods are invasive, meaning that a sample has to be taken or that they are difficult to implement on-line. In muscle food, the pivotal qualitative characteristics that need to be determined are texture, nutritional value, and appearance. Several very promising measurement techniques are currently being studied and used in laboratories, some of which will shortly be ready for industrial deployment. The great variability in raw meat leads to highly variable products being marketed without a controlled level of quality. This problem is aggravated when the industry is unable to satisfactorily characterize this level of quality and cannot therefore market products with a certified quality level, which is an otherwise essential

condition for the survival and development of any modern industry.

A number of methods exist for measuring various qualities & compositional attributes of meat. In these main techniques are

- **Ultrasonics**
- **Optical methods**
- **Microwave characterization**
- **X-ray technology**
- **Nuclear Magnetic Resonance (NMR) measurements.**
- **Radiation**

Ultrasonics: Analyzing the acoustic parameters of waves propagating in a medium makes it possible to assess the characteristics of the propagation medium and to characterize it.

Ultrasonics has been used to determine texture, composition and physical state in liquid and solid foods. The commonly measured ultrasonic parameters are velocity, attenuation and frequency spectrum composition. Velocity is the parameter used most since it is the simplest and most reliable measurement.

Spectroscopic methods: Waves propagate and the study of radiation, absorption and more generally of any interactions between electromagnetic radiation and matter is called spectroscopy.

Spectroscopic methods are widely used for muscle food quality assessment and control, in both laboratory and meat industry settings (Hildrum, Wold, Vegard, Renou, & Dufour, 2006). Optical spectroscopy offers a panel of useful techniques for on-line characterization because of its *non-contacting* possibilities and because of the fibre-optical components which make it easy to design portable devices. It has been widely investigated in the field of meat science as a means of gaining structural information. Polarized light gives additional organizational data and are therefore often used for these applications.

Fourier Transform Infrared (FT-IR) spectroscopy is a fairly new technique for collecting infrared spectra. *Instead of recording the amount of energy absorbed when the infrared light frequency is scanned (monochromator), the IR light is guided through an interferometer.* After passing through the sample, the measured signal is the *interferogram*, a time-domain signal. Performing a mathematical Fourier transform on this signal results in a spectrum identical to that from conventional (dispersive) infrared spectroscopy, and measuring a single spectrum is faster. It has been demonstrated that microstructure changes in salted pork can be detected by FT-IR microspectroscopy (Bocker, Ofstad, Bertram, Egeland, & Kohler, 2006). Uddin, Okazaki, Ahmad, Fukuda, and Tanaka (2006) also investigated protein denaturation and changes in water state in fish–meat gels while heating with IR spectroscopy. Swatland is the only author who used polarized IR light to access structural information on meat. The polarization gives additional information on sample organization that can be exploited to detect cold shortening in pork (Swatland, 1995) and beef (Swatland, 1996). Swatland and Barbut (1995) also showed that myofibrillar near-IR birefringence in turkey meat is correlated with WHC of raw meat and with fluid loss during cooking.

Total Body Electromagnetic Conductivity (TOBEC)

TOBEC utilizes the fact that lean meat conducts electricity better than fat. This technique and technology are over 30 years old, with the EMME

Company (EMME standing for Electronic Meat Measuring Equipment) originally patenting a 'Method and apparatus for measuring fat content in animal tissue either in vivo or in slaughtered and prepared form' in 1973

TOBEC uses a varying electromagnetic field, generated by applying a radiofrequency signal to a solenoid coil, through which the animal or meat products passes longitudinally. Because of difference of electro conductivity and dielectric properties between various body components, the load observed by the source that drives the solenoid coil takes on a different value from that of the empty sample zone. By including other predetermined parameters of the sample, the load difference may be utilized to infer the fat-to-lean ratio to a commercially acceptable standard. Since water content is highly correlated to lean content of meat, either attribute can be inferred.

TOBEC technology has been developed for both meat processing and medical applications. Numerous publications document the investigations of TOBEC for meat-related applications, including the evaluation of carcass composition in pig and lamb carcasses, the prediction of commercial yield and lean in beef hind quarters and pig carcasses, the assessment of live lamb chemical composition and the measurement of compositional differences in hams, loins and bellies in pigs.

NEUGAT

The simultaneous transmission of neutrons and gamma rays (NEUGAT) can be used for measuring the percentage, by weight, of fat in boneless meat. Originally developed by the Institute of Geological and Nuclear Sciences Ltd (IGNS, Wellington, New Zealand), this technology was further developed in the mid 1990s by the Meat Industry Research Institute of New Zealand Inc. (MIRINZ, Hamilton, New Zealand) in conjunction with IGNS under contract to the Meat Research Corporation (Australia).

In essence, a Californium-252 (²⁵²Cf) radiation source can be used to generate a beam, containing approximately 85% of gamma photons and 15% neutron particles that is projected through a sample

of meat containing lean and fat. The number of gamma events detected is proportional to the thickness of the product in the beam, while the ratio of neutrons to gamma photons gives an indication of the proportion of chemical lean in the product.

Microwave characterization

The interaction of microwaves and food products has been exploited for heating in many applications for thawing, cooking and disinfection purposes. Recently, however, there has been an emergence of sensor systems based on the interaction of low-power (microwave sources no more powerful than in mobile phone devices) electromagnetic microwaves with biological matter. In the microwave frequency range (almost 0.3–300 GHz), the dielectric properties of biological tissues are closely correlated with water content and state (Kent & Jason, 1974).

X-ray measurements

X-rays have long been used in medicine and others areas. The principle is to obtain a measurement of the attenuation of the penetrating energy. Different materials have different attenuation properties, and so depending on the level of penetrating energy, it should be possible to obtain quantitative measurements, in particular for bone, lean meat and fat. Multiple technology tools using X-ray beams at different energy levels have been developed, making it possible to discriminate fat, bone and lean meat according to the energy attenuation measured.

Single-Energy X-Ray

Single-energy X-ray systems for measuring meat and meat product composition have been available for many years. These systems operate on the principle of the differential X-ray absorption between lean and fat due to their elemental composition.

X-Ray Based Contaminant Detection

A similar principle is used in systems developed for identifying contaminants in food products. Examples include the Eagle range of X-ray-based food product inspection systems (Heimann Systems GmbH, Frank-furt, Germany), which can detect and reject foreign body contaminants such as metals, glass, stone, bone, PVC, Teflon, and

stainless steel in pumped and packaged meat product streams.

Nuclear magnetic resonance (NMR)

NMR contributes to the characterization of many products, including muscle food. The high costs involved do make it currently difficult to consider installing NMR systems on production lines. The tool nevertheless has a wide range of research applications, particularly for product assessment, and can be seen as a reference method given the richness of measurements obtained.

A review (Bertram & Andersen, 2004) and several papers ([Bertram et al., 2002] and describe the status of NMR applications in meat science and explain the potential and relevance of spectroscopic and relaxation-based methodologies to different topics of importance for meat science. The most widely explored area of NMR in meat science is proton relaxometry. The use of relaxometry has been highly successful due to its ability to characterize water and structural features in heterogeneous systems like meat.

Venturi et al. (2007) showed how NMR spectroscopy can measure water activity in freeze-dried chicken breast meat by studying of the shape of the T_2 relaxogram. Low-field water–proton NMR T_2 relaxometry has been widely used to determine WHC, which is closely linked to myofibrillar structure, for beef Micklander, Peshlov, Purslow, and Engelsen (2002) [Straadt et al., 2007], underlined the ability of NMR to track structural changes in pork during cooking.

Radiation technique

A method and apparatus is disclosed for the contact-free determination of features of quality of a test object selected from meat products. In one embodiment the test object is radiated with a light source. Radiation emanating from the test object is detected to create definite radiation values. These definite radiation values are then analyzed, preferably in comparison to the reference value.

Conclusion

Introducing new technology into the meat industry, at the level of slaughtering, meat cutting, and distribution, is not easy. This segment of the industry is driven by large volumes at a small profit

margin. Although waste reduction, streamlining, and innovations in product development make immediate economic sense, investing in research aimed at improving consumer confidence in the quality of the end product requires a long-term commitment to the future of the industry. But market forces may be slowly pressuring the system toward a change that, when eventually it occurs, is likely to be major, rapid, and chaotic, leading to the extinction of conservative enterprises and the rapid success of more flexible ones. Everyone is aware of the quality revolution that has transformed many aspects of manufacturing, and it is only a matter of time before the same expectations are imposed by consumers on the meat industry. There are clearly many ways to obtain useful information for meat processing from on-line sensors, both in selecting carcasses and in process control.

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Marker Vaccine- A next generation vaccine for control of infectious diseases

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Introduction: Viral diseases are most devastating diseases of both livestock and Poultry industry. As of now, vaccination or stamping out policy is followed for control of infectious diseases. Though the vaccine is a boom tool for control or prevention of viral infections, most of the vaccines are acting only to reduce the clinical signs of viral diseases and it fails to achieve the eradication or control of diseases. Currently two types of vaccines are being used at the field level such as live attenuated and killed vaccine. Both of these vaccines fail in differentiation of infected from vaccinated animal (DIVA). The term DIVA was coined in 1999 by J.T. van oirschot of the Central Veterinary Institute, in the Netherlands. The serological surveillance study of all virus infection in the endemic area is as important as vaccination policy in the control or eradication measure. Since, vaccination fails to differentiate the infected from vaccinated animal, the infected acts as potential carrier and virus shedder in the endemic area. It causes a major impediment for the export of poultry and poultry products. The differentiation of infected from vaccinated is not alone enough but also to identify the vaccinated birds that become infected to fulfill the trade policy of most countries. The recent advances in molecular biology, immunology and understanding of microbial pathogenesis help to develop marker vaccines. The marker vaccine is a type of vaccine, which is produced by either deletion of a particular gene of protein or insertion of heterologous gene or some other gene of immunodominant protein in the vaccine construct. This aids in differentiation of infected animal from vaccinated animal. At present, the development of marker vaccines are being tried against foot and mouth disease (FMD) in cloven hoofed animal,

classical swine fever in pigs, avian Influenza and Newcastle disease in poultry.

Ideal qualities of marker vaccine

- First, it should reduce or prevent clinical disease,
- Second, it should reduce or eliminate virus shedding into the environment from infected birds to prevent the virus shedding to uninfected flocks.
- Third, it should increase the resistance of animals to become infected.

The reduction of virus shedding and increasing resistance to infection can help to break the infection cycle.

Role of Marker vaccine in the development of diagnostic test

Marker vaccine helps to develop diagnostic kit by targeting immunodominant epitope of protein i.e. especially Non-Structural (NS) proteins. The diagnostic test is targeted to quantify serum antibodies against these NS protein. Since, the vaccine construct does not contain gene for NS protein, the vaccinated animal fail to elicit high serum antibody titre against NS protein but the titre is high in infected animal could be a major factor for DIVA strategy. In addition, the insertion of gene of heterologous protein is also tried to develop marker vaccine such as influenza vaccine by replacement of different neuraminidase gene along with hemagglutinin gene.

Marker vaccine against Influenza disease

Influenza viral infection and its vaccination is major impediment for export of poultry and poultry products. The DIVA vaccine strategy helps to overcome these constraints. The following four different DIVA vaccine strategies are being tried against influenza viral infection:

1. Sentinels
2. Subunit vaccines
3. Heterologous NA protein DIVA strategy
4. Non-Structural (NS) protein DIVA strategy

Among four, the heterologous NA protein proved to be a better strategy but the development of an ELISA diagnostic test which provide high sensitivity and high throughput is not currently available.

Marker vaccine against Newcastle disease

Newcastle disease is most devastating viral diseases of poultry. It is caused by Newcastle disease virus (NDV) of Paramyxoviridae family. Recently, the development of marker vaccine against NDV is targeted to find immunodominant epitope of nucleoprotein (NP-IDE) of NDV. In addition, the insertion of S2 glycoprotein of murine hepatitis virus in-frame to replace the NP-IDE of NDV helps to develop NDV based cross-protective marker vaccines. The development of NP peptide based an ELISA test helps to differentiate infected from vaccinated animal, which supports the study of serological surveillance of NDV in the hot spot environment.

Marker vaccine against Foot and Mouth disease

For control of FMD, the whole virus inactivated vaccine is being used in the field condition. Since, the vaccinated animals does not induce more antibody titre against the non-structural proteins of FMD virus such as 2C, 3A, 3B, 3AB, 3ABC and 3D. These proteins are targeted to develop suitable diagnostic test to differentiate clinically /sub clinically infected animals from vaccinated animals. Of which 2C3AB NS protein based an ELISA test proved more sensitive and suitable test for surveillance study of sub clinically infected animals.

Marker vaccine against Pseudorabies

The development of marker vaccine against Aujeszky's disease is achieved by deletion of gene coding for glycoprotein of pseudorabies virus and the development of monoclonal antibody based an ELISA test against glycoprotein E helps to differentiate infected from vaccinated animal. The first Pseudorabies virus marker vaccine licensed in 1988 by the USDA CVB contained a large

deletion in the gX gene which did not affect the immune response to Pseudorabies virus.

Conclusion

The development of marker vaccines against various viral diseases helps to step down the stamping-out policy for the eradication of infectious disease from the endemic area. The developing marker vaccines should decrease the virus shedding and increase the resistance to viral infection and it should clearly distinguish the infected carrier and non-carrier animals to achieve enhanced surveillance of viral infection in the endemic area.

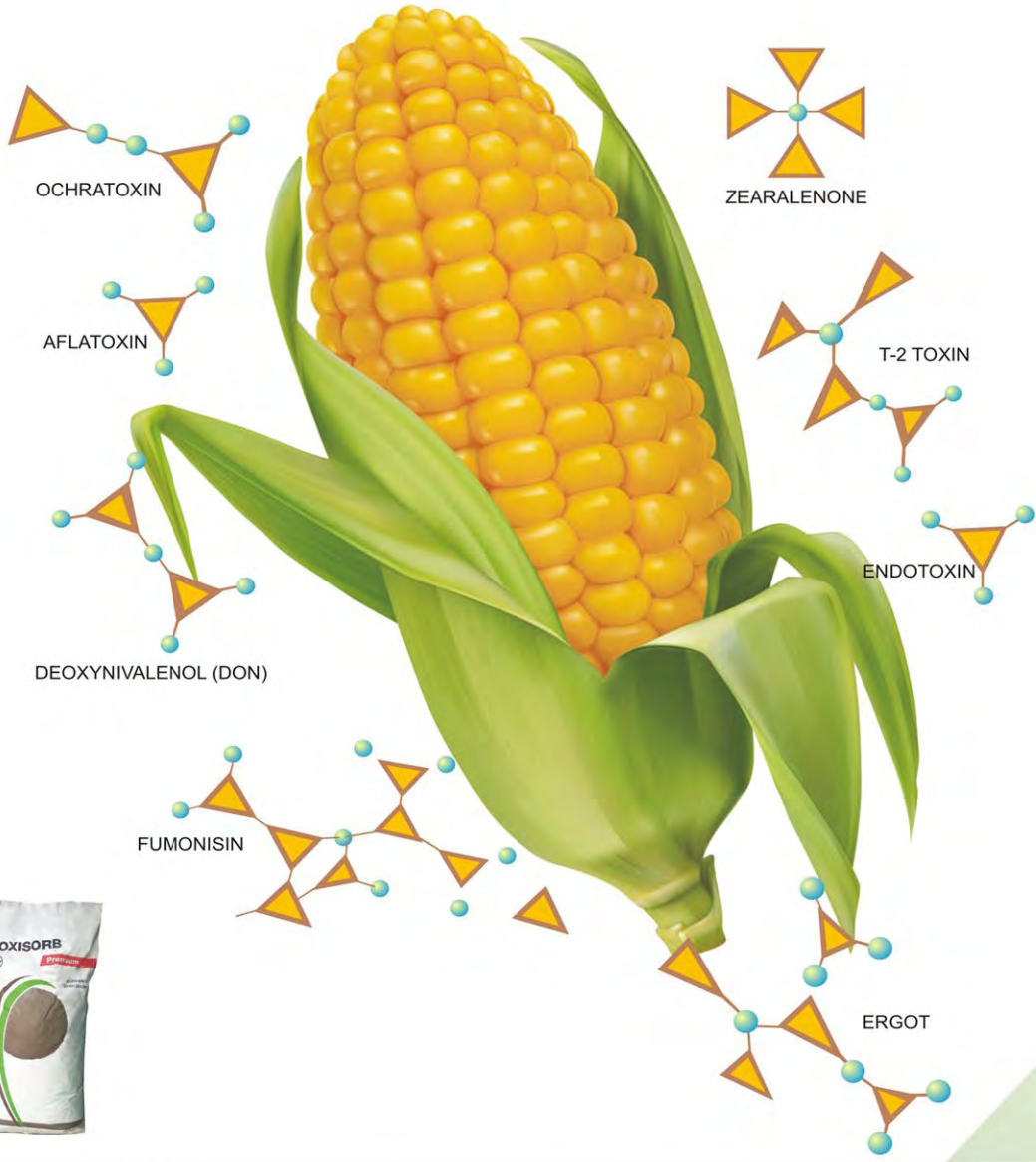
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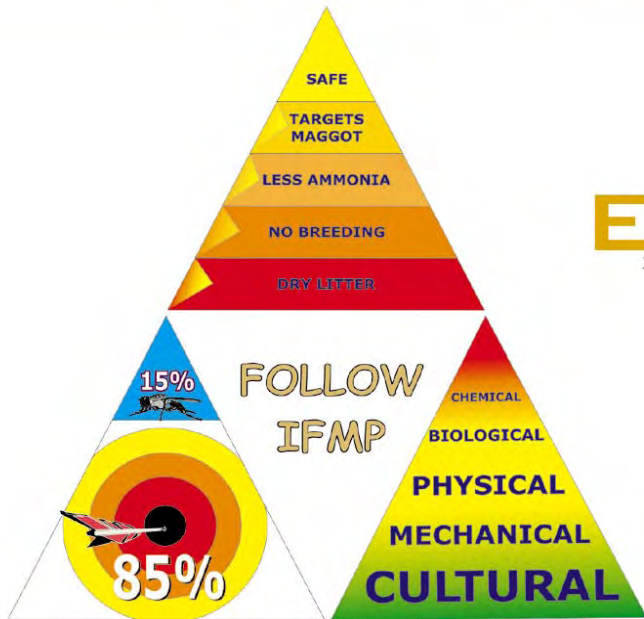


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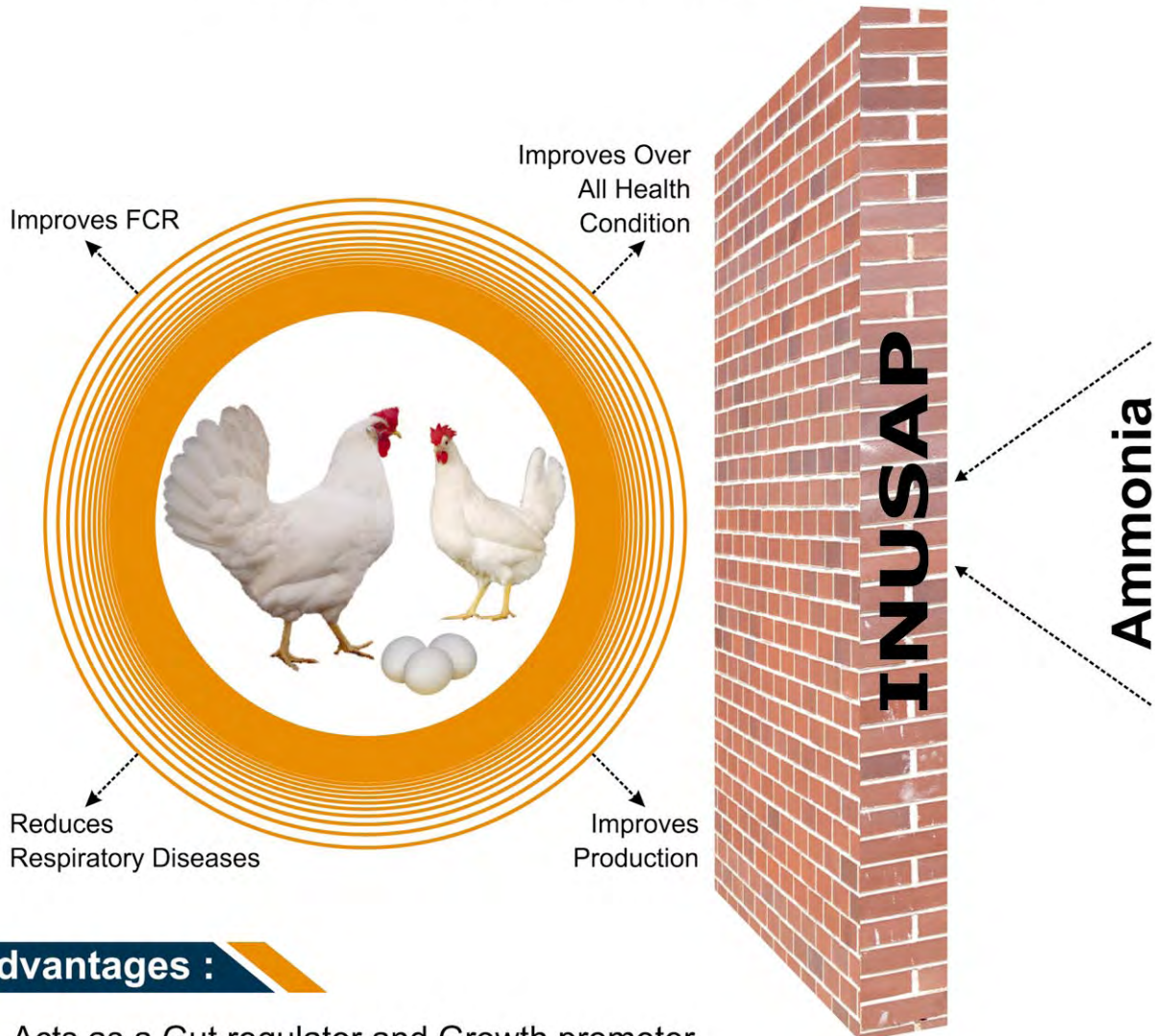


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Bacillus Group Probiotics – Ideal Choice for Poultry Production

Anjan Mondal, Kemin Industries South Asia Pvt. Ltd.

INTRODUCTION: In the last few decades, antibiotic growth promoters (AGP) have been widely used in poultry diet to promote growth, improve feed efficiency and control enteric diseases. Extensive use of antibiotic growth promoter at subtherapeutic doses in poultry diets has the possibility to generate antibiotic resistant pathogens in animal products. Due to the increasing resistance of pathogens to AGP, as well as antibiotic residues in animal products and in the environment, these has been gradually replaced by antibiotic alternatives to modulate gut development and health. Several alternative strategies were initiated to prevent the growth of pathogenic microbes in farm animals to maintain their health and performance. Probiotics are becoming popular as one of the alternatives to antibiotic growth promoter. Probiotics have been defined as live microbial feed supplements which beneficially affect the host animal by enhancing microbial balance of beneficial microbes. The essential goal for adding probiotics in the animal feed is to enhance the production performance of animal and prevention of enteric pathogens. The aim of this review is to describe the role of probiotics in poultry production.

MICROORGANISMS USED AS PROBIOTICS IN POULTRY NUTRITION

Most probiotic products in poultry industry contain single or mixed culture of living microorganisms, which induce beneficial effect on the host. The microorganisms currently being used in probiotic preparations for poultry are varied and numerous (Table-1).

CRITERIA FOR SELECTING AN IDEAL PROBIOTIC

The characteristics of an ideal probiotic are:

- i) Probiotic organisms should be non-pathogenic to animals.
- ii) Probiotic strains should be capable of surviving and metabolizing in the gastrointestinal environment.
- iii) It should be isolated from healthy gut and preferably host-specific strains of beneficial microbes.
- iv) These strains must have short generation time and can produce antimicrobial compounds and modulate the immune response in healthier way.

Table-1: Probiotics commonly used in poultry feed

Microorganisms	Genus	Species
Bacteria	<i>Bacillus</i>	<i>subtilis, amyloliquefaciens, cereus, coagulans, licheniformis, megaterium, mesentericus, natto, polymixa</i>
	<i>Lactobacillus</i>	<i>thermophilus, acidophilus, brevis, bulgaricus, casei, fermentum, gallinarum, jensenii, plantarum, reuteri, rhamnosus, salivarius</i>
	<i>Bifidobacterium</i>	<i>animalis, bifidium, bifidus, thermophilus</i>
	<i>Enterococcus</i>	<i>Faecium</i>
Yeasts	<i>Saccharomyces</i>	<i>bouardii, cerevisiae, faecium, salivarius subsp. Thermophilus</i>
Fungi	<i>Aspergillus</i>	<i>niger, oryzae</i>

- v) The probiotic strains should be stable during conventional industrial processes, maintaining its viability and desirable characteristics.
- vi) These should overcome pelleting temperatures and be compatible with most feed additives.
- vii) The probiotic bacteria must have the ability to grow rapidly on low-cost media for economically viable productions.

MECHANISM OF ACTION OF PROBIOTICS

Probiotic strains have been found to inhibit pathogenic bacteria both *in vitro* and *in vivo* through several different mechanisms. In the poultry the mechanism of action of probiotics is schematized on Fig. 1.

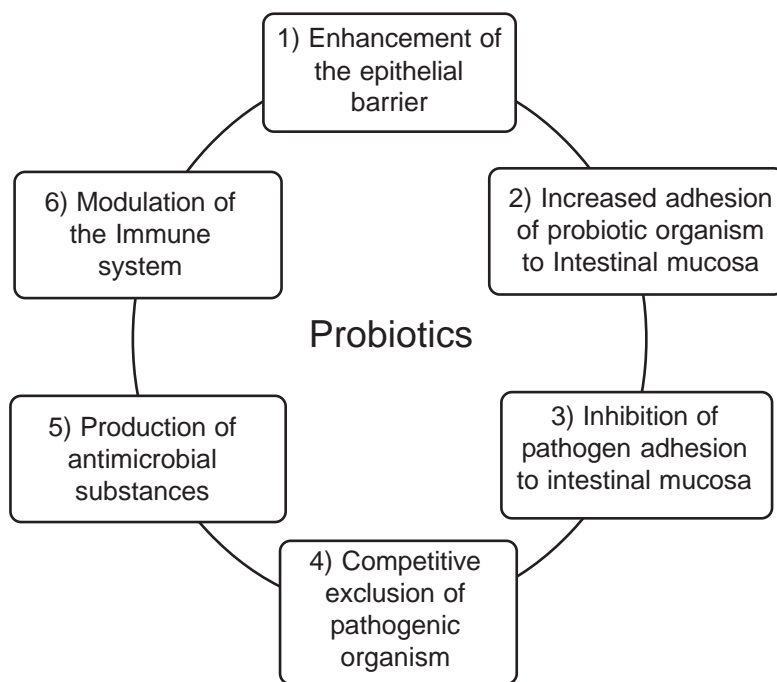


Fig.1: Mechanism of action of probiotics in Poultry

ROLE OF PROBIOTICS IN POULTRY PRODUCTION

DIGESTION AND ABSORPTION

Many studies suggested that dietary supplementation of probiotic has beneficial impact on poultry performances. Probiotics have a

beneficial effect on modulation of gut microflora and pathogen inhibition in poultry. The morphological structure of the intestinal mucosa is an important determinant of gastrointestinal tract function (digestive and absorptive) affecting the growth performance of birds. Generally, increase in villus height and villus height: crypt ratio increases the absorption of nutrients due to larger surface area.

PROBIOTICS AND INTESTINAL IMMUNITY

Probiotics can protect the body from enteric diseases by enhancing gut immunity, improving gut development and altering gut microbiota. Probiotics and their metabolites were found to interact with diverse immune cells, thus playing a vital role as immune modulators. Both innate and adaptive immunity is enhanced by probiotics. Addition of

probiotic in diet prevents chronic inflammation of the GIT through stimulation of innate immunity in the gastro-intestinal epithelium. Probiotics stimulates different subsets of immune system cells to produce cytokines, which in turn play a role in the induction and regulation of immune response. Also, increase in the number of lymphocytes and lymphoid cells in lamina propria and intra-epithelial lymphocytes in small intestine was found to inhibit the growth of infectious organisms. Dietary supplementation of probiotic had a positive effect on serum immunoglobulin (IgA, IgY and IgM) and cell mediated immunity in broiler chicken. The stimulation of cell

mediated immunity would help constantly to fight against viral diseases and can reduce the flock mortality occurring due to immunosuppressive agents. Probiotics have a positive effect on the host immune response through increased activity of macrophages and their enhanced ability of phagocytose organisms with intestinal integrity against enteric pathogens in broilers. Several authors have reported the close relationships

between the gut microflora and intestinal immune system in chickens and other animals.

BACILLUS SPECIES AS PROBIOTICS

The supplementation of *Bacillus subtilis* in diet improved the villus height and villus height: crypt ratio in the intestinal mucosa. This reconstituted the normal structure of chicken intestinal villi, which was distorted and damaged by necrotic enteritis (NE) caused by *Clostridium perfringens*. *Bacillus subtilis* PB6 strain produces a heat-resistant and anti-clostridial factor that could be used to prevent necrotic enteritis. Broiler chickens fed with *Bacillus subtilis* based probiotic tend to reduce *Clostridium perfringens* counts in the large intestine and excreta and *Salmonella* population in the cecum, ileum and excreta. Also, it increased the population of *Lactobacillus spp.* in the cecum, ileum and excreta. Dietary supplementation of *Bacillus subtilis* reduced intestinal lesions in broilers challenged with *Clostridium* and *Eimeria*. It was found that the effect of *Bacillus subtilis* on *Eimeria maxima* infection in broiler chicken reduced the clinical signs of experimental avian coccidiosis. The probiotics maintain poultry gut health and reduce the

shedding of oocysts from infected poultry, thereby controlling the spread of disease.

Bacillus subtilis enhanced gut microflora balance which has the potential to improve gut health and nutrient absorption efficiency and thus improved the growth performance and feed conversion efficiency in broiler chickens. Laying hens fed with *Bacillus subtilis* based probiotic increased hen day egg production, egg weight and improved the egg shell thickness, albumen quality, yolk color when compared to hens fed without probiotics.

CONCLUSION: Probiotics are currently used as an alternative to conventional antibiotic growth promoter in poultry feeds. It improves the gut health, nutrient absorption, increases digestibility, improves growth rate, feed conversion and immune health in poultry. The dietary inclusion of probiotic could be a potential viable solution to address the issues of gut health. Also, supplementation of probiotics is highly beneficial for economic production of poultry. Among the probiotics used in poultry production, *Bacillus* group especially *Bacillus subtilis* PB6 is the ideal choice for improving poultry performance which is well documented in several researches.

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Care of chickens for heat stress in summer months

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Chickens are very sensitive to environmental temperature. Their growth, egg production and health are severely affected during extremes of weather. Therefore, within the economically feasible limits, ideal temperature has to be provided to the birds, in order to obtain optimal growth rate and returns from the birds. This is the time of year when your chickens will need more special attention. Chickens have a much higher body temperature than you or I and will generally feel that rise in heat faster than we will. The average body temperature for a chicken normally will run at 102-103 degrees F. Their heart rate is normally 280-315 beats per minute. Another fact is a rooster will take around 18-20 breaths per minute while a hen is 30-35 breaths per minute. The average life span for an egg laying chicken is around 5-8 years for large breeds such as your Rhode Island Red's but have been known to live 20 years while 'meat' birds only live 1-3 years.

Heat can create more problems for your chickens than cold weather can. It's easy to see they are insulated rather well with many feathers. Chickens fluff up their feathers as many birds will do which traps air between the layers which keep air in as an insulation in cold weather. In warmer weather they seek out shade. You will notice them lay down and spread their wings and bodies out to cool down.

The main way a chicken cools itself though is drinking plenty of cold water.

Since we as humans do not speak chicken 'cluck cluck language' our chickens let us know in other ways such as body language when they are uncomfortable or getting overheated. Number one will be having their mouth open and panting and most often they will have their wings spread somewhat hanging at the sides of the body. They will lay around more. Egg laying will drop.

Chickens will eat less in warm weather. Chickens cannot sweat so they hold their wings open away from their body and pant to release some of that extra heat in the summer. Chickens cool themselves by blood flowing through the comb and wattles which then cools and recirculates back through the interior part of their body. In extreme heat they most often will seek out a shady location to lay and rest.

I've read that adult chickens will start to pant once temperatures reach in the middle 80's. With the heat we have moving through our region now special care is essential to keep a happy and healthy flock. Heat stress factors can be damaging to a chicken's health and well being even leading to death in some cases. We can prevent this by paying close attention and meeting their needs in these conditions.

Table 1. Heat Stress and Ambient Temperature

55° to 75°F	Thermal neutral zone. The temperature range in which the bird does not need to alter its basic metabolic rate or behaviour to maintain its body temperature.
65° to 75°F	Ideal temperature range.
75° to 85°F	A slight reduction in feed consumption can be expected, but if nutrient intake is adequate, production efficiency is good. Egg size may be reduced and shell quality may suffer as temperatures reach the top of this range.

85° to 90°F	Feed consumption falls further. Weight gains are lower. Egg size and shell quality deteriorate. Egg production usually suffers. Cooling procedures should be started before this temperature range is reached.
90° to 95°F	Feed consumption continues to drop. There is some danger of heat prostration among layers, especially the heavier birds and those in full production. At these temperatures, cooling procedures must be carried out.
95° to 100°F	Heat prostration is probable. Emergency measures may be needed. Egg production and feed consumption are severely reduced. Water consumption is very high.
Over 100°F	Emergency measures are needed to cool birds. Survival is the concern at these temperatures.

Adverse Effects

The various physiological and pathological changes that take place in the flock, during high summer temperature are as follows:

1. Energy intake and thereby feed consumption and other nutrients intake reduce as the environmental temperature increases. This is because birds need less energy for maintenance of body temperature, when the ambient temperature is high. Consequently, growth rate and body weight of birds will become lower.
2. There will be early two-fold increase in the water consumption of birds during summer; because during high environmental temperature the major way to lose the excess heat produced in the body is by loss of water vapour through expired air.
3. High ambient temperature increases the respiratory rate and body temperature. Since there are no sweat glands in Poultry, they will start panting vigorously, in order to lose the excess body heat produced. As the outside temperature increases the heat production as well as the heat loss from the body decreases.
4. Decreases oxygen consumption, blood pressure, pulse rate, thyroid size and activity, blood calcium level and body weight.
5. The problems with ectoparasites will be more during summer and the following monsoon. Moreover, high environmental temperature associated with high relative humidity (>70%) may lead to outbreaks of Coccidiosis.

6. Incidences of Fatty Liver Haemorrhagic Syndrome and other metabolic disorders like heat stroke, liver rupture etc. are more during summer; especially in case of heavy broilers.

7. Birds will shed more feathers during summer, in order to lose the excess body heat produced.

At high environmental temperatures, nearing the body temperature of the birds, vapourisation of body water through respired air is the only way to lose substantial amount of heat from the body.

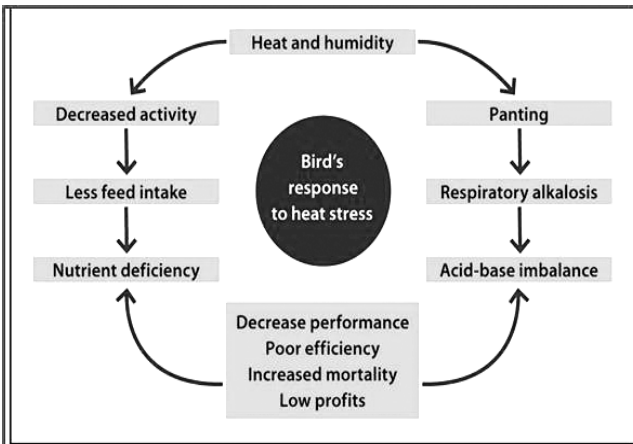
8. Caged birds and birds reared on slatted floors will suffer more due to high environmental temperature than birds reared on litter floors; because birds on litter can cool themselves to some extent by dusting themselves in the litter.

9. Heavy mortality due to heat stroke will be noticed among heavy broilers, in the late afternoon and evening.

10. Temperature also affects egg breakage. Elevated environmental temperature is associated with decrease in shell quality. Reduction of shell thickness produced by heat stress is apparently due to respiratory alkalosis which causes lowering of partial pressure of carbon dioxide in the lungs and raises blood pH. As the ambient temperature increases above 26°C, the egg size declines.

SIGNS OF HEAT STRESS

Like dogs, chicks and grown chickens pant to keep cool—the first sign they need shade and water. With heat stress, they are open mouth panting while spreading their wings and squatting close to the



ground. They are trying to lose heat by adjusting their feather position.

Gasping and panting, spreading wings, lethargic and droopy acting, extremely pale combs and wattles, closed eyes, lying down, drop in egg production, reduced egg size, egg weight, and poor shell quality, increased thirst, decreased appetite, lost body weight, increased cannibalism

CHICKEN HEAT STRESS MANAGEMENT

The above adverse effects due to high environmental temperature can be overcome to a considerable extent by proper management of the flock, house, feed etc. during summer, as indicated below:

Housing:

By proper roofing, the temperature inside the poultry houses can be kept at 5° - 10°C below the outside temperature.



Thatched roofing of about six inches thickness provides

optimum comfort to the birds during summer, than any other roofing material.

In large farms, aluminium roof is preferred due to its durability, resale value and rear reflecting properties. In case of non-insulated houses, the roof must be raised to a sufficient height from the floor level; The eaves at the roof shall project out

at least one metre on all the four sides as overhang to prevent direct sun light and rain water entering into the house.

Provide “ridge-ventilation” such as “half-monitor” or “full monitor”.

In tropics, in order to prevent direct sun light falling into poultry houses, the long axis of the houses have to face north and south i.e. the houses must be orientated east to west; with a slight tilt towards southern side in the east and towards north in the west. Open type, cross-ventilation is recommended in tropics. Except for a 20cm height wall, all the four sides upto the roof should be provided with 12mm size and 18 gauge chicken wire mesh or 25mm size chain link mesh. As far as possible the width of poultry houses shall not exceed 10 metres. If the width of the poultry house exceeds 10 metres, cross-ventilation alone may not be effective in providing proper air flow in poultry houses. Roof vents will help in removing trapped heat around the ceiling. If you have electric in the house providing a fan will help in circulating air flow.

Having constant air flow is a must. Grow “fast-growing” shady trees around poultry houses in order to reduce the severity of the summer heat waves and also to break wind drafts during monsoon. Provide tunnel ventilation along with pad coolers and/or foggers, to produce evaporative cooling. Sprinklers may be fixed on the top of the roof and operated continuously from 10 to 18 hours, to cool the roof. A thermometer is an essential tool to have in the house to monitor the heat conditions. All window should be open for air circulation. Thick bedding such as pine shavings can be a heat absorber and should be used more sparingly having only an inch or so in thickness, but more thick and wet litter produce/ generates more heat. Therefore, during summer, the litter thickness must not be more than 6cm. Rear relatively more heat tolerant strains of broilers suitable for tropical climate. Heat tolerant breeds: Andalusian, Aseel/ Asil, Brahma, Delaware, Leghorn, Minorca, Rhode Island Red and Sumatra etc.

Water:

This is the time to have additional amounts of water available for your chickens. In high heat conditions chickens will drink twice as much water. Try keeping extra pails of water available for your flock both in the coop and outside as well.

Having more than one source of water for chickens also helps in preventing fights between them over 'who gets to drink first'. Place pans around the yard so chickens do not have to walk too far to find it. This will encourage them to drink more and more often. Make sure the water is clean and fresh!

The best rule to live by is replacing the water daily so it is always fresh and cool. Chickens will drink more water if it is cool rather than warm. During hot weather algae is more likely to grow so remember to clean out the water bowls more often too.

Feeding:

Since feed consumption generate more body heat, avoid feeding broilers over four weeks of age, during hot weather. If automatic winchable feeders are used, lift the feeders between 9 and 18 hours. Nearly 10 to 15% of the calories (energy) in the feed, of carbohydrate and protein origin, may be replaced by fat /oil energy, by adding 2 to 3% oil or fat. **In extreme heat** chickens eat less so it is important to feed them during the coolest part of the day. Remember digestion produces more heat. Addition of 0.48 percent potassium chloride to water lowered heat stress in layers. Add 1kg of sodium bicarbonate to one tonne of feed to lower heat stroke and to increase shell thickness. Two kg of sodium bicarbonate may be added to one tonne of feed.

Drugs and Chemicals:

Like electrolytes, ascorbic acid, sodium bicarbonate, tranquilisers, sodium salicylate, paracetamol, chlorpromazine hydrochloride, cyproheptadine hydrochloride may be administered through feed or water, to make the birds to withstand hot weather.

Different ways of cooling off Chickens

Provide frozen water bottles. Frozen water bottles can be placed in the bedding inside the coop. They can be placed in the water pans to keep the water nice and cold. 2-liter bottles are wonderful to use. Hosing off the coop. Take the hose and apply water to the walls and roof of the coop in extreme heat conditions. Hose the run area early in the morning paying special attention however that the chickens are not standing in the water which can lead to foot problems.

Providing Electrolytes:

When a chicken pants it will alter their electrolytes, so adding electrolytes to the water will aid in rebalancing. This will increase the chickens drinking habits making them drink more water which they need in extreme heat conditions. When supplementing the water with anything it is always important to speak with your vet or health specialist.

Provide evaporative cooling:

Water misters and foggers can be used. Providing water on chickens helps to cool them off in high heat conditions.

Avoid overcrowding:

Overcrowding increases heat. Provide plenty of room for your chickens to move freely. Provide shade in as many areas as possible. Try not disturbing your chickens in the middle of the day.

They need to do their own thing and rest when they can.

Free ranging:

Taller grass, shrubs and weeds prevent air flow. Make sure they have plenty of places where the grass is short and shady locations. Make sure you are providing plenty of fresh, clean cold water.

Provision of chilled or frozen fruits and vegetables:

Providing chilled fruits and veggies will help in cooling off your chickens. Avoid grains such as corn which are high in starch content during extreme heat conditions. High starch content grains will heat up a chicken's body temperature.



Note: Never give heat stressed chickens apple cider vinegar. Only give to chickens with no signs of heat stress.

Provide a dirt area:

Providing loose dirt that has been watered down and allowed to drain will be a cool area they can lay in and dirt bathe. A chicken likes nothing better than rolling around in cool dirt! Try to have plenty of these areas so all your chickens have space to cool off.

Leave your chickens alone:

As much as we love our chickens and want to be around them it is best to leave them alone during extreme heat conditions. At this time you want to keep stress levels down as low as possible. Let them do their own thing. Avoid picking them up which will increase their body temperature. Only monitor them during hot weather for signs of excess heat stress.

CONCLUSION

Poultry are prone to heat stress during periods of high temperatures and humidity. All chickens are susceptible to heat stress, but particularly older birds. They don't have sweat glands to cool their skin, so they rely on their respiratory system. To compensate, they pant to cool themselves, as the panting evaporates water from the throat to lower their body temperature. High temperatures and humidity levels cause reduced growth rates, egg production and hatching rates. Managing the effects of heat stress is challenging, but necessary for poultry producers.

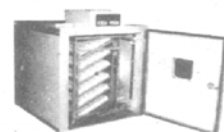
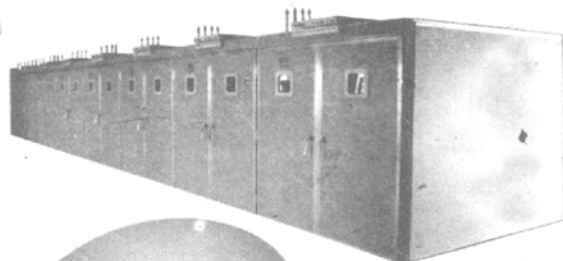
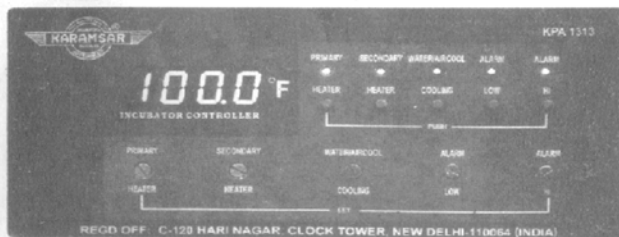


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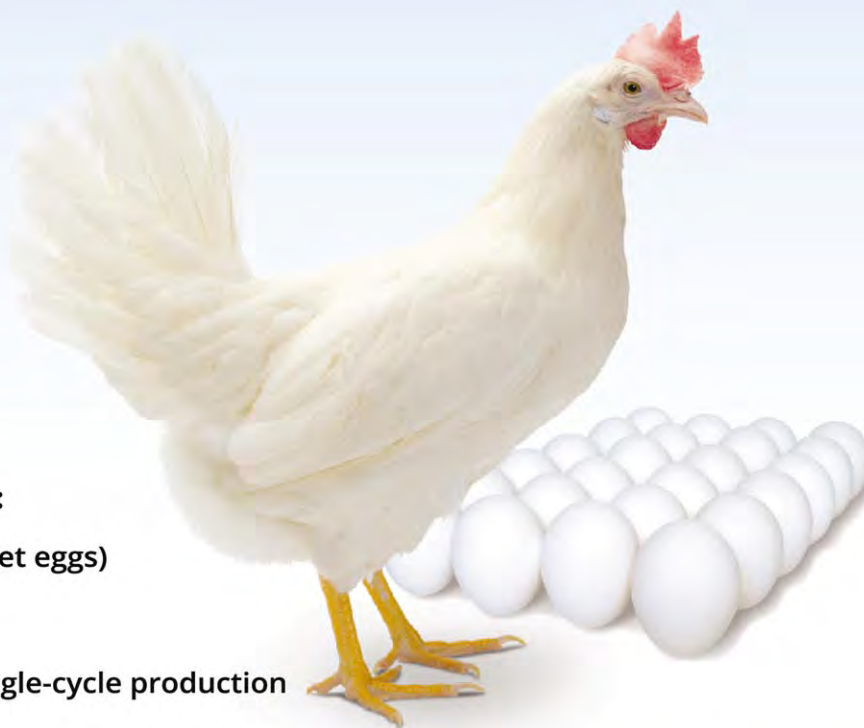
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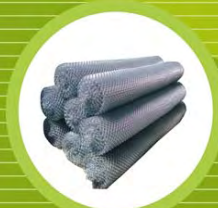
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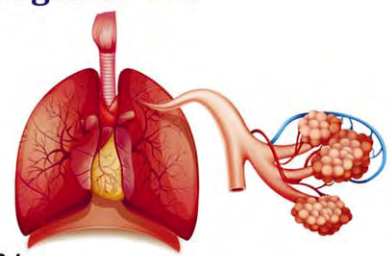
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Alltech expands its base by opening new manufacturing facility in Pune, India

Will also be home to Asia's largest organic trace mineral manufacturing



[PUNE, India] – Alltech, the global leader in animal nutrition, has officially opened its state of the art manufacturing plant in Pune, India on 27th October, 2018. The opening ceremony was joined by more than 150 stakeholders from animal industry, this plant is designed to satisfy the needs of Alltech's customers in the region and will be the largest organic trace mineral plant in Asia.

Alltech India, started its office in 2001 and its production operations in India in 2004 in Bengaluru. Over the years, the company has grown twenty-fold, serving poultry, dairy, aqua feed millers and farmers to improve their efficiency and profitability

“When we outgrew our plant capacity in 2016 and decided to expand our business and invest in a bigger plant, Pune was the first choice,” said Dr. Mark Lyons, President and CEO Alltech. “Pune is one of India's fastest-growing cities. With a cosmopolitan population of over proximity to the port and speedy development this was an ideal place for us to be able to cater to our customers in a faster and more effective way.”

The Pune facility was designed to cater not only to the local market, but to South and Southeast Asia, Australia and Europe as well. The plant spreads over a total area of 132,000 square feet, this will be 101st manufacturing facility for Alltech globally.



The plant is equipped with features such as natural gas as its energy source for reducing carbon emissions, fire hydrant systems ensuring safety, and segregated docks for raw material and finished products, enabling free movement of vehicles and clear demarcation and traceability of material in and out of the facility. "The dream of Make in India is now a reality". said Dr. Aman Sayed, managing director of Alltech India and regional director of South Asia.

Along with these notable features, the Pune facility is also scientifically equipped and advanced.

"We have a fully-fledged lab for testing our raw materials and finished goods internally, ensuring

that they meet the quality standards and guarantees before being shipped out to customers," said Raghu Sarakki, quality manager South Asia . "We are required to follow the Alltech® Quality System and our Alltech Q+™ (Quality Plus) program, ensuring the quality, safety and traceability of every batch of product manufactured here." The facility will soon obtain certifications such as ISO22000:2005 (for food safety management), FAMI-QS certification (for European food standards) and ISO14000:2015 (for environmental management).

"The Chakan industrial area is considered as one of the best," added Dr Aman Sayed "MIDC has



developed this area, which stretches 246 hectares, with basic as well as high grade-quality facilities. Over 750 large and small industries, including a number of automobile component manufacturers, are based in the area.”

While addressing the audience Dr. Mark said Alltech intends to continue investment, follow its ACE Principle and job creation in the future while contributing to development as part of its efforts to strengthen its business foundation in this emerging market.





Volschendorf organizes technical seminar at Rasipuram



Dr Mangesh Sagar welcoming the audience

Volschendorf Enterprise Pvt. Ltd. conducted technical seminar at Rasipuram, Tamilnadu on 11th October 2018. Dr. Mangesh Sagar, Director-Sales & marketing presented a flowery welcome to the guest of honour, Mr. Bart Boomsma, Technical Manager Nutrition , R & D and also Mr. Clemens Gerris Business Manager, Palital Feed Additives. He also welcomed the eminent poultry farmers of Rasipuram area. Dr Onkar Pawaskar M.D., Volschendorf & Dr. Mohita Gautam, Business Development Officer, Volschendorf were also present for the Technical Seminar.

Mr. Bart Boomsma guest speaker presented an excellent speech on importance of healthy gut and in turn importance of coated butyric acid over other short chain fatty acids. He also emphasized the importance of maintaining normal microfloral number inside the poultry gut. He mentioned the need of more and more concept based products with continuous



Mr Bart Boomsma, guest speaker during his presentation

R&D in coming years to face the challenges in poultry farming.

Volschendorf is an official partner of Palital, Netherlands has an expertise in coating technology. Palital products Intest Plus SC40 and Intest Plus - Quattro are matrix encapsulated, concentrated forms of sodium & calcium butyrate in pellet form. Intest plus SC40 and Intest plus- Quattro includes improving intestinal integrity and GIT functionality. Intest plus optimizes and creates balance between the intestinal microflora. Most importantly, it has a direct and indirect antibacterial effect against the pathogenic bacteria. Intest Plus has its uniqueness in its target action in digestive tract.

Mr Nainamalai, Area Sales Manager for Volschendorf, concluded the seminar by giving vote of thanks. The session was followed by cocktail & sumptuous dinner.



Eminent farmers at the seminar



Team Palital & Volschendorf

BIOMIN Mycotoxin Academy A Resounding Success in Myanmar

Over 150 professionals from leading companies in the feed and livestock sector participated in the Mycotoxin Academy held across three major cities in Myanmar - Yangon, Mandalay and Taunggyi - from 30 October to 1 November 2018.

Building on the success of the Mycotoxin Academy series that recently concluded in India, BIOMIN expanded the geographical reach of the series to Myanmar, and welcomed more than 150 delegates at this much-anticipated multi-city conference held across three days.

The Mycotoxin Academy kicked off in Yangon, capital of the Yangon Region of Myanmar, on 30 October. The next stop was Mandalay, the second-largest city of Myanmar, and we were honored to have Dr. Kyaw Htin, Chairman of Mandalay's Livestock Development Committee, open the conference on 31 October. The conference concluded successfully on 1 November in Taunggyi, the capital and largest city of Shan State in the country.

True to the spirit of the Mycotoxin Academy, conceived to facilitate knowledge transfer between BIOMIN experts and professionals from the feed and livestock industry, the series continued its focus on raising the awareness of mycotoxins, and innovative ways on mycotoxin risk management.

Safe, affordable and sustainable animal production amid booming protein economy

Mr. Edward Manchester, BIOMIN Asia-Pacific Regional Director, explained why BIOMIN chose to bring the Mycotoxin Academy to Myanmar: "We believe in the vast opportunities in Myanmar as the country opens up its economy. According to The International Monetary Fund (IMF), Myanmar's GDP is estimated to be 6.7%, on the back of the country's booming agriculture sector. This is a significant jump compared to the 5.9% recorded in



the previous year. In addition, the country is also experiencing an increasing demand for animal protein such as meat and eggs, amid growing affluence. The positive response we have received from the Mycotoxin Academy is a very encouraging sign."

Dr. Justin Tan, BIOMIN Asia-Pacific Regional Sales & Marketing Director, agreed. He commented: "Growing incomes provide opportunities for the feed and livestock industry, but animal production must be safe, affordable and sustainable. BIOMIN is at the forefront of driving the animal protein economy, evident in the themes of the Asia Nutrition Forum and World Nutrition Forum. We are excited to bring our innovation and science-backed expertise in mycotoxin risk management and gut performance management to Myanmar."

The mycotoxin threat in animal production is real

During his presentation at the Mycotoxin Academy, Dr. Justin Tan delivered the latest [BIOMIN Global Mycotoxin Survey](#)

results, which highlighted the prevalence of mycotoxins in raw materials and finished feed. Next, he explained the effects and impact of mycotoxin contamination in animal production. Due to the complexity of modern day animal production and the nature of mycotoxins, an effective way to counteract the risks associated with mycotoxins is to adopt a three-pronged strategy. This is built on the concepts of Adsorption, Biotransformation and Bioprotection. In particular, the Mycofix® Plus product line has been proven to irreversibly bind and deactivate different types of field and storage mycotoxins, while protecting against liver damage and boosting the immune system of the animal.

Dr. Gangga Widyandugraha, BIOMIN Asia-Pacific Regional Technical Sales Manager and poultry expert, took to the stage next to showcase the actual cases of mycotoxicoses collected from field postmortem analyses that he personally conducted in Myanmar. Delegates were deeply intrigued by the findings, and it was clear as day that the mycotoxin threat is real. The Mycotoxin Academy

concluded with a group dinner at each stop, which allowed attendees to gain expert advice and network with industry peers.



Final day of the Mycotoxin Academy series with delegates in Taunggyi, the fifth largest city of Myanmar

BIOMIN looks forward to growing its presence in Myanmar, and continue delivering innovative solutions to producers. BIOMIN will be present at the upcoming Agrilivestock Myanmar, held from 6-8 December 2018, with a booth and a series of technical presentations.

M.A. Waheed



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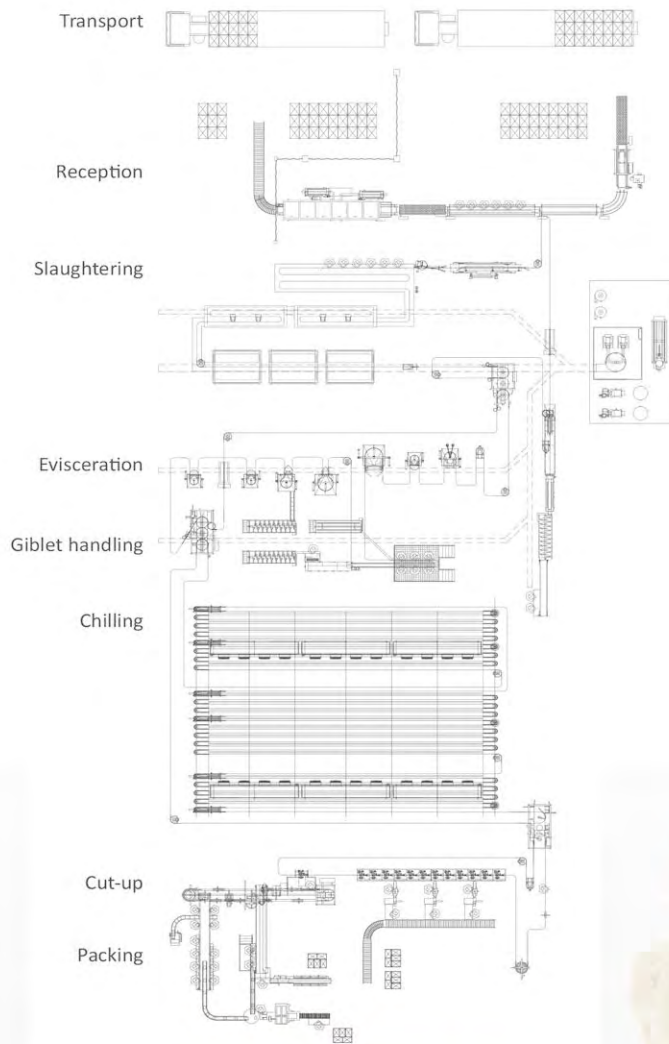
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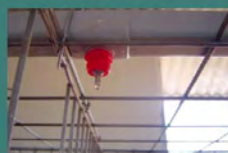
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Evaluating Ammonia Binders - B50 Value

A Critical Test To Evaluate Ammonia Binding Capacity

Poultry industry is one of the fastest growing sectors in India today. Though the growth rate is high, the poultry industry regularly faces different types of challenges. Out of all the challenges, ammonia emission is one of the major ones the industry is facing, especially in the winter season. Ammonia is a colourless gas produced by the microbial decomposition of organic nitrogen compounds found in the manure. It is highly soluble in water and very toxic. It has a direct negative effect on the birds and farm workers.

There are several ways to control ammonia in the farm that includes ventilation, dietary management, litter management, feed additives etc. All these methods have some merits and demerits. Though ventilation is one of the most economical methods to control ammonia, its limitation is that it is completely dependent upon the external environmental conditions. Good sunlight with proper airflow makes it more effective. In winter season, when farms are completely covered with curtains this method is not effective. Similarly, in dietary management, specialists are required to reformulate the nutrient content in the feed on a regular basis.

To overcome these limitations and to control ammonia, one of the convenient and safe methods is the use of Yucca extracts as a feed additive. Yucca extract is obtained from the Yucca schidigera plant. This plant contains some active components like saponins and glycocomponents. Saponin helps to increase the permeability of the intestinal wall, thus allowing better nutrient absorption of the feed. Glycocomponents helps bind and neutralize ammonia. Yucca extract is very effective in binding of ammonia but most important point to be considered is its potency and therefore the required inclusion level to neutralize ammonia. The potency of any Yucca Extract is measured by its B50 value.

AMMONIA AND ASSOCIATED RISKS IN POULTRY FARMING

Ammonia accumulation in poultry sheds is a common challenge especially during winter season because of limited ventilation. Ammonia accumulation can also occur due to the usage of old litter for a long period. Ammonia is a highly irritating, colourless gas having

a sharp pungent odour. It is produced by the breakdown of uric acid present in the manure by bacteria. Temperature and moisture act as catalysts in this process. Ammonia is harmful both for birds and humans.

Harmful effects of Ammonia:

High level of ammonia is found to depress feed consumption, body weight gain, onset of sexual maturity and egg production.

Petkov (1966) has reported as much as 9% drop in egg production upon two-month exposure to high NH₃ levels.

Birds show watery eyes, closed eyelids and rubbing of eyes with wings due to irritating nature of ammonia.

Due to high ammonia levels, egg white also starts deteriorating and there is discolouration of egg yolk which reduces the market value of the egg.

Birds exposed to higher ammonia levels develop kerato conjunctivitis, air sacculitis, and show reduced respiratory rate and increased susceptibility to coccidiosis and various respiratory diseases due to damaged ciliary and epithelial lining of the respiratory tract.

Poor carcass quality in terms of increased breast blisters has been reported in broilers.

Ammonia is a potent immune-suppressant, and therefore, lesser the quantity liberated within the system of bird or animal, the better the health and healthier the environment.

Ideal solution to ammonia problem:

There are various approaches available to control ammonia. Dietary treatment seems to be most logical in terms of efficacy and convenience. Any dietary ammonia binder should have the following properties:

- It should inhibit Urease enzyme
- It should bind preformed ammonia
- It should be effective in the gut as well as in the litter

BIOPOWDER

Biopowder is a 100% natural and organic product, produced by the milling, pulverizing and standardization of stems of the *Yucca schidigera* plant.

Biopowder reduces and controls ammonia which affects the performance of birds. It improves productive parameters increasing the weight and increasing efficiency in production performance.

Biopowder has two active components, Saponins and Glycocomponents.

Saponins:

- Saponins do not allow the uric acid to get converted into ammonia, by binding with urease inside the cell.
- Saponins also work as a surfactant, and reduce the surface tension, thereby enhancing the absorption of nutrients
- Improve the microbial activity in the GIT
- Improve digestion

Glycocomponents:

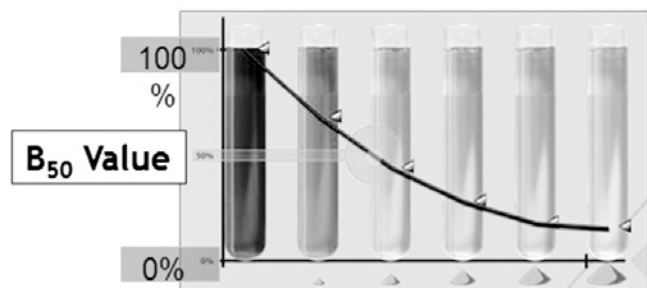
- Glycocomponents bind directly with ammonia in the digestive tract, and remove it from the system, improving intestinal conditions
- They also continue to act in the environment by binding with ammonia and preventing its release into the air thereby maintaining a healthy environment within the shed

EVALUATION OF EFFICACY OF AN IDEAL AMMONIA BINDER

Nowadays, there are quite a few products available in the market based on Yucca. While selecting, one should ask for B50 value as it is a true indicator of the efficacy of product. It is also important that the extract should be specifically from the Yucca schidigera plant. There are many species of Yucca, but the extract from Yucca schidigera is considered to be the most ideal one in terms of efficacy and performance.

B50 Value:

Several commercially available ammonia binders are either diluted or contain non-Yuccaschidigera components. These products can easily be identified by testing the B50 value of the product.

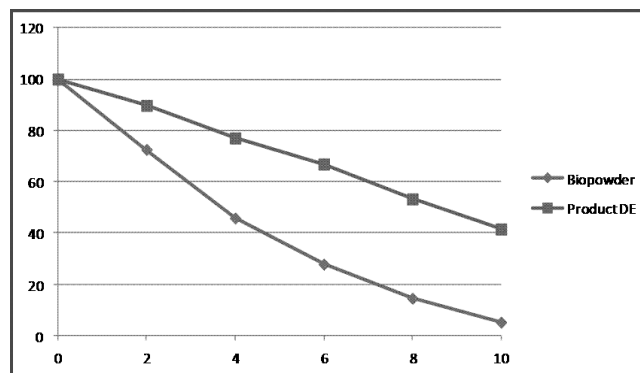


The B50 value indicates the milligrams of a Yucca extract necessary to reduce 50% of ammonia in aqueous solution.

In the B50 value test, it is the amount of Yucca extract required to bind 50% of ammonia produced by 0.2 milliliter of a 5 millimolar solution of ammonium sulphate. The result is interpreted by the change in the colour (blue to light blue) of the solution. Biopowder guarantees a B50 value of less than 5.0 mg. Lower the B50 value, better is the ammonia binding property.

Also lower the B50 value, lower is the product's inclusion required to bind the same quantity of ammonia. Biopowder is generally recommended to be included into finished feeds at a standard inclusion of 100 grams/MT of feed and therefore the product offers the best 'value proposition' in terms of investment to return.

COMPARISON OF B50 VALUES OF A COMPETING BRAND WITH BIOPOWDER



In a comparative study B50 value of Biopowder and a competing brand was conducted.

Results of study indicate that Biopowder has a B50 value of 3.6 mg whereas product DE has a value of 8.6 mg.

Which means that to bind with a quantity of Ammonia, if 3.6 mg of Biopowder is needed, then for same performance 8.6 mg of other brand is required which means that ammonia binding capacity of Biopowder is 2.4 times more as compared to another product. As per the comparison, Biopowder is far more cost effective and efficacious as compared to product DE.

For any additional information, please contact

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PRESS RELEASE



KAI Celebrates World Quality Day

On 08 November 2018, KAI celebrated World Quality Day for the fourth consecutive year at Gummidipoondi factory, India. The motto of celebrating World Quality Day is to create quality awareness and promote quality culture in the organization, which helps to serve our customers in best way with our quality products and services. All the employees in the factory actively participated in the celebration and a huge number of creations received from the participants were displayed in the celebration, which shows the level of awareness about the importance of quality within the organization. Dr. R. Sureshkumar, KAI President, Dr. Haridasan Chirakkal, KAI Vice President - R&D, George Joseph, KAI Vice President - Operations and other executives of KAI delivered speeches about the importance and positive impact of quality and trust towards our business success and organizational growth.

Various contests like quizzes, posters, presentations, essays and slogan were held among operators, staff and children. Winners were recognized in the event and prizes were distributed.

World Quality Day is celebrated globally on the second Thursday of November each year. The theme for this year is “**Quality: A question of trust**” which mainly focuses on unique role of quality profession in maintaining trust plays a vital part in building and sustaining trust for all stakeholders: customers, suppliers, staff, regulators, shareholders and society. The quality management profession is about helping our organization by improving business performance, development through ensuring trust for our customers and stakeholders. The team is pictured here planting a tree in recognition of the day.

For more information, contact Dr. R. Pappathi, Head - QA/RA.

PRESS RELEASE

Appointment of new Executive Director at Avitech Nutrition



responsibility he was serving Avitech Nutrition as Director Commercial. In his role as Executive Director Mr. Malhotra assumes full charge of the company.

Avitech Nutrition has appointed Mr. Sanjiv Malhotra as Executive Director from 12th October 2018. Mr. Malhotra has been part of Avitech Nutrition team for the last 18 years and prior to assuming this

Mr. Sanjiv Malhotra brings with him deep experience in the field of animal nutrition feed industry and is well equipped to guide Avitech Nutrition to its next phase of growth in the domestic market as well as international markets. Mr. Malhotra will report to a Board of Directors led by Mr. Rahul Kapur.

Contact us: Avitech Nutrition Pvt. Ltd
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PRESS RELEASE

Launch of World Veterinary Poultry Association (India)



26th Oct 2018, Kochi

The World Veterinary Poultry Association (WVPA) is a global organization of professional body for poultry veterinarians and poultry professionals for the benefit of Poultry industry. The objective of the Association is to bring the academicians, researchers, industry professionals to a common platform for discussion and exchange of ideas amongst those engaged in veterinary aspects of poultry health, welfare, disease, husbandry and food safety and has its regional branches in more than 60 countries. On 26th October, 2018 Dr Nigel Horrax, Global President WVPA officially announce launch of its new branch in India World Poultry Association (India). WVPA (India) is a newly formed not-for-profit organization designed to act in the best interests of the Indian Poultry Industry.

The Association shall be to facilitate discussion and exchange of ideas amongst those engaged in veterinary aspects of poultry health, welfare, disease, husbandry and food safety. The Association will intend to provide common Platform for the professionals from the Academia, research and Industry related to the Poultry Industry and effective input for the policy decisions for benefit of Indian Poultry Industry. The Association shall hold not less than one meetings each year, one of which shall be linked to the Annual General Meeting.



The Office of the Association shall be with one President, three Senior Vice President, one Secretary, one Joint Secretary and one Public Relations Office and one Treasurer and members. Current office is headed by Dr Jeetendra Verma as the President of WVPA (India) and three Vice Presidents Dr Ajit Ranade, Dr Pankaj Shukla and Dr Sailendra Das; Secretary Dr Shirish Nigam; Joint Secretary cum PRO Dr Bichitra Barman; Treasurer Dr P G Phalke and members Dr D Nagalakshmi & Dr Dinesh Kumar Arora. All these members of the office of the association were selected from the Academia, Research and Industry.

Membership for WVPA (India) is open for the Poultry Veterinary Professionals from academia, research and industry that can be applied through the web portal www.wvpa.in

Life membership will be awarded to the selected nominees on the basis of their contribution and affiliation with Indian Poultry Industry and its selection will be made by the Executive Committee, for details are available on the website of WVPA (India)

The Association's By-laws, to be independent, having no material financial interest in any Member. WVPA (India) will be intent on building positive relationships with all industry players, and both levels of policy makers, academic, research and Industry.

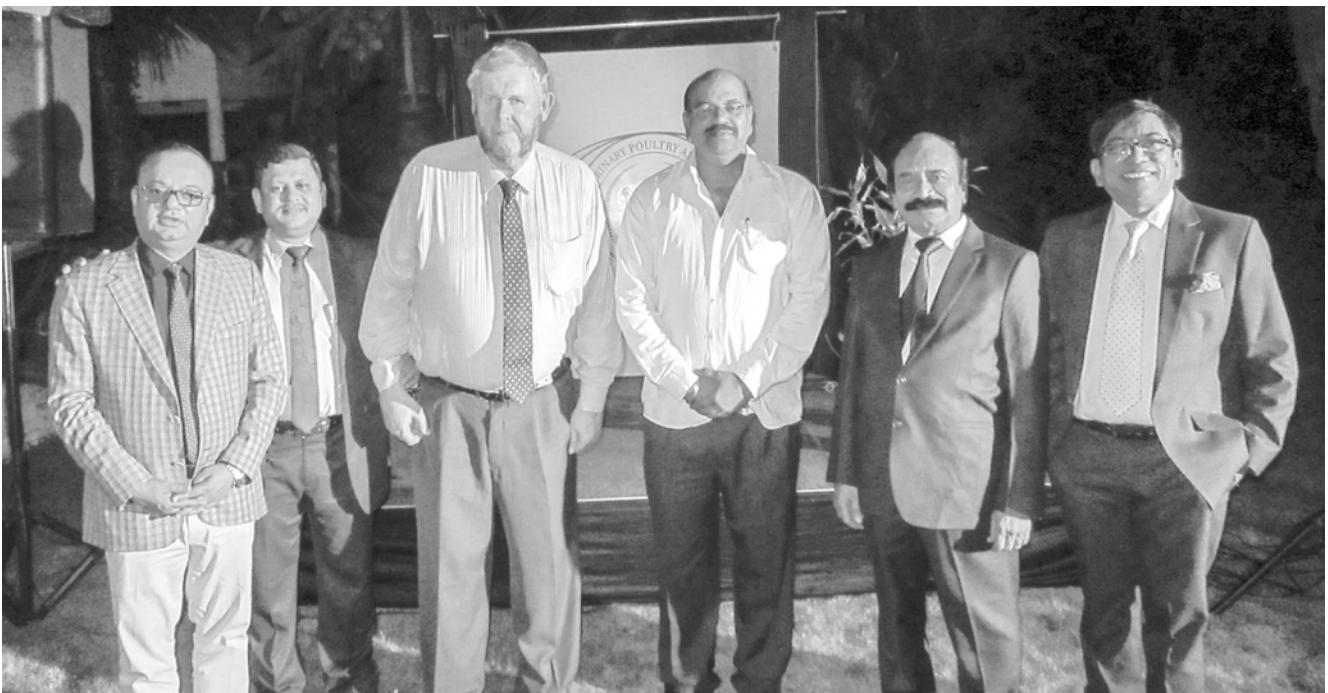


The launch of WVPA (India) held at Hotel Le Meridian, Kochi India in conjunction with the VIV Leadership Forum 2018. Dr Nigel in his speech narrated the role of WVPA Global branch and explained how the regional branch will get guidance and exposure from the global network WVPA and its resources. Dr Verma welcomed all the guests and Dr Nigam expressed the experience and the difficulties while establishing and registering WVPA (India). Dr Barman detailed the audience about the objectives, mandates and future plans and activities of WVPA (India). The Association is going to hold two meetings each year, one of which shall as per the mandate of WVPA Global and will be linked with annual general meeting and the other will be

related with current burning issues of the Industry. Dr Barman also stated that WVPA (India) is going to organize one-day technical seminar on Avian Influenza during 1st week of February 2019 with delegation from global experts and Indian scientists.

Dr Ranade expressed how this WVPA (India) will link the scientific brain and industry for the betterment of the Industry. Dr Phalke expressed vote of thanks to all the participants. Mr Manjesh Jadav, General Manager VHPL, expressed that WVPA (India) will help Indian Industry with better collaboration of research and applied science.

The launch ceremony was attended by leading personalities from India and Aboard namely Mr Vasanth Kumar, Mr Ruwan, Mr Lakshmanan, Mr RajendraThorat, Mr Raju Bhosle, Mr Suresh Rayudu Chitturi, Noud Janssen, Nan-Dirk Mulder, John Kirkpatrick, Ashok Lalla, Dr Sujit Menon, Dr Tawan Van Gerwe, Sanjay Naglikar, Dr Selva Kumar, Mr GiridharKothwar, Mr Somu Kumar, Mr Ramkutty, Mr. Rajeevan and many more. The gathering voiced that WVPA (India) will create new height for the service of Indian Poultry Industry and every one expressed their willingness to cooperate for the success of newly launched WVPA (India)



Maternal Immunity in Birds

Dr.K.L.Revappa, Dr.S.K.Maini and Dr Suresh Sharma

Vaccine Division, Vesper Pharmaceuticals, Soleddevanhalli, Bengaluru

Maternal immune protective factors transferred across the placenta, colostrum or eggs from mother to offspring's play a key role to protect the new born against pathogenic attacks. This protective action is called "Maternal Immunity", which was first described in mammals and birds more than 100 years ago, (Eirlich, 1892).

The maternal immunity has been reported in a broad range of vertebrates such as mammals, birds, reptiles, fishes and as well as invertebrates such as insects, shrimp and amphibians (Zhang *et al.*, 2013). In case of birds passive immunity has a relatively short duration, commonly 1 – 2 weeks and generally less than 4 weeks and its function is to protect young ones during a period of first few weeks when their immune system is not fully developed to react themselves to an early challenge by any pathogen.

Major components of maternally derived immune protective factors are immunoglobulin's (Igs). In mammals, maternal Igs are transferred to foetus and the new born through placenta and breast milk respectively. In birds, maternal Igs are incorporated into egg yolks and transferred to the embryonic circulation through yolk sac membrane of the developing embryo.

Out of the three Ig classes in birds (IgA, IgM and IgY) only IgY (as the chicken IgG molecule is longer than the mammalian IgG, the chicken IgG is referred to as IgY), is actively transferred into the egg yolks, which suggest existence of a selective IgY transport system in maternal ovary (Atsushi Muroi 2013). Functionally, IgY is generated mainly in secondary antibody responses and behaves like mammalian IgG. IgY concentration is the highest in serum among the three classes of Igs. Molecular analysis of IgY has indicated that IgY is the evolutionary progenitor of both mammalian IgG and IgE, (Warr *et al.*, 1995). The IgA and IgM are mainly found in the albumin. (Rose *et al.*, 1974) and they are transferred to the albumin as a result of mucosal secretion in the oviduct more specifically in the magnum.

Determination of IgY concentration in yolk and blood provides us insight into the existence of selective IgY

transport mechanism in ovarian follicles of birds. The concentration of IgY in egg yolk of chicken has been measured by many investigators and it varies from 1 to 25 mg/g of yolk (Patterson *et al.*, 1962; Rose *et al.*, 1974). It seems likely that scattering of the yolk concentration data is caused by multiple reasons including differences in strains of chicken (Gross and Siegel, 1990) and fluctuation in concentration of blood plasma IgY in the hen. However regardless of strain of chicken the blood IgY is concentrated to some extent in egg yolks of chicken and importantly the IgY concentration of yolk plasma fraction were found to be 1.7 fold higher than the blood plasma. The transfer of IgY through the ovarian follicular epithelium reaches its maximum 3 to 4 days prior to ovulation. The IgY is transferred from the egg yolk to the offspring via the embryonic circulation. The transfer starts from the day 7 of embryonic development and reaches its maximum 3 to 4 days before hatch. The amount of IgY transferred to the egg yolk and from the egg yolk to the embryo has been reported to be proportional to maternal serum IgY concentration. In a work done with anti-NDV antibodies, Hamal *et al.*, (2006) reported that 27 – 40 % of the hens IgY was transferred to the progeny and it directly related to the titers in the hen. Further, they reported that the transferred anti Newcastle Disease virus antibody recorded the highest level in chicks plasma at 3 days of age then decreased considerably by the 7th day of age to vanish by 14th day of age in meat type of commercial chicken (broilers).

Protection of the young ones by maternal antibodies has been reported in many viral diseases of poultry, Gharaibeh and Mohmoud (2013) studied decay of maternal antibodies in broiler chicken. They measured maternal antibody titers by ELISA for avian encephalomyelitis virus (AEV), avian influenza virus (AIV), chicken anemia virus (CAV), infectious bursal disease virus (IBDV), infectious bronchitis virus (IBV), infectious laryngotracheitis virus (ILT) and reovirus (Reo).

Half-life estimates of maternal antibody titers were 5.3, 4.2, 7.0, 5.1, 3.9, and 4.7 days for AEV, AIV, CAV,

IBDV, IBV, ILTV and Reo respectively. The statistical analysis revealed significant differences among half-lives of maternal antibody titers against certain pathogens. Furthermore, all maternal antibody titers were depleted by 10th day of age except for IBDV.

IgA and IgM are transferred to the embryo by absorption of the albumin by embryonic gut and may have its major function in the newly hatched chick as a protective Ig in the alimentary tract or as an additional source of protein. The amount of IgA and IgM transferred to the progeny is less than 1 % of the concentration of those Ig's in the hens plasma, (Hamal et al.,2006).

Vaccination program of the chicks in the poultry industry are highly variable based on the different factors, maternal immunity is one of those factors. Vaccination with live vaccine while having a high level of maternal antibodies leads to vaccination failures and neutralization of live vaccines, (Al-Natour et al., 2004). The level of maternal antibody decay and its half-life time is an important information for designing a suitable vaccination program, for active immunization of the birds.

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Attili, West Godavari District – 534 134, (A.P).

(M): 9666939299 and 9849195410

BROILER LIFTING RATES FOR THE MONTH OF OCTOBER 2018

place	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	31
Hyderabad	76	72	72	74	76	78	78	78	80	80	80	81	83	84	84	84	84	89	91	96	102	102	107	108	108	103	97	92	92	87	82
Karimnagar	77	72	72	74	76	78	78	78	80	80	80	81	83	84	84	84	84	89	91	96	102	102	107	108	108	100	97	90	90	85	82
Warangal	76	72	72	74	76	78	78	78	80	80	80	81	83	84	84	84	84	89	91	96	102	102	107	108	108	103	97	92	92	87	82
Mahaboobnagar	76	72	72	74	76	78	78	78	80	80	80	81	83	84	84	84	84	89	91	96	102	102	107	108	108	103	97	92	92	87	82
Kurnool	76	72	72	74	76	78	78	78	80	80	80	81	83	84	84	84	84	89	91	96	102	102	107	108	108	103	97	92	92	87	82
Vizag	69	69	69	70	72	74	74	74	76	76	76	77	77	77	77	77	77	80	83	88	91	91	94	94	94	90	86	86	86	80	77
Godavari	78	74	74	75	77	79	79	79	81	81	81	82	84	85	85	85	85	90	92	97	103	103	108	109	109	104	98	92	92	86	81
Vijayawada	78	74	74	76	78	80	80	80	82	82	82	83	85	86	86	86	86	91	93	98	104	104	109	111	111	106	100	95	95	88	83
Guntur	78	74	74	76	78	80	80	80	82	82	82	83	85	86	86	86	86	91	93	98	104	104	109	112	112	107	100	95	95	89	84
Ongole	80	76	76	78	80	82	82	82	84	84	84	85	87	88	88	88	88	93	93	100	106	106	111	113	113	108	102	97	97	90	85
Chittor	78	78	78	76	78	81	83	83	83	85	85	85	92	92	92	92	92	95	98	103	108	108	119	130	130	117	103	103	103	97	90
Nellore	78	78	78	76	78	81	83	83	83	85	85	85	92	92	92	92	92	95	98	103	108	108	119	130	130	117	103	103	103	97	88

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