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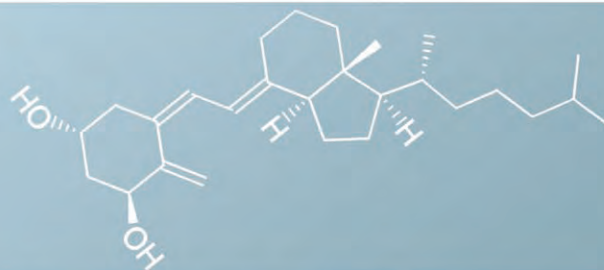
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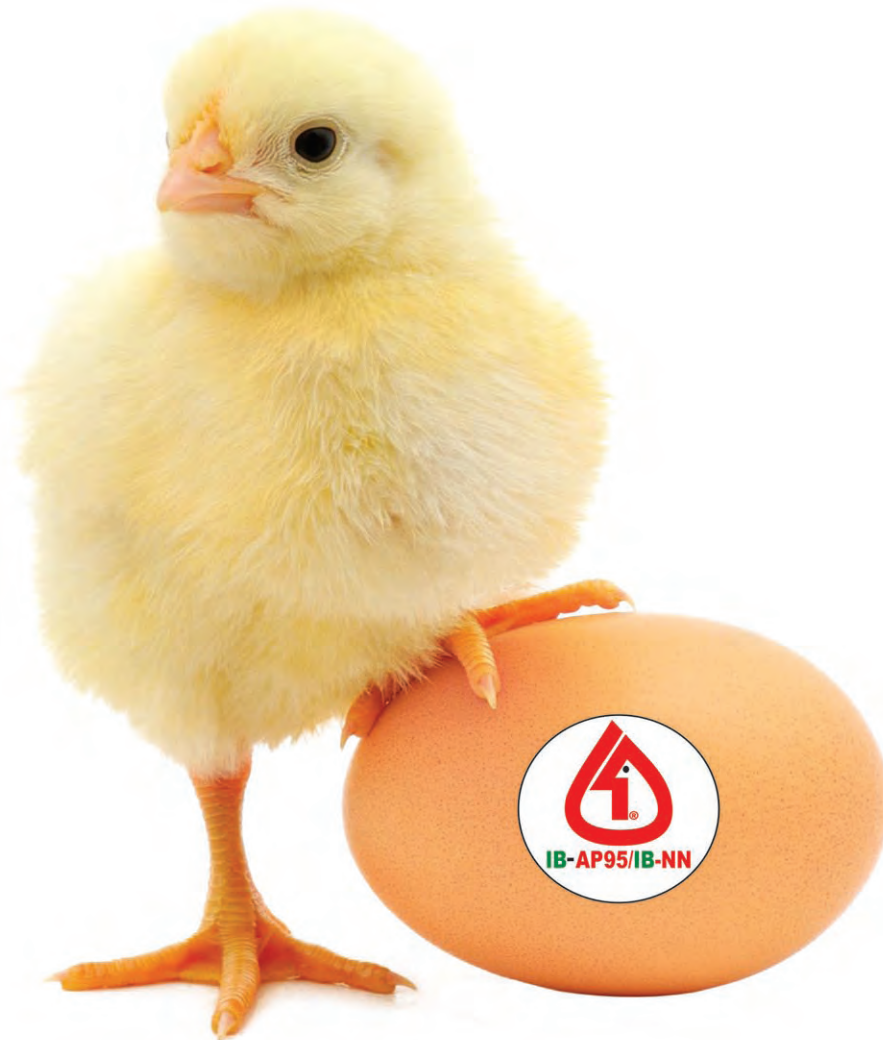
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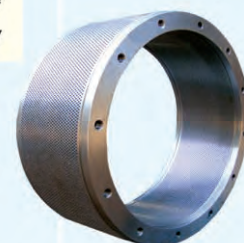
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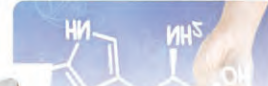
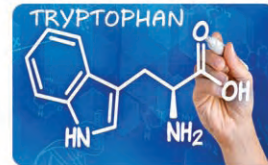
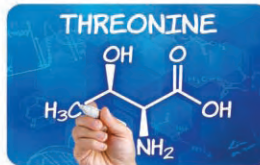
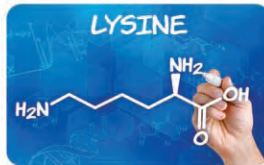
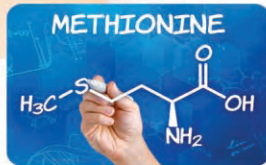
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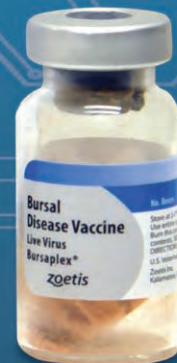
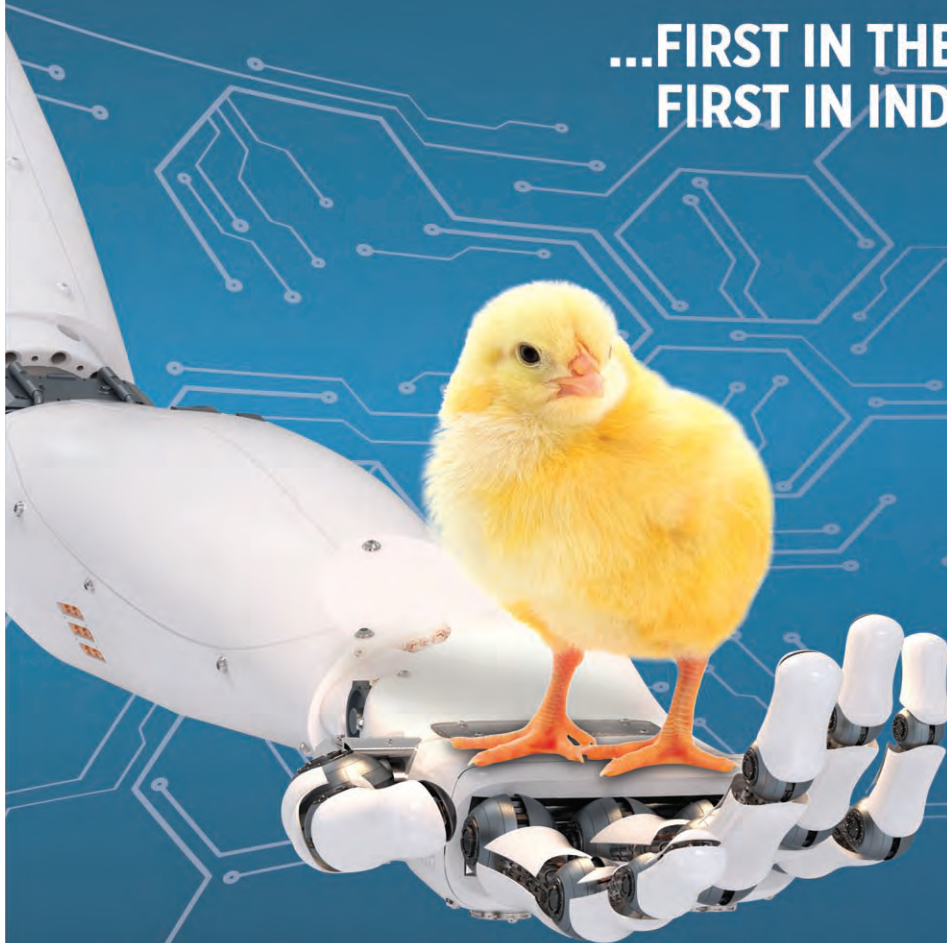
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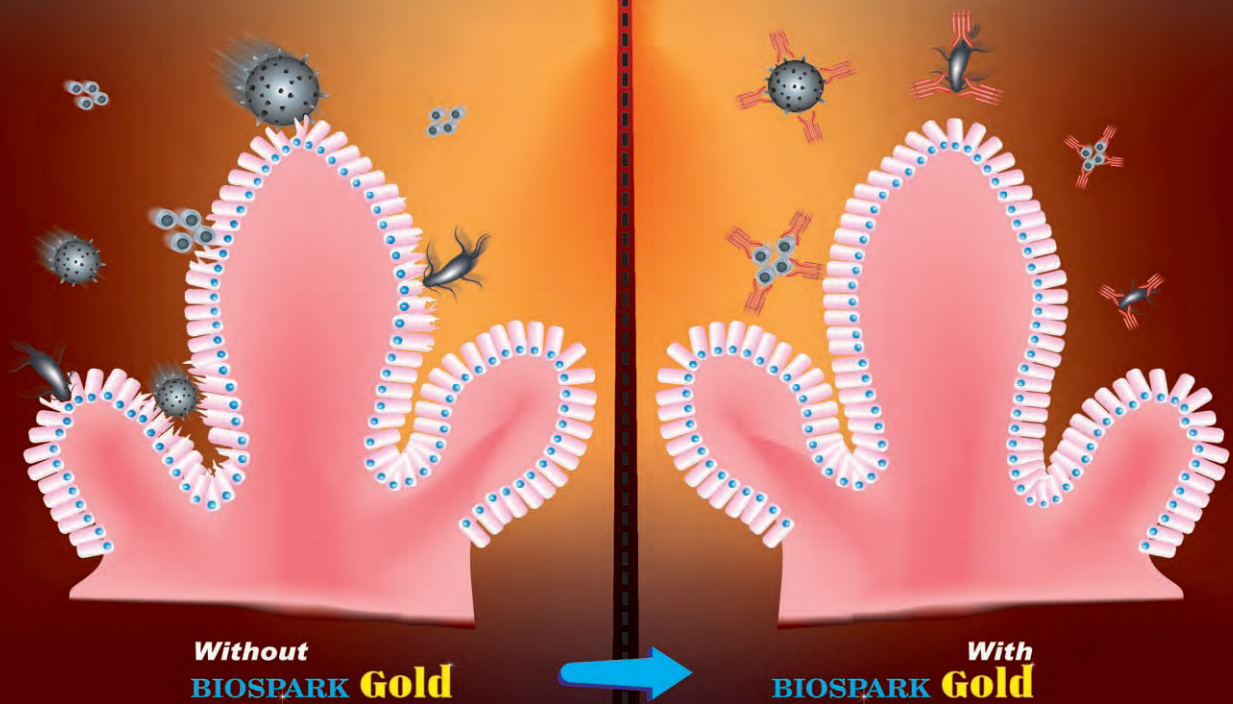


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Heat stress: Causes, indicators and alleviation measures in poultry

M.A.Wani, Rupjyoti Hazarika, Faneshwar kumar, Sajad A Sheikh
PhD Scholars CARI, Indian Veterinary Research Institute Izatnagar, Bareilly, U.P-243122

The term "Stress" is used to describe the detrimental effects of variety of factors on the health and performance of poultry. Anything which disrupts physiological and psychological stability of chicken is the stressor and reaction of stressor is termed as stress. There are common sources of stress, which can be grouped under, one or more of the following categories, Climatic stress, Environmental stress, Nutritional stress, Physiological stress, Physical stress, Social stress, Psychological stress, Pathological stress- Exposure to infectious agents.

Common causes of stress in birds

- Poor brooding conditions (low temperatures, cold water)
- Contaminated premises (built-up litter, early exposure to various disease agents)
- High stocking density (limited feeder and drinker space)
- Temperature extremes (cold and heat)
- Handling, weighing, vaccination, grading and transport (pain, physical damage)
- Beak trimming (handing pain)
- Lack of body weight uniformity (magnified differences in the packing order)
- Rapid growth (Strict nutrient demand)
- Quantitative feed and water restrictions (frustration, hunger)
- Postvaccinal reactions (reduced feed intake, fever)
- Feed quality problems (variation in nutrient content)
- Long or uneven feed distribution (split feeding)
- Sex separate feeding (pressure to restrict body weight gains)
- Harsh caretakers (poor husbandry)
- Inadequate ventilation (deterioration of the air quality)
- Clinical or subclinical diseases (reduced feed intake, fever, pain)
- Poor litter conditions (wet and cold)
- Sexual maturity and onset of egg production (drastic stimulation with feed and light)

Physiological mechanism of stress regulation:

Exposure of birds to stress is an inevitable event in poultry husbandry, when the threshold level of stress is crossed it results in distress to birds. Then the birds show stress syndromes, which are classified into three stages.

- Stage of alarm reaction (Neurogenic system).

- Stage of resistance or adaptation (Endocrine system).
- Stage of exhaustion.

Neurogenic (sympatho-adrenal) system (Short-term regulation of stress): This system consists of sympathetic (post ganglionic) nervous system and adrenal medullary tissue. It is characterized by increased secretion of the catecholamine from the adrenal medulla. Catecholamines prepare the bird for "Fight or Flight" reaction and commanding a rapid release of glucose in blood, depletion of liver glycogen, increased peripheral vasomotor activity, altered ventilation rate and increased neural sensitivity also increase energy production.

Endocrine system (Long-term regulation of stress): This system is comprised of hypothalamus-pituitary adrenal axis (HPA). It is characterized by adrenal cortical hypertrophy and increased synthesis and release of adrenal glucocorticoids, known as corticosterone in birds.

Stage of exhaustion: Finally, if the bird does not recover from the stressor and the availability of body reserves and hormones from the adrenal gland are inadequate, exhaustion phase leads to fatigue of the homeostatic mechanisms and death.

Physiological indicator of stress in poultry

- Atrophy of the thymus and atrophy of the bursa of fabricis in young birds, enlargements of the anterior pituitary and the adrenal glands.
- Increased reliance on glucose as an energy source.
- Hypoglycemia (increased glucose utilization).
- Decreased growth and increased muscle degradation.
- Impaired growth of cartilage and bone.
- Decreased voluntary feed intake (anorexia).
- Increased body temperature
- Epinephrine content in yolk of donor hens also serves as a very good tool to reflect stress load in layer stock.
- Changes in the numbers of circulating leucocytes profiles (heterophil:lymphocyte ratios and basophil and eosinophil numbers).
- Immunosuppression
- Excess fat deposition in the abdomen (abdominal fat pad).
- Ascites (water belly) in high producing broilers

Heat stress

There are several constraints to the future development of the poultry industry in the hot regions of the world. Most obvious constraint to high production in these (Indian subcontinent) regions is climate i.e. heat stress. Climate model projections indicate that the global surface temperature will probably rise a further 1.1 to 6.4°C during the twenty-first century; therefore, with this rise in global average temperature significant impact on efficiency, production, morbidity and mortality can be expected on birds (IPCC, 2007). Considering this scenario attention has been paid to the role of different techniques to minimizing the effects of heat stress.

Techniques to reduce Heat Stress:

Housing Management

Site & planning:

- Orientation :- Long axis should be East-West
- Air movement: - Perpendicular to Prevailing Wind direction.
- Spacing :-Recommended design spacing
 $D = 0.4 * H * (L) 0.5$
H & L are height and length of obstructing building.
- Building width: - 10-12m is preferable.
- Roof: - Gable or shed roof along with ridge vent to provide an escape for hot air at roof peak is desirable.
- Floor: - Concrete floors are desirable for easy Cleaning & Disinfection.
- Wall: - Should be water proof & poor conductor of heat.
- Insulation: - Should be placed below the roof as it will prevent influx of heat into the building.
- Painting & White washing: - Outside of walls & roofs should be painted white or covered with material which will reflect heat.
- Ventilation: - For elimination of already heat produced. Proper ventilation is necessary.
- Not more than 13m wide & 4m in height

Natural Ventilation: Curtain-sided houses rely extensively on natural air movement and these buildings are located away from obstructions (Trees, buildings).

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Fan Fogger System: The foggers inject fine water particles into the warm inside air. As the water vaporizes, heat is absorbed from the air, lowering its effective temperature. Foggers reduce air temperature in the house on hot days (90° - 95°F).

Genetic strategies

Selection for heat tolerance:

Fast producing broilers produce more heat & have high heat load & high mortality. Therefore, comparatively slow growing lines are chosen. Naked neck gene reduces feather mass by 20% & 40% in Na/na & Na/Na condition respectively and results in higher growth rate & meat yield than their feather counter parts under normal temperature & effect is more pronounced at high temperature. Frizzle gene reduces heat insulation of feathers by curling of feathers & reduce their size. Effect is only significant in slow growing line. Dwarf gene dw gene results in reduction of 30%- 40% of adult body size hence better heat dissipation.

Nutritional strategies

Food intake & growth rate is improved by increasing metabolic energy of diet & decreasing proteins, with concomitant increase in amino acid balance.

Vitamin Requirement : Decreased nutrient intake at high temperature decreases intake of micro nutrients. So supplementation of these nutrients is helpful for maintenance of performance & immune function. Under heat stress, birds are not able to synthesize the sufficient amount of vitamins, hence they must be incorporated in the diet especially, Vitamin A, Vit. C @ 1000mg/kg, Vit. E @ 8000 IU/Kg diet.

Mineral Requirement: Blood acid balance is disturbed by hyperventilation and results in respiratory alkalosis. Respiratory Alkalosis suppress growth rate & egg shell quality. Suppression of growth can be partially alleviated by supplementation of 1% NH₄Cl, 0.15%-0.6%KCl, 0.2%NaHCO₃. Supplementation of electrolytes in water enhance, water consumption, increase tolerance to heat stress and improve production performance.

Other Nutrients & Feed additives: Heat stress can induce unfavorable changes in indigenous bacterial microbionta. Supplementation of probiotic lactobacillus strains may enrich diversity of micro flora in chicken, restore microbial balance in jejunum & caeca of chicken and reduce harmful effects of heat stress.

Water: Water requirement increase during hot periods. It has been shown that 6% water intake increase per degree rise in temperature from that at 20°C temperature and 25% more drinking space should be provided. Water below body temperature will certainly aid in heat dissipation. Water drinkers should be wide & deep enough so that birds face is immersed in it. Earthen pitchers can be used for watering birds

CONCLUSION: Research work in the area of stress physiology should be directed in future in the following directions:

- Need good indicator of physiological stress: The physiological indicator of stress such as atrophy of the thymus and bursa of fabricis in young birds, enlargements of the anterior pituitary and the adrenal glands are good indicator of stress but there are inherent problems with their detections. These organs cannot be weighed in live birds and require slaughter of the animal. Therefore, a suitable technique of physiological indicator of stress is currently needed.
- Mechanism of stress: To study the mechanism of stress (climatic and environmental stress) laboratories should be strengthened with some specific facilities like climatic chamber.
- Suitable managemental practices: The production efficiency of poultry is severely affected by various kinds of stressors. It has significant effect on economic production of poultry. Appropriate managemental practices can be investigated to reduce the different type of stress in poultry and

getting the best returns from them. The research work should begin right from construction of poultry shed, along with feeding, disease control and other managemental options.

Amelioration of stress in birds at physiological level - Development of an anti-stress kit for birds.

The goal of poultry scientist should be to strike a balance between the hypo-and hyper-stress and to find as much eustress as possible and to minimize distress. While devising strategies for stress control, it is necessary to eliminate all avoidable forms of stressors and maintaining unavoidable stressors under control. Thus, the ultimate aim of successful poultry husbandry is not eliminate stress but to maintain it at optimum level for good production efficiency. A targeted multi-disciplinary futuristic approach is advocated so that the problem of stress is well tackled.

Multifarious efforts should be made to develop suitable technology to overcome the problem of follicular atresia as this is one of the main channels responsible for the drop in egg production under stressful conditions.



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Immunomodulation in Poultry Under Heat Stress Conditions

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Introduction: Stress reduces the overall performance of broilers alterations in body homeostasis results in physiological changes of an individual causing stress. Various kinds of stressors can induce stress, among which, heat stress plays a major role. The heat stressed birds may fall short to perform with respect to the body weight, feed efficiency, laying performance and mortality. However, the heat stress susceptibility of a breed depends upon various factors such as strain, feathering pattern, nutritional plane and production system. Further, it can be considered as a factor responsible for immune suppression in birds, resulting in infectious diseases and reduced performance in the flock. This causes potential economic losses and the farmer need to face the debts in the business. So, to counteract this stress induce immune suppression, one should follow certain strategies including supplementation of some nutrients like vitamins, minerals, electrolytes and some additives like probiotics, prebiotics, essential oils, polyherbal preparations, aspirin, betaine, and acetic acid. These substances bring about the change in the internal environment of gastrointestinal tract.

Causes of heat stress

In our country, the high ambient temperature is a big concern, as in summer, the temperature may reach up to 40-47°C. The temperature above 35°C induces heat stress on birds. The second reason is an increase in relative humidity above 60% along with high temperature. It causes heat load on birds due to lack of heat dissipation by birds. Third reason can be taken as the low protein intake by birds. Although proteins increase the heat production, but the low protein diets may cause detrimental effects, as they will reduce feed efficiency and body weight. It will also increase feed consumption and abnormal fat deposition. Another reason is the concentration of ammonia in the shed, which will result in accumulation of aerial ammonia in shed which may increase by high temperature and can affect the homeostasis in birds. Hence ideal and balanced feed with all essential nutrients should be brought into practice.

What is immunosuppression

Immune suppression literally means, "suppression of the immunity". It is a great concern in the poultry industry worldwide. It may occur due to infections, but, stress (high temperature, poor nutrition, poor management)

induced immune-suppression is reported already by many researchers. depressed immunity due to cortisone production and leucopenia due to atrophy of lymphoid organs such as thymus, bursa of fabricius, and spleen. It results in poor performance, low body weight, increased FCR, mortality and secondary bacterial infections in the flock. So, to counteract the above consequences due to immunocompetence, we must look into certain strategies for its amelioration by means of immunomodulation or immunopotential through dietary interventions and medications.

Nutritional strategies

At high environmental temperature, feed intake is reduced, which may cause deficiency of micronutrients like vitamins and minerals. Vitamin A, E and C have major role in stress alleviation and immunomodulation in heat-stressed chicken.

Vitamin A

Vitamin A is a fat soluble vitamin having significant role in immune function and reproduction. In layer if supplemented @ 8000 IU/Kg. diet, it reduces heat stress and increases egg production. While in broilers, it's supplemented @ 15000 IU/Kg. diet, which gives excellent results with improved weight gain, feed efficiency and carcass quality. It is very effective if given in combination with zinc to minimize heat stress.

Vitamin C

Ascorbic acid is a water soluble vitamin and can be synthesized in poultry and not required as a supplement under normal condition. However, in heat stressed chicken, it is proven to be beneficial by reducing corticosterone production with simultaneous increase in insulin and thyroid levels. It also deprives protein derived glucose synthesis and increase fat degradation. In case of broiler breeders, it increases egg weight, fertility and hatchability. In heat stressed broilers, ascorbic acid requirement is more, as it also acts as antioxidant. It improves carcass yield and quality, feed efficiency, carcass protein content and reduces crude fat.

Vitamin E

Vitamin E is a fat soluble vitamin and its dietary intake reduces heat stress and improves egg production. It increases yolk and albumen content in the egg. It increases plasma concentration of yolk lipids by

production and release from liver. It protects the liver and body cells from oxidative injuries also. Vitamin E supplementation @ 250 mg /Kg. diet is beneficial for egg production at high temperature. Vitamin E shall be supplemented before, during and after any stressful condition.

Herbal plants and HSPs

Natural herbal plants and their derivatives like secondary metabolites are being used traditionally for their therapeutic and immunomodulatory functions. These herbal principles or metabolites include saponins, glycoproteins, polysaccharides, and flavonoids etc. These metabolites have a wide variety of medicinal values actions like lymphocyte stimulation etc. *Aloe vera*, & *Agelcagiggas* are some of the examples of these herbs. Beside this some Chinese herbs like *Panax ginseng*, *Gingiberofficinale*, and *Saussurealappacan* be quoted as good examples of such herbs. Many of the herbs mentioned above are used as the immunomodulators, tonics and adaptogens.

Essential oils

Essential oils (turpenes and phenylpropenes) are the derivatives of mixture of aromatic oily liquids obtained from the leaves, flowers, buds, wood, bark, fruits, seeds, of some plants. They have their own characteristic odor or fragrance. Some of them are liquid at the room temperature while some are volatile in nature. The mixture of different essential oils containing cavacrol,

thymol, terpenoids, garlic oil, cineol, geranitol, â-inone, citral, graniol etc, when added @ 24mg/Kg of diet, acts in a wide range like antioxidant, antibacterial, antimycotic, antiparasitic, insecticide, hypolipidemic factor, immune-modulator, digestive stimulator and heat stress alleviator. They are potent antioxidants and acts as preservative by its antioxidant properties along with the meat obtained from the birds fed on such feed which is fortified with essential oils and improves their shelf life. Turmeric powder, if included in poultry rations @ 0.1-0.2% will enhance the immunity of the birds. Essential oils from *tulsi*, *ashwagandha*, *garlic*, *turmeric* and *aamla* have found to be beneficial in summer season to reduce heat stress in layers. *Aamla* and *ashwagandha* are also helpful in broilers with respect to the body weight, immune status and as an antioxidant.

Probiotics

Probiotic is a generic term and its products containing bacteria and/or yeast cultures that stimulates the growth of microbes capable of modifying gastrointestinal environment to favor health and improving feed efficiency. Probiotics mainly contain *Lactobacillus* species like *L. bulgaricus*, *L. acidophilus*, *L. lactis*, *L. plantarum*, *S. thermophilus* etc, and some other species like *Enterococcus fecalis*, and *Bifidobacterium* etc, which enhance health by producing lactic acid in gut and making alterations in gut microflora and eliminating pathogens to improve feed utilization. It also develops

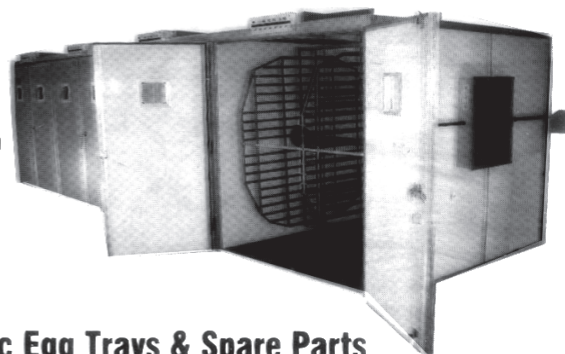


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immune response by stimulating immune cells to produce cytokines. Probiotics, especially lactobacilli, could modulate systemic antibody response to antigens in chicken, when fed @ 50 mg/Kg. diet. Lactobacillus based probiotics also enhances the response against coccidiosis, especially against *E. acervulina*. These probiotics also stimulate cells of cecal tonsils.

Minerals and others:

Chromium, an essential trace mineral for normal physiology of birds improves feed efficiency, feed intake, body weight and carcass characteristics if supplemented @120ppb/Kg of diet. It functions for deprivation of serum cortisol and insulin levels. Chromium usually depletes stress in heat stressed birds, and hence its supplementation in diet is very necessary. Organic form of chromium is more active in biological system than that of inorganic one. Cr-Nano particles are more effective than Cr-Macroparticles as having greater absorption rate in the gut. Chromium also increases antibody response and leucocytes activity.

Following are the recommended levels of inclusion of above said feed supplements and additives.

Conclusion: Preferences for optimum production performance with high feed efficiency under various climatic conditions have made modern chicken more prone to heat stress and subsequent immune-suppression. Certain nutritional strategies like inclusion of feed supplements such as vitamins, minerals and electrolytes were proven to be very beneficial in challenging immune-suppression. Some novel feed additives like polyherbal preparations, essential oil mixtures, probiotics, acetic acid, betaine, aspirin, and prebiotics also have made it advantageous to alleviate heat stress and to potentiate immunity of chicken and are proven to be very promising in enhancing heat tolerance of birds.

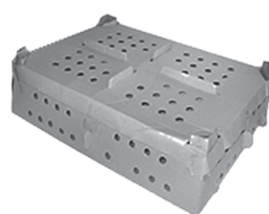
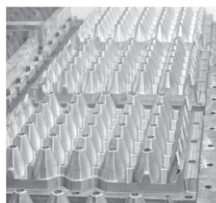
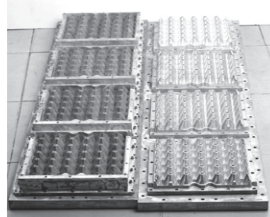
References available on request

Sl. No.	Ingredients	Level of inclusion in feed/ water
1	Vitamin A	8000-12000 mg/ Kg feed
2	Vitamin E	150mg/ Kg feed
3	Vitamin C	150mg/ Kg feed
4	Zinc (Zinc oxide)	48 mg/ Kg feed
5	Potassium (Potassium chloride)	300 mg/ Kg feed
6	Chromium piconolate	20 mg/ Kg feed
7	Magnesium	1.2mg/ Kg feed
8	Aspirin	300-500 mg/ Kg feed
9	Betaine	01mg/ Kg feed
10	Probiotics	50 mg/ Kg feed
11	Prebiotics (MOS)	0.3% mg/ Kg feed
12	Sodium bicarbonate	3.15/ litre of water
13	Essential oils	250-500 litre of water
14	Polyherbal mixture	01 litre of water
15	Vinegar (5% acetic acid)	01 litre of water



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Stop the Gumboro Cycle, Starting from the Hatchery

Dr. Jessica Lee T. M.
Ceva Animal Health Asia



Dr. Jessica Lee T.M.

Gumboro, also known as Infectious Bursal Disease (IBD), was first discovered by Albert Cosgrove in early 1960's. IBD virus (IBDV) is a RNA virus belonging to the family of

Birnaviridae. It is a non-enveloped virus which makes it an incredibly high resistant to chemical and physical agents which explained after 50 years, despite stringent biosecurity and adapted field vaccination program, Gumboro disease problem still widely present and caused problem in almost all poultry producing countries creating worldwide concern.

Global Gumboro Disease Situation

According to Ceva Internal Study (figure 1) on isolation of IBDV from all over the world, the very virulent form of Gumboro disease is still present in many countries, and variant strains of Gumboro disease are present in several countries, leading to sub-clinical forms of Gumboro disease (*Gumboro Disease Special, World Poultry 2016*). "Subclinical" which is not obvious and difficult to monitor, still infect chicken in the field and create the opportunity for the field virus to multiply (creating higher virus pressure in farm) and produce variants that may escape passive immunity (Maternal Derived Antibody) from the breeders program. Both clinical and sub-clinical forms are equally important as the consequences of negative impact is significant, short term or long term respectively. Needless to say, affected flocks experience lower in bodyweight, poor feed conversion, lower efficacy of vaccines, increase in mortality due to IBD or other diseases as a result of immunosuppression, increase usage of antibiotic due to secondary infection, increase number of days in harvesting age and lower performance index. When these affected birds are sent to

processing plant, carcass quality or yield will reduce and condemnation rate increased. Overall the economic impact due to Gumboro is substantial to all poultry producers.



Figure 1: Isolation of Gumboro disease virus on global level

Importance of Stop Gumboro Cycle

In India, Morla S. *et.al* 2016 and Microbial Pathogenesis 93:131-136, described the presence of vvIBDV. Ceva Internal Study in 2017 from bursa samples of 29 – 30 days old broilers in India showed no vaccine strain but confirmation of vvIBDV despite two time drinking water vaccination at the age of six and 12 days old.

Unlike other diseases, the characteristic of high resistance of IBDV allows it to persist for a very long time in contaminated premises and becoming the resident virus. As soon as Day-old chicks are released onto the floor, they are potentially in contact with IBDV. This means, repeatedly new batch of chicks will have 100% possibility of getting the challenge once they are susceptible. As soon as the birds are infected, replication of the field virus will take place in the bursa of Fabricius and the virus will then shed into the house. This will increase the virus pressure plus the risk of emergence of variant IBDV that will infect the

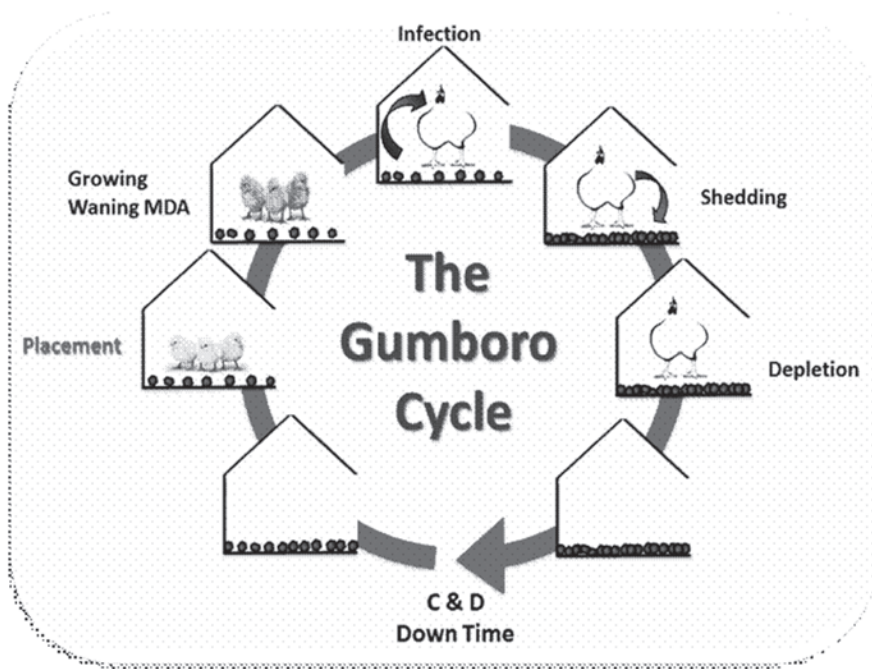


Figure 2: The Gumboro Cycle

Constraint of Current Gumboro Vaccination in the Farm

In the first few weeks of life, passive immunity transmitted in the form of antibodies, Maternal Derived Antibody (MDA), from the breeders to chicks plays very important role to provide protection before active immunity induced by vaccination. The higher and more homogenous the amount of MDA in chicks, the stronger and later the age of susceptibility, at least after 2 to 3 weeks of age. Following protection by MDA, active immunity generated from

chickens cycle after cycle. Cleaning and disinfection (C&D) with down time helps to reduce the virus pressure but IBD virus will still remain. This is known as “Gumboro Cycle” (figure 2) To better control Gumboro is to stop the Gumboro cycle by vaccination of birds which protects them against the disease by vaccine induced immunity and lower the challenge pressure for the following cycles of production.

administration of live vaccines must able to start in the presence of this still-effective passive protection and take over in all chickens when it dropped to non-protective level. However, to establish protective active immunity, there are two critical points: the well administration and the “take” (replication) of the vaccines in the bursa of the birds.

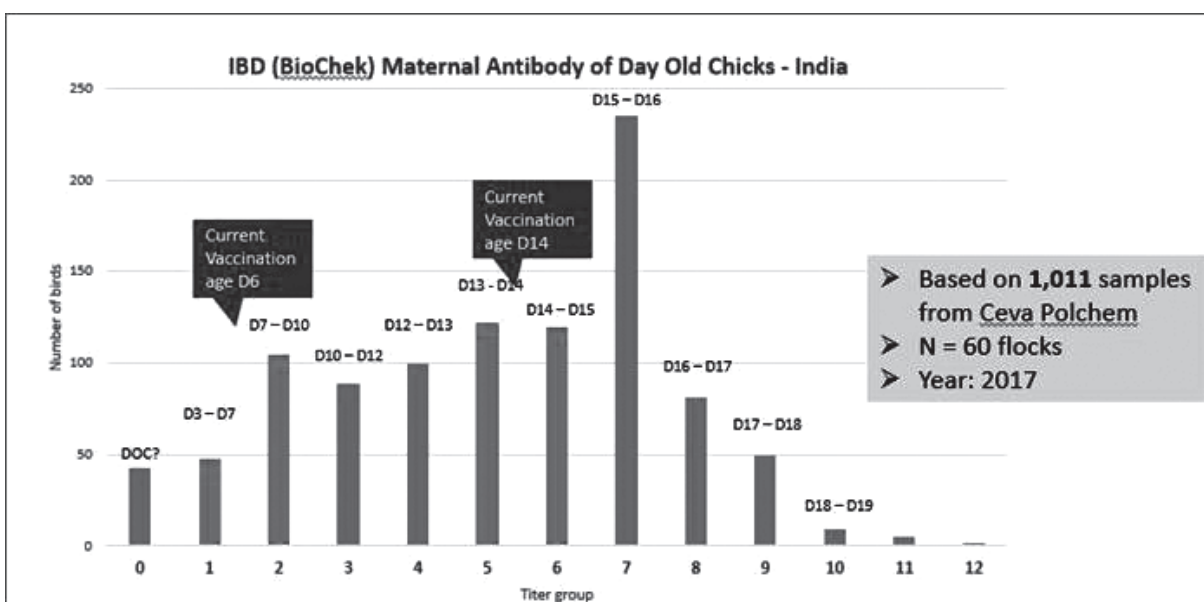


Figure 3: Heterogeneity of IBD Maternal Derived Antibody (MDA) Titer from 60 flocks DOC in India, 2017

IBD Titer (Biochek) from 37 flocks using Drinking Water IBD vaccination

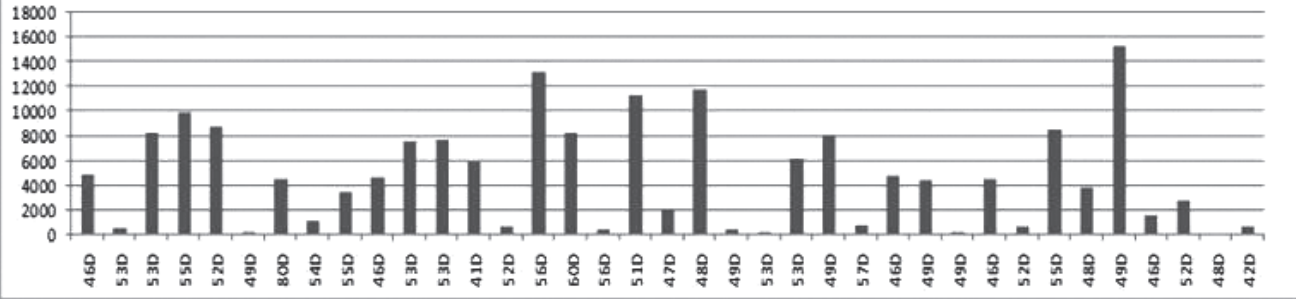


Figure 4: IBD Titer from 37 flocks using drinking water IBD vaccination in Spain

The current IBD vaccination using conventional live attenuated Gumboro vaccines faced two major constraints. First, is the heterogenous level of MDA in chicks at day of age due to possible different source of chicks or chicks of different age of breeders and etc. Live attenuated Gumboro vaccine needs to be given at the right timing to avoid interference with MDA. If the MDA is still very high, it can neutralize the vaccine virus or delay the replication or on the other hand, if given too late, the birds will be susceptible to the field virus and may get infected. A current survey of around 1,000 bloods samples collected in 2017 from 60 flocks of broiler day-old chicks and tested in CevaPolchem showed only 40% of birds were vaccinated at right timing if the birds were to be given live attenuated IBD vaccines at the age of 6 and 14 (figure 3)

Secondly, the quality of administration (either drinking water or eye drop) of this vaccine is extremely crucial and depends on many factors, just to name a few: technique of vaccination, vaccine handling in farm and many more. In many cases, due to frequent changes of farm workers which also will be performing farm vaccination, will lead to inconsistent quality of vaccination.

In 2009, Ceva internal serological study (figure 4) in Spain using Biochek ELISA towards 37 flocks of chicken vaccinated with IBD drinking water during harvesting age, found a huge variation of titers and up to 32% of these flocks were not protected.

Moreover, proper vaccination is not only depends on birds receiving the vaccines but also the full dose as penetration of MDA depends on the dose of vaccine received. Such unsatisfactory vaccination will allow field viruses to replicate in non-immunized birds and increase the load of virus in the field giving more possibility for emergence of variant IBD.

Stop Gumboro Cycle Using Immuno-complex vaccine

To address the difficulty of achieving successful Gumboro vaccination in farm, Ceva had developed an Immuno Complex vaccine, namely Transmune IBD. This new technology vaccine can be administered to all chicks through in-ovo or subcutaneous route of vaccination in hatcheries with consistent high percentage of accuracy and reliability.

Immune Complex vaccine, Transmune IBD, is prepared from live attenuated Intermediate Plus IBD (strain Winterfield 2512) mixed together with specific anti-IBDV serum (Virus Protecting Immunoglobulins, VPI) in a well formulated proportion. Vaccine virus is shielded and not being recognize by the MDA (i.e. not neutralized). As the VPI being catabolized as the same rate as the MDA, the vaccine virus will be release, breakthrough the MDA (when the level had dropped to the level where vaccine can take), allowing itself to reach and colonize the bursa before the field IBD virus. As the vaccination by Transmune IBD is

individually adjusted towards the level of the MDA of each of the chicks, vaccines will replicate in the bursa at "optimum time". This allow full protection against clinical signs, resistance towards field IBD virus infection (whatever is the challenge virus), prevention towards shedding which help to reduce the risk of new variants to pop-up. With the administration in the hatchery using proper equipment, every chicken will receive same and well controlled dose of vaccine.

According to Stoute, et.al (2013), once the bursa follicles are fully colonized by one IBDV strain a second strain cannot infect the bursa follicles, which means subsequent infection will be prevented. This was also reported by a few researchers that viral competition between the co-infecting IBDV pathotypes may be influenced by factors such as competition for cell surface receptors and intracellular biosynthetic machinery required for viral replication. It is also possible that the presence of the non-very virulent IBDV pathotypes may be stimulating the infected cells to produce interferon proteins, which can render uninfected cells resistant to viral infection. Other factor such as host non-specific immunity production of cytokines can also reduce the severity. Vilmoset. al (2009) showed 100% blocking of the infection of the bursa of Fabricius from vvIBDV within 2 days post-vaccination with W2512 with neither molecular detection nor histopathology lesion caused by challenged vvIBDV at 4 days post-challenge.

Conclusion

Since the introduction of Transmune IBD in the market since 2006, today there are up to 76 billion broilers had been vaccinated worldwide, which equal to 1 in every 4 broilers. At present, Transmune IBD is registered in up to 65 countries globally. Over the 12 years of experience in the field, Ceva also had collected vast amount of serology titer, field performance data and result from processing plants from Transmune vaccinated

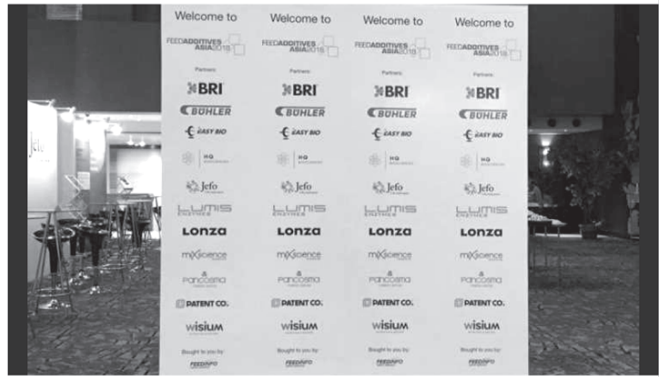
flocks. No doubts, Transmune IBD vaccine had become the reference IBD vaccine in the poultry industry.

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LUMIS ENZYMES

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PRESS RELEASE

Rossari Animal Health's Technical Seminar at Karnal, Haryana



Rossari Animal Health conducted the mega technical seminar at hotel Noor Mahal, Karnal on 25th May 2018. The event was attended by over 150 eminent poultry business stakeholders from Karnal & surrounding areas viz. Poultry Farmers, Breeders & Veterinarians

The event started with welcoming of all guests & dignitaries by Dr.Aashaq Hussain, Technical Manager, North Zone, Rossari AHN followed by technical session of Dr.J.L. Vegad, the distinguished persona in the field of Veterinary Pathology & Biosecurity practices. Dr.Vegad briefed the audience over "New Information on Importance of Biosecurity at Poultry Farm" in his informative session he had explained all the complex phenomenon of Poultry Biosecurity Basics and its applications on field level i.e. significance of point mutation and base pairing on pathogenicity



of common poultry diseases like avian influenza, mycoplasmosis and its implications over success rate of vaccination practices and the required care to be taken to improve upon the same.

Dr.Vegad's session was followed by session of Dr.Abhijit Mishra, the renowned consultant in the field of Poultry Nutrition. Dr.Abhijit delivered the informative session on "Insight on Poultry Nutrition" during which he touched up on several aspects of poultry nutrition and feeding practices along with importance of several feed additives like enzymes to improve the nutritive value of the feed.

Dr.Abhijit's session was followed by a brief introduction of Rossari Animal Health by Dr.Vishal Surve, Asst.Marketing Manager,Rossari AHN, in



which he touched upon the quality formulation & manufacturing strength of Rossari AHN from its GMP & ISO certified manufacturing facilities with PAN India robust distribution network to cater the required customer demands.

The last session for the event was delivered by Mr.Anil Sathe, General Manager, Karcher's Agriculture and Institutional Business. Mr.Sathe delivered the session on "High Pressure Farm Cleaning Machines" and enlightened the audience with basic working mechanism and application procedure of Poultry farm and hatchery cleaning operations by use of Karcher's high pressure



cleaning machines which are very effective in saving of time, labour & water cost by use the high end German machine technology. Mr. Sathe as well announced the association of Karcher India & Rossari Animal Health for promotion & marketing Karcher's High Pressure Farm Cleaning Machines for Poultry Business Sector.

Dr.Anish Kumar, Business Head, Rossari AHN delivered the vote of thanks to all the participants and elaborated the Rossari Animal Health's journey so far in field of Poultry Business and its future commitments to deliver more and more of such



innovative & quality product applications to cater the Poultry farming fraternity.

Dr.Shruti Sasikumar, Manager Institutional Sales, Rossari AHN facilitated the entire session with her gracious event anchoring.

The entire session was supported by North sales team of Rossari AHN- Mr.Sanjay Kumar, Mr.Vishal Kumar,Mr.Vikas Singla, Mr.Sohan Lal, Mr. Vikas Kumar, Mr.Pradeed Kumar and Mr. Narendra Bagora along with special efforts & support from Rossari AHN's distribution partner Mr. Nitin Singla .



NATIONAL EGG CO-ORDINATION COMMITTEE

DAILY/MONTHLY EGG PRICES DECLARED BY NECC AND PREVAILING PRICES AT VARIOUS PRODUCTION CENTRES (PC) AND CONSUMPTION CENTERS (CC) JUNE 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	382	382	382	382	386	391	395	397	400	402	402	407	410	412	414	416	418	422	424	424	424	424	424	424	424	424	426	428	430	430	410.2	
Ajmer	323	323	327	338	345	345	345	350	350	355	365	360	360	360	360	363	368	368	368	368	358	358	358	358	352	352	354	358	363	365	-	353.41
Banglore (CC)	410	410	410	410	410	410	412	415	415	418	420	423	425	425	425	425	427	429	429	429	429	429	429	429	429	429	429	429	429	429	429	422.1
Chennai (CC)	435	435	435	435	435	435	435	440	440	445	445	452	452	452	452	452	452	452	457	457	457	457	457	457	457	457	457	457	457	457	448.76	
Chittoor	428	428	428	428	428	428	428	433	433	438	438	445	445	445	445	445	445	445	450	450	450	450	450	450	450	450	450	450	450	450	441.76	
Delhi (CC)	343	343	343	350	350	357	357	357	357	362	370	375	375	375	375	375	382	385	385	385	380	375	370	370	370	370	370	375	380	385	368.2	
E.Godavari	360	360	360	360	360	360	360	362	364	366	368	370	372	374	376	378	381	384	384	384	384	384	384	384	384	378	378	378	378	380	372.96	
Hyderabad	361	361	361	361	363	365	367	369	371	374	377	380	382	384	386	388	390	392	392	392	392	392	392	392	382	382	382	382	382	384	378.93	
Miraj	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mumbai (CC)	416	416	416	416	416	418	421	423	425	427	427	432	435	437	439	441	443	445	447	447	447	447	447	450	450	450	440	440	440	440	434.36	
Mysore	416	416	416	416	416	416	421	421	425	425	430	430	430	430	430	430	435	435	435	435	435	435	435	435	435	435	435	435	435	-	428.2	
Nagapur	373	375	376	378	380	382	383	385	385	-	-	-	-	-	-	400	400	400	395	395	392	390	390	390	390	-	-	-	-	387.31		
Namakkal	420	420	420	420	420	420	425	425	430	430	435	435	435	435	435	435	440	440	440	440	440	440	440	440	440	440	440	440	440	-	432.93	
Pune	418	419	419	419	421	421	426	427	428	432	432	440	442	442	-	444	444	444	450	450	450	450	450	450	450	440	440	440	442	442	436.96	
Punjab	317	321	322	323	330	336	338	338	338	340	-	-	-	-	-	360	360	366	366	366	366	357	347	347	347	347	342	345	356	-	343.86	
Vijayawada	360	360	360	360	360	360	360	362	364	366	368	370	372	374	376	378	381	384	384	384	384	384	384	384	384	378	378	378	378	380	372.96	
Vizag	366	366	366	366	366	366	366	368	370	372	375	377	380	380	380	385	390	392	400	400	400	400	400	400	390	390	390	390	390	395	382.53	
W.Godavari	360	360	360	360	360	360	360	362	364	366	368	370	372	374	376	378	381	384	384	384	384	384	384	384	384	378	378	378	378	380	372.96	
Warangal	363	363	363	363	363	365	367	369	371	373	374	379	382	384	386	388	390	392	394	394	394	394	394	394	394	384	384	384	384	384	380.1	
Prevailing Prices																																
Allahabad (CC)	367	369	371	376	376	390	390	390	386	390	395	400	400	400	390	409	409	414	414	414	409	405	395	395	395	390	390	400	414	414	395.23	
Barwala	325	325	327	338	338	341	341	341	344	350	357	357	357	357	-	363	368	368	368	368	358	352	352	352	352	352	354	360	363	-	350.42	
Bhopal	360	360	360	365	372	378	382	390	395	398	400	407	410	410	410	412	414	415	415	415	415	410	410	402	400	400	405	407	410	397.9		
Hospet	375	375	375	375	375	375	377	380	380	383	385	388	390	390	390	390	390	392	394	394	394	394	394	394	394	394	394	394	394	394	387.1	
Indore	352	354	348	345	354	360	365	370	374	374	374	390	390	388	390	382	388	378	395	400	395	385	390	385	385	388	390	390	395	400	379.13	
Jabalpur	370	365	365	367	375	380	385	395	396	398	400	411	411	411	413	415	415	417	417	417	417	417	410	410	407	407	407	409	410	412	400.96	
Kanpur (CC)	362	362	362	362	371	381	381	381	381	386	395	395	395	395	395	395	395	395	395	395	395	381	381	381	381	381	371	371	381	386	386	382.63
Kolkata (CC)	390	390	390	390	390	390	390	398	402	406	410	412	413	419	424	429	429	429	429	429	429	429	429	429	429	429	429	425	425	425	412.86	
Luknow (CC)	380	380	380	390	390	390	390	390	390	397	407	410	410	410	410	410	410	420	420	420	420	420	420	420	420	420	410	410	410	417	420	405.7
Raipur	387	387	390	390	390	392	394	396	400	405	410	415	418	418	418	418	421	421	430	430	430	430	430	430	425	415	415	415	415	415	411.16	
Varanasi (CC)	380	371	380	383	390	397	397	397	397	403	407	407	410	410	410	410	410	417	417	417	417	410	407	403	403	403	403	410	413	420	427	403.86

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Tilmicosin Phosphate 250 mg/ml concentrate for oral solution

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FEED INCLUSION RATE

(Broilers, Layers and Breeders)

For growth promotion in normal farm conditions : 250 gm - 500 gm per ton of feed.

When necrotic enteritis, salmonellosis is present at the farm : 500 gm - 1 kg per ton of feed.

PRESENTATION

5 & 25 kg pack.



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Liquid
(For Maintaining Respiratory Health)

USAGE

- ▶ To maintain normal respiratory health and functions and improve F.C.R. along with optimum egg production in layers and breeders and higher growth in broilers particularly when conditions are likely to challenge respiratory functions e.g. change in weather, cold environment and during susceptible period in chicks.
- ▶ To keep the respiratory system clean and optimally functional, free from mucus build up and least prone to respiratory problems for easy breathing and optimum oxygen uptake by the lungs.

Feed Inclusion Rate : 750 gm per ton of feed

Water Inclusion Rate (per 100 Birds)

Broilers	Layers	Quantity
0-2 Weeks	0 - 8 Weeks	10 ml
3-4 Weeks	9-20 Weeks	20 ml
5th Week & onwards	21-72 Weeks	40 ml

To be given orally, mixed with drinking water, once daily. Double quantity is recommended for breeders.

Presentation : Liquid : 1 Ltr & 5 Ltr

Powder : 1 kg, 10 kg & 25 kg



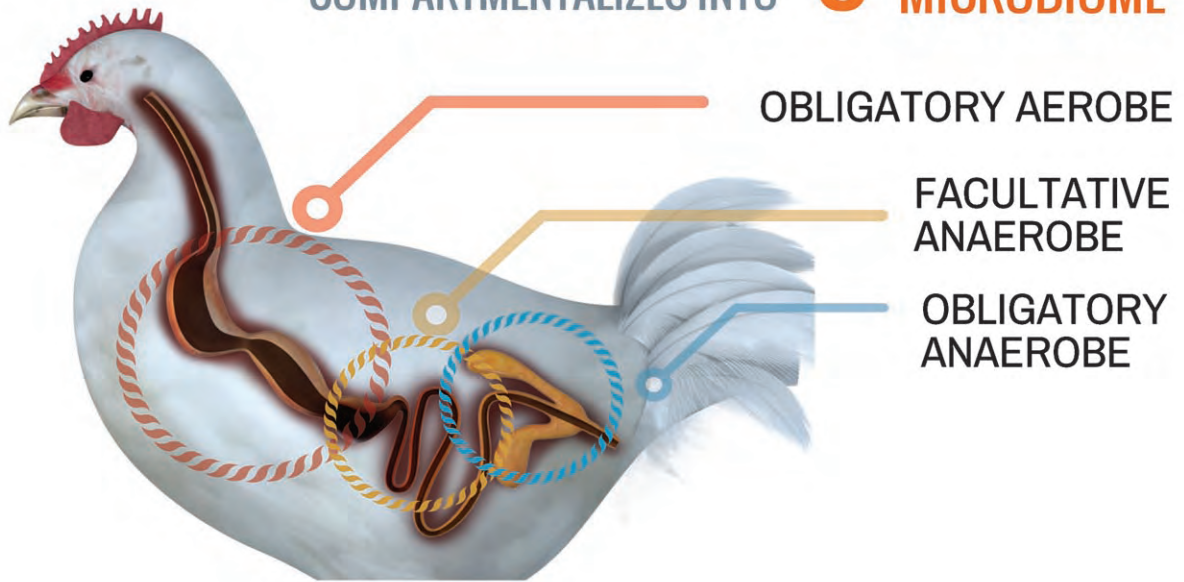
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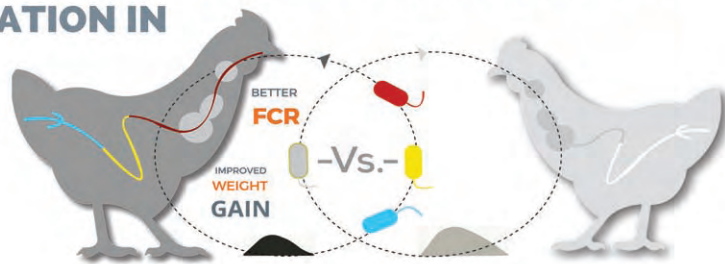


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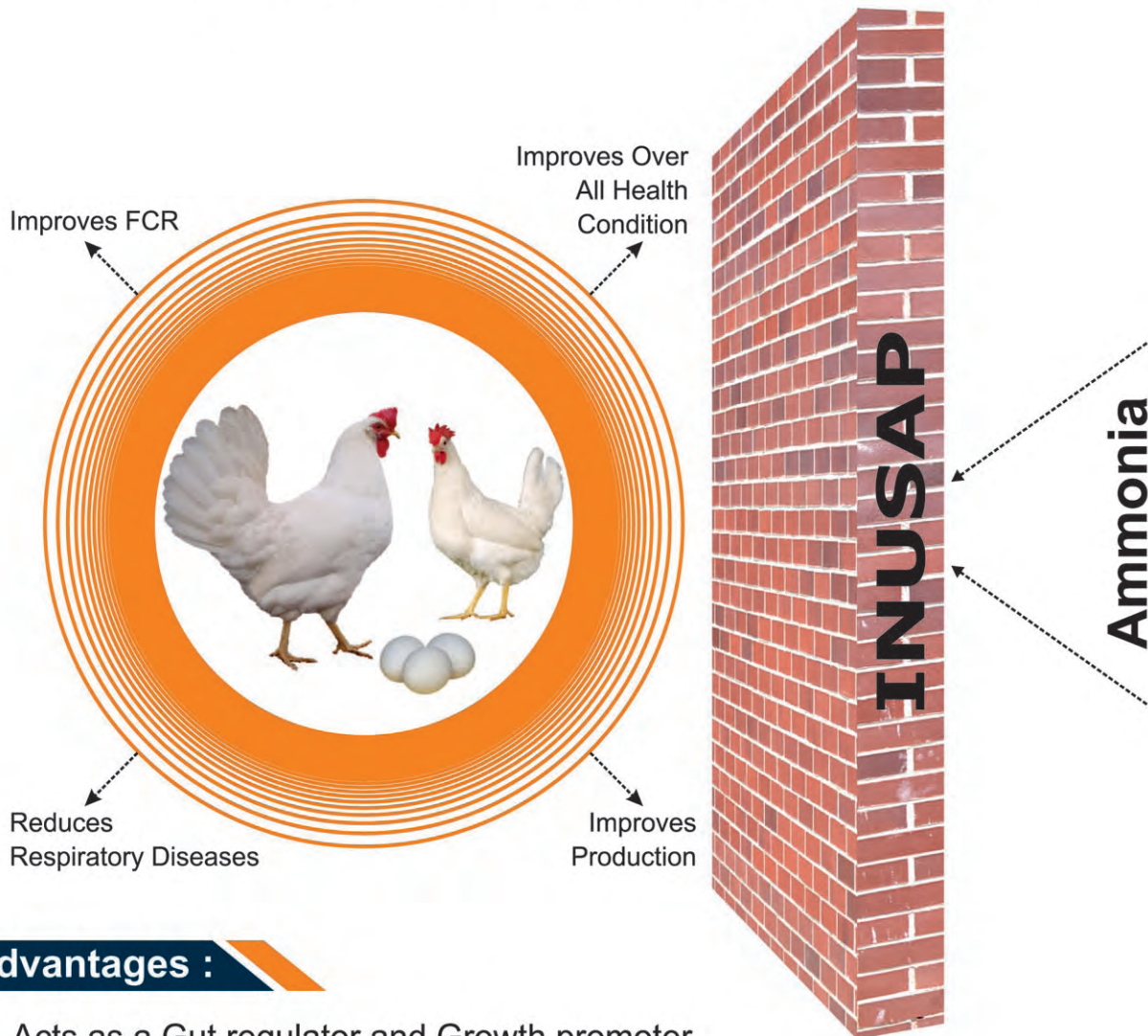
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100 g/ton throughout the year
For Treatment - 200 g/ton
along with specific antimicrobial
Packing : 5 kg & 25 kg



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POULTRY LINE, JULY 2018

3 in 5 Livestock producers expect to use more Phytogenic feed additives this year

Many in the livestock industry expect to increase their use of phytogenic feed additives (PFAs) in 2018. According to a recent survey of more than seven hundred agribusiness professionals, a full 60% of respondents reported that their PFA use would increase over the next 12 months.

Plant-based feed additives – specifically essential oils, plant extracts, herbs and spices – are known to have a range of biologically active properties that can be applied to modern animal production. These include anti-oxidant, anti-inflammatory, anti-microbial and digestion enhancing effects.

Increasing interest: “We continue to see strong demand for PFAs from all sectors of the animal protein industry,” commented Michael Noonan, Global Product Line Manager Phytogenics at BIOMIN. “As the awareness and understanding of the benefits of scientifically tailored PFAs such as Digestarom® is growing, their commercial application becomes more widespread.”

Scientific findings underscore the fact that phytogenic feed additives can reduce the microbial threat and promote intestinal health, which is imperative for optimal performance and profitability.¹

Furthermore, reported results of market research in various countries suggest that consumers look favourably on the addition of phytogenic feed additives to animal feed.

These industry expectations, coupled with consumer acceptance, indicate the strong growth in demand for phytogenic feed additives for farm animals globally, in line with projections that the PFA market will reach the US\$1 billion threshold by 2023.

Turning science into solutions

The upcoming BIOMIN Phytogenic Feed Additives Survey builds on similar work published in 2017.

“As a leading global supplier of PFAs, we are in constant contact with clients, researchers, valued distributors and our skilled sales and client support teams throughout the globe,” noted Mr. Noonan.

“Through discussions with clients, trials and scientific research, we are continually highlighting the advantages that PFAs offer to the feed and livestock industries,” explained Mr. Noonan.

BIOMIN has conducted hundreds of trials with phytogenic feed additives over the years. “Our scientific knowledge of PFAs and on-the-ground customer support throughout the world provide us the means to



Michael-Noonan

help our clients achieve the best outcomes,” Mr. Noonan concluded.

Upcoming publication

More than 700 nutritionists, business owners, veterinarians and consultants located in over 80 countries provided their views on the use of phytogenic feed additives in livestock in the recent BIOMIN Phytogenic Feed Additive survey.

The full results of the actual BIOMIN Phytogenic Feed Additives Survey will be published in June 2018.

AFTERWORD

Optimizing gut health and performance through phytogenic feed additive (PFA)

Phytogenic feed additives have gained considerable attention in the feed industry and to an increasing extent producers are incorporating them into their feeding programs. It is evident that this category of feed additives covers a large variety of substances with an even bigger number of active ingredients, including carvacrol, thymol, cinnamaldehyde and anethol, just to mention a few important examples. Phytogenic feed additives are either available in a solid, dried and ground form or as extracts or essential oils.

In comparison to Antibiotic Growth Promoters (AGPs), phytogenics do usually not bear the risk of cross-resistances and residues in animal products. Improvements in feed conversion ratio (FCR) and body weight gain, as well as their benefits in assisting in disease prevention have been observed in recent trials.

Phytogenics in broiler production

The main target in broiler production is to optimize feed conversion (FCR). Digestarom® P.E.P. was tested in different dosages in a scientific trial at the Agricultural University of Athens, Greece (Mountzouris *et al.*, 2008). Day-old, male Cobb broiler chicks were assigned to

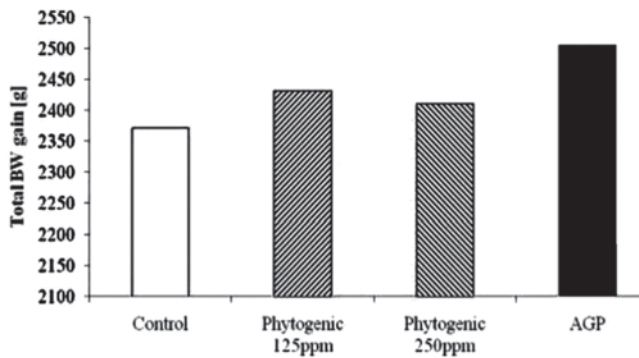


Figure 3: Effect of phytoGENICS and an Antibiotic Growth Promoter on total body weight gain of broilers (Agricultural University of Athens, Greece)

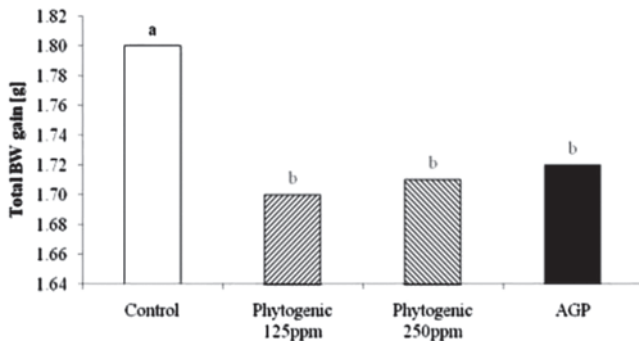


Figure 4: Effect of phytoGENICS and an Antibiotic Growth Promoter on FCR of broilers (Agricultural University of Athens, Greece). ^{a,b} Means with different letter differ ($P < 0.05$).

different treatments, comprising 3 replications per treatment and 105 birds per treatment. The Negative Control (NC) contained no growth promoters, whereas the Positive Control (PC) contained Avilamycin. In further treatments, *Digestarom*[®] P.E.P. 125 poultry was supplemented at 125 or 250 g/t, respectively. As shown in Figures 3 and 4, *Digestarom*[®] P.E.P. increased body weight gain and significantly improved FCR. Differences between the dosages of *Digestarom*[®] P.E.P. were minor, indicating that the regular inclusion level of 125 g/t was optimal under the experimental conditions herein.

PhytoGENICS in egg production

The effects on performance and economics of *Digestarom*[®] P.E.P. were investigated in the early

Table 3: Effects of phytoGENICS on egg traits in layers

	Control	+ PhytoGENICS
Shell thickness (mm)	0.416 ^b	0.478 ^a
Albumen height (mm)	6.57	7.09
Haugh Units ¹	79	82

^{a,b} Means with different superscript letters differ significantly ($P < 0.05$)

¹ Haugh Unit is a correlation between egg weight and albumen height.

stages of the egg production cycle (Nichol and Steiner, 2008). A 12-week trial was carried out with high-performing, Lohmann Brown hens using six replications with 16 birds per replication in a randomized complete block design and resulting in 96 hens per treatment. The age of the birds at the beginning and conclusion of the trial was 20 and 32 weeks, respectively. The birds were assigned to two dietary treatments: (1) Control (no additives), (2) control + *Digestarom*[®] P.E.P. All birds were vaccinated for Newcastle Disease and Infectious Bronchitis every six weeks. As shown in Table 2, hens fed phytoGENICS consumed less feed and had higher egg production as compared to the control group. Total and average daily feed intake was lower by 1.8% when the control diet was supplemented with phytoGENICS.

Hens offered phytoGENICS produced more eggs and had a better feed conversion in comparison to birds in the control group. Additionally, supplementation of the diets with phytoGENICS improved egg shell parameters (Table 3), i.e. shell thickness ($P < 0.05$) and albumen height. As indicated by a higher Haugh Unit rating (82 vs. 79), the internal egg quality was higher in hens fed phytoGENICS.

Based on actual local prices, *Digestarom*[®] P.E.P. improved productivity, resulting in a 1.74% cost saving (47.09 vs. 47.74 USD per 1000 eggs).

Table 2: Effects of phytoGENICS on average performance parameters (week 20 to 31) of layers

	Control	+ PhytoGENICS	Difference (%)
Daily feed intake per hen (g)	112	110	-1.8
Total feed intake per hen (kg)	9.42	9.26	-1.8
Egg production (%)	92.6	93.5	+1.0
No. of eggs per hen	77.8	78.6	+1.0
FCR (kg feed/kg eggs)	2.069	2.034	-1.7

Traditional Herbal Plants for Health Management of Poultry

Manisha Singodia, Sanjay Kumar Rewani, Ashok Baidha, Subhash Chand

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Post Graduate Institute of Veterinary Education and Research, Jaipur-302031
Email: manishasingodia27@gmail.com

Introduction: A herb is characterized as a plant utilized for the medicinal purpose (for the treatment of the disease or for improvement in well-being and profitability). Rigveda, the most established report of human knowledge composed in the vicinity of 4500 and 1600 B.C specify the utilization of medicinal plants in the treatment of man and animals. Herbs are utilized as mixtures in complex formulations to have a synergistic impact. Herbs, are a moderately new class of feed additives and utilizing based on an assumption that photogenic mixes may enhance the palatability. Aloe Vera, pepper, sisal and neem were the most utilized therapeutic plants. Parts utilized included leaves, barks, and roots. Some particular mixtures were said to prevent or treat the particular illness. For instance, Aloe Vera was said to treat Newcastle, Croton megalocarpus was said to treat coryza sinusitis, Combretum mole was said to treat intestinal worms.

Advantages: Absence of side effects, an absence of residual effects, nonhazardous, eco-friendly, minimum problem of drug resistance. Despite the fact that greater part of herbals is stable, there are different constituents which are photolabile, thermolabile in this manner less stable.

1. As Antibiotics for Broilers: One method for decreasing the prepared antibiotics costs is through using the antibiotic properties of herbal trees. There is, in any case, a need to investigate the likelihood of utilizing these herbal trees as a wellspring of antibiotics for broilers. A manufactured antibiotic was utilized as a part of the poultry, the leaves of the avocado, guava, duhat, eucalyptus, or tamarind tree in a herbal decoction (water in which the herbal source was been boiled and which in this way contains the constituents of the substance dissolvable in boiling water). Amarillo can be a decent source of antibiotics and substitute to financially fabricated antibiotics for broilers. Apply antimicrobial activities in vitro against vital pathogens including fungi. Apply their antimicrobial movement through various systems,(eg: tannins) act by iron

Local Name	Botanical Name	Part Used	Selection Of Disease Symptom Treated	Possible Target Diseases
Aloe (Eshikakha)	Aloe Vera	Leaves	Diarrhoea (Whitish, Greenish, Bloody)	Newcastle Disease
Pepper (Pilipili)	Capsicum	Fruit	Coughing, Gaspings, Noisy Breathing	Respiratory Diseases
Lilokha.		Leaves	Diarrhoea	Gastrointestinal Diseases
Sisal (Likonge)		Leaves	Diarrhoea, Unthrift Ness, Drooping Wings	Gastrointestinal Diseases
Neem (Mwarobaini)	Azadirachta Indica	Leaves, Bark	Whitish Diarrhoea, Pox Lesions, Scaly Legs	Viral Diseases and External Parasites
Kumukimilia	Combretum Mole	Leaves, Bark	Gaspings, Coughs, Foamy Diarrhoea	Respiratory Diseases and Intestinal Worms
Imbululusi		Leaves, Bark and Roots	Diarrhoea, Unthriftiness, Drooping Wings	Gastrointestinal Diseases
Amavinzo Tithonia		Leaves	Diarrhoea (Foamy), Coughing, Unthriftiness, Drooping Wings	Gastrointestinal Diseases and Worms
Musembe	Endatta Abyssinica	Bark	Cough, Gasps and Diarrhoea	Respiratory Diseases

deprivation, hydrogen bonding or in particular collaborations with essential proteins, for example, compounds demonstrated that tannic acid inhibits the development of the intestinal microscopic organism, for example, *Bacteroides fragilis*, *Clostridium perfringens*, *E. coli* and *Enterobacter cloacae*. Watched a noteworthy lessening of *C. perfringens* colonization in the intestine of broilers nourished diets containing mixtures of thymol, eugenol, curcumin and piperine, or thymol, carvacrol, eugenol, curcumin and piperine. The antimicrobial exercise of herbs and spices Ginger, Cumin, Clove, Garlic, Pepper, Coriander, Mustard, Cinnamon, Oregano, Rosemary, Sage, Thyme. Garlic has more solid antimicrobial activities in the digestive tract than different herbs and spices.

2. Antioxidant Activity:

The antioxidant activity of plant extricates is for the most part identified with the nearness of phenolic compounds and different mixes, for example, Flavonoids (exhibit in oregano and thyme) and Terpenoids (e.g., thymol, carvacrol and eugenol). Among every one of the herbs – Rosemary (*Rosmarinus officinalis* L.) and Sage (*Salvia officinalis* L.) have the most astounding antioxidant potential. Other plant species having antioxidant movement: Plant species from the group of Zingiberaceae (e.g., ginger and Curcuma) and Umbelliferae (e.g., anise and coriander) as well as plants rich in Flavonoids (e.g., green tea) and Anthocyanins (e.g., many fruits), Pepper (*Piper nigrum*), Red pepper (*Capsicum annum* L.), and Chili (*Capsicum frutescent*) contain antioxidative segments. In a considerable lot of these plants, parts of the dynamic substances are exceptionally foul or may taste hot or sharp, so which may limit their utilization for sustaining purposes.

3. Effects on Digestibility:

Fragrant compounds, for example- capsaicin, the dynamic rule of the chili pepper (*Capsicum annum*), have demonstrated effective incitement of pancreatic

and intestinal enzymes in monogastric animals. Therefore, they advance a lessening of the intestinal consistency, making the digestive process more efficient, Other plant dynamic segments, such as eugenol (active principles of clove) and cinnamaldehyde (cinnamon). Apply valuable activities inside the digestive tract, for example, purgative and spasmolytic impacts, as well as prevent flatulence.

While assessing the mixture of sage, thyme, and rosemary or with a commercial item containing capsaicin, cinnamaldehyde and carvacrol in broiler eating routine watched, comparative ileal dry matter and protein digestibilities as the eating routine supplemented with antibiotic in finishers. Improve the exercises of trypsin and amylase in broilers. Additionally revealed that herbs animate intestinal emission of mucus in broilers hinder grip of pathogens and in this way contribute the microbial eubiosis in the gut.

4. Growth-Promoting Efficacy / Performance Enhancer:

Performance enhancers are natural, synthetic, chemical compounds, or basic inorganic components used to enhance animal development rate as well as encourage feed conversion ratio. Antibiotics agents and chemotherapeutic medication are the most every now and again utilized execution enhancers in animal production particularly in poultry production. But now, it is demonstrated that antibiotics are not generally useful for poultry health even human health as a result of residual impacts. They are giving more regard for the indigenous medicines i.e photogenic items, for example, herbs (flowering, nonwoody, and nonpersistent plants), spices (herbs with an intensive smell or taste ordinarily added to human nourishment), essential oils (volatile lipophilic compounds derived by cold expression or by steam or liquor refining), oleoresins (extracts determined by nonaqueous solvents).

The primary mode of action of growth-promoting activity arises from stabilizing feed hygiene (e.g., through organic acids), and even more from beneficially affecting the ecosystem of GIT microbiota through controlling potential pathogens. This applies especially to critical phases of life i.e during the early stage of life and high production phase of poultry. Because of a more stabilized intestinal



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health. Birds are less exposed to microbial toxins and other undesired microbial metabolites, such as ammonia and biogenic amines. Consequently, relieve the bird from immune defense stress during critical situations and increase the availability of essential nutrients for absorption. Thereby helps the birds to grow better within the framework of their genetic potential. These effects are also typical for organic acids, the major part of their biological efficacy mainly through stabilizing the microbial eubiosis in the GIT including the suppressed formation of biogenic amines. With supplementation of herbs, we may improve the supply status of limiting essential nutrients. Improve the pre-cecal digestive capacity reduction in the passage of fermentable matter into the hindgut, thus low/less the post ileal microbial growth and the excretion of bacterial matter in feces, respectively. So results in an increased apparent digestibility of dietary protein.

5. Toxin Binding Activity:

Among the different measurements, 0.20% was observed to be the best herbal toxin binder and the detoxicant ToxiCheck (containing *Azadirachta indica*, *Andrographis paniculata* and other herbs) in various combinations demonstrated binding and discharge of aflatoxins from the intestinal tract, enhancing growth, FCR, supplement digestibility and diminishing seriousness of liver lesions.

6. For Respiratory Distress:

Respiratory distress is a virus-borne infectious disease, which spreads quick starting with one bird to the next, ordinarily known as Ranikhet disease (Newcastle disease), it is widespread all over India. The indications incorporate watery discharge from nostrils, gasping, trembling, facial swelling, and sometimes twisting of the neck. Under the effect of the infection, adult laying birds decrease their feed and water consumption with the considerable drop in egg production as well.

Both Shatadal and Narugopal utilize local herb (name withheld for IPR reasons) in the mix with different herbs to set up a medication to treat respiratory distress in birds. The drug is given orally twice or thrice in a day depending upon the seriousness of the condition. It is administrated until the affected birds get cured, generally within five days.

Conclusion:

Popular demand and scientific significance for organic poultry production, particularly feeding with medicinal botanicals have increased considerably in recent years to the production of the synthetic chemical used in poultry industries. Furthermore, research required to devolved different feed additive from unknown herbals plants to increase benefits and good safe protein food to consumers as well as poultry industry growth.

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PRESS RELEASE

CLFMA CFO Forum presented valuable insights on the future of Indian livestock sector

In India, about 20.5 million people depend for their livelihood, upon livestock sector, which contributes about 4% country's GDP and 26% of total Agriculture GDP¹



India, Mumbai, XXX May 2018: CLFMA organized its first “CFO Forum” in association with NCDEX IPFT for senior-level professionals from various sub-sectors of livestock industry such as poultry, dairy, feed and aquaculture. The CLFMA CFO Forum witnessed expert speakers’ offering deeper insights on the prospects and potential of the sector from financial perspective.

B. Soundararajan, Chairman of CLFMA of India opened the forum by emphasizing the vital role of livestock Industry being the lifeline of rural India. He urged the members of the Industry especially CFO’s to think strategically with a long-term vision. G Chandrashekhar, noted policy commentator and senior journalist offered a global outlook on various commodities and key drivers that are to be tracked on a regular basis. He predicted an imminent rate hike by US Fed possible due to upward trend continuing in the crude prices.

Ashish Modani from ICRA spoke on the macro-economic factors impacting the industry while explaining about exports particularly, bovine meat. With the livestock industry contributing to 8.5% of the employment and 4% of the GDP, this sector must focus on the quality of the overall industry infrastructure particularly processing and cold storage.

The importance of risk reduction to ensure a stable cash flow and profitability was highlighted by Rahul Ghosh from NCDEX IPFT. He emphasized on the need to follow a policy-based structure approach to optimize the risk ratio. He also mentioned that price volatility is the biggest risk in our business. M Krishna Rao from SBI focused on bottomline being key for any business; priority sector lending by connecting to the right persons in need; and diversity beyond crop loans where livestock sector; and how digital technology enables efficient loan processing.

Speaking about various nitty-gritties of GST, Raghavan Ramabadrhan from Lakshmikumaran & Sridharan enlightened the audience about tax compliance and how GST enables seamless flow of credit in both goods and services across borders. Articulating his passion, Ashish Mantri of Abhay Cotex shared his experience of getting funded by VC & PE players and stated that alternative proteins will lead the next wave of revolution in food and feed. He said big picture thinking, global business model, innovation & collaborations will attract investment and enable effective asset utilization

Sharing interesting insights on blockchain technology, Sudhir Chaudhary of Auxesis Group how innovations and evolving technologies help improve efficiency and safety in transactions for example, smarter contracts enabling faster and safer transactions. Dr D Ravindra of NABARD stressed the difference between viability and bankability and mentioned that socio-economic and environmental parameters are becoming more and more important in the process of evaluating potential projects for financing.

Summarizing the entire event, S V Bhawe, Deputy Chairman of CLFMA stressed on efficiency and far-sighted approach for the CFOs and concluded the forum by saying that livestock industry is poised to continue on its upward growth trend.

Commenting on the program, Raghavan Sampathkumar, Executive Director of CLFMA said “Livestock sector deserves more attention, budgetary

allocation and parity with crop-based agriculture. We appreciate the support from NCDEX IPFT for organizing this event successfully.”

About CLFMA of India:

CLFMA of India (www.clfma.org) is the apex organization and the voice of the country’s dynamic livestock sector. Having had illustrious leaders such as Adi Godrej at its helm as Chairmen in the past, the 50-year old industry association is recognized as one among the highly reputed in India. It currently has over 230 members representing diverse subsectors of animal protein value chain including feed manufacturing; poultry, dairy and aquaculture business; animal nutrition and health, veterinary services, machinery and equipment; processing, distribution and retailing of meat; and ancillary services such as banking.

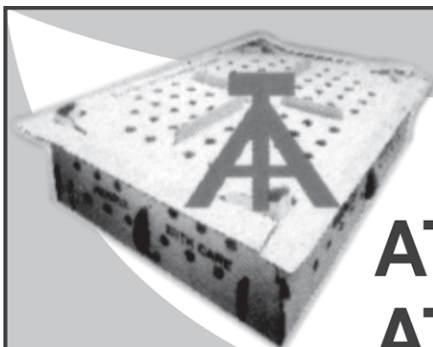
About NCDEX: National Commodity and Derivatives Exchange Ltd (NCDEX), one of the leading commodity Exchanges in the country has started series of initiatives to educate and inform stakeholders about the commodity market, different stages of post-harvest activities management and benefits of using various hedging tools like Futures and Options.

These initiatives are specially designed programs which provides information about how to link with Commodity exchange and how to get benefits through Farmer Producer’s Organizations (FPOs). NCDEX has continuously been conducting many capacity building meetings and training programs with FPOs



to explain the benefits of trading on the exchange platform. Beside risk mitigation and improved price discovery, the Exchange has also helped many FPOs with improved and transparent storage and warehousing facilities. As of April 2018, around 75,000 farmers have traded on the NCDEX platform through 71 FPOs, and the FPO national footprint has now penetrated to 12 States.

NCDEX actively reaches out to stakeholders in the value chain including farmers, students, and corporates on various topics related to commodity markets and educates them on how to fetch better price realization for their agri-produce, thus enhancing their income.



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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	88	88	92	92	97	102	102	105	105	105	105	105	107	107	107	109	111	113	115	117	117	117	117	110	104	97	97	97	92	92	92
Karimnagar	88	88	92	92	97	102	102	105	105	105	105	105	107	107	107	109	111	113	116	117	117	117	117	110	104	97	97	97	92	92	92
Warangal	88	88	92	92	97	102	102	105	105	105	105	105	107	107	107	109	111	113	115	117	117	117	117	110	104	97	97	97	92	92	92
Mahaboobnagar	88	88	92	92	97	102	102	105	105	105	105	105	107	107	107	109	111	113	115	117	117	117	117	110	104	97	97	97	92	92	92
Kurnool	88	88	92	92	97	102	102	105	105	105	105	105	107	107	107	109	111	113	115	117	117	117	117	110	104	97	97	97	92	92	92
Vizag	80	83	87	87	92	92	92	92	92	92	92	92	94	94	96	98	100	102	102	107	107	107	107	99	93	86	86	86	81	81	81
Godavari	88	88	92	92	97	100	100	104	104	104	104	104	106	106	108	110	112	114	114	116	116	116	116	108	102	95	95	95	88	88	88
Vijayawada	90	90	94	94	99	102	102	105	105	105	105	105	107	107	109	111	113	115	115	117	117	117	117	109	103	97	97	97	90	90	90
Guntur	90	90	94	94	99	102	102	105	105	105	105	105	107	107	109	111	113	115	115	117											
Namakkal	69	69	69	74	76	76	76	76	76	76	76	72	72	72	74	74	74	77	77	77	77	79	79	79	79	79	79	82	84	87	87

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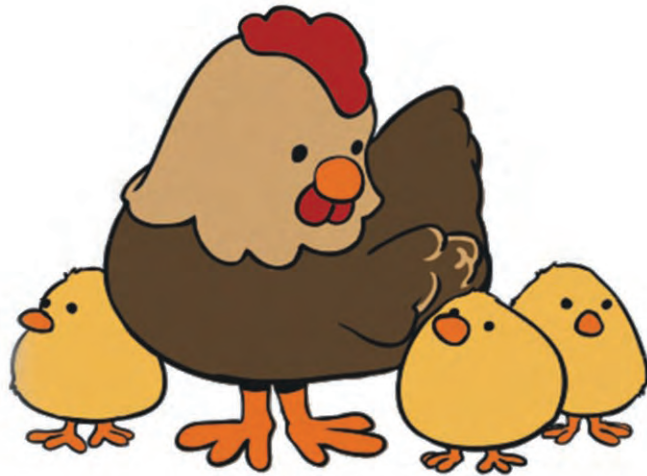
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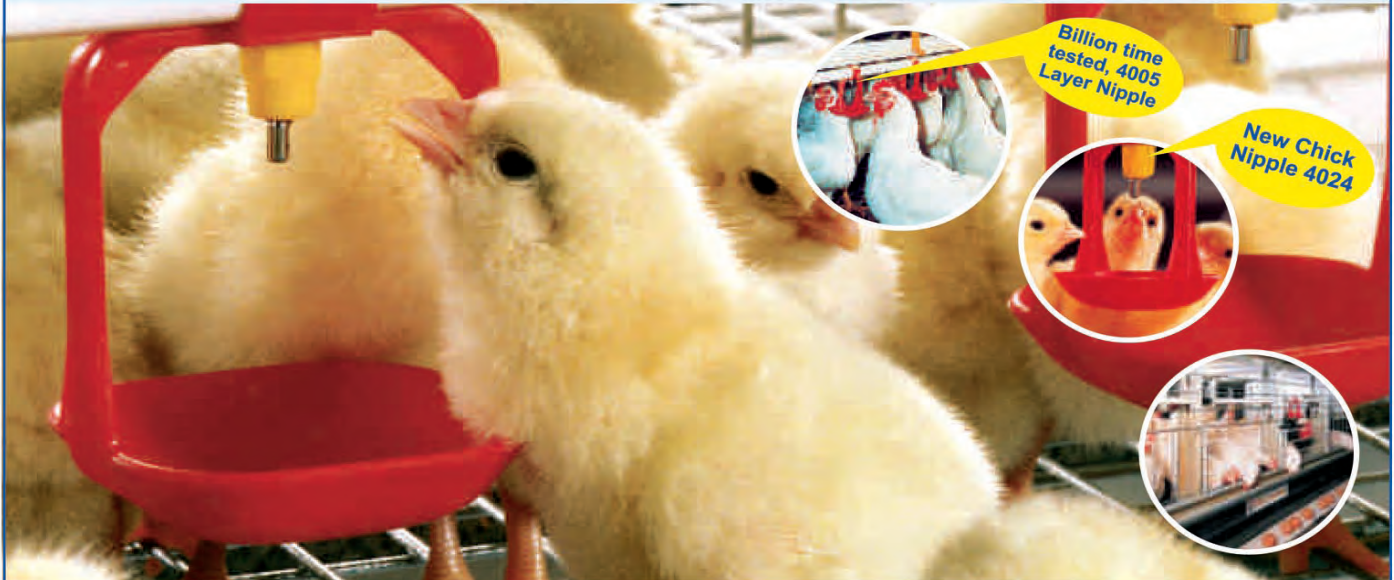
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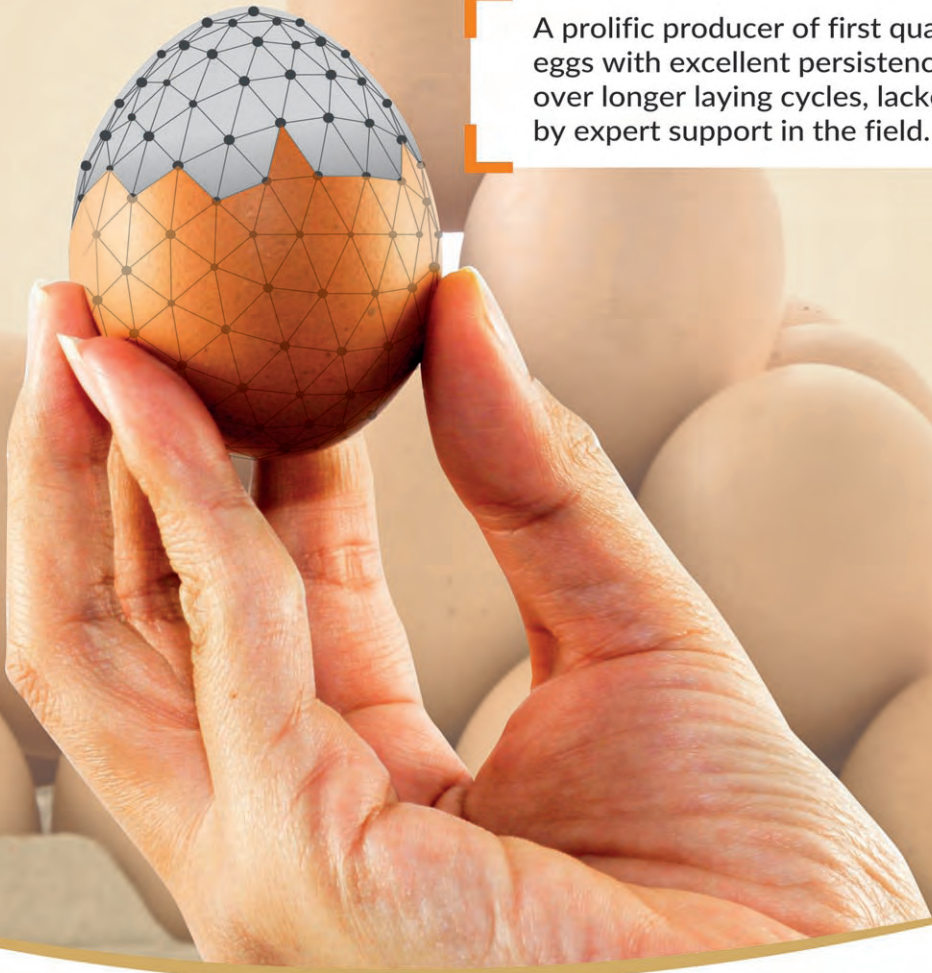
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Factors affecting fat digestion in Poultry

Yasir Bashir - Kemin Industries South Asia Pvt. Ltd.

INTRODUCTION: With tremendous increase in the genetic potential of broilers leading to rapid weight gain with maximum feed conversion, their nutrient needs have also increased. Nutrient specifications for today's fast-growing broiler birds are comparatively higher than those of earlier strains. High energy diets of modern broiler strains make it imperative for inclusion of fats and oils into their diet, which provide higher energy per unit than cereals and other feed ingredients. High dense feed formulations are virtually impossible without the inclusion of fats and oils which are having at least twice the energy value as those of carbohydrates and proteins. In addition, fats also help to reduce dustiness in feed, improve palatability and reduce wear and tear in feedmill equipment. Fats and oils are principally almost similar in their structure with differences in chemical properties and physical states. They are esters of three fatty acids with glycerol commonly called triglycerides, with fats being triglycerols in solid form and oils being triglycerols in liquid form at room temperatures.

Digestion and assimilation of fats is quite different and complex than that of carbohydrates and proteins. This involves three critical steps - emulsification of ingested fats, their hydrolysis by digestive enzymes and finally micelle formation which leads to the absorption of digested fatty acids into the portal system. Emulsification is a critical step, as it is difficult for the large fat molecules to be miscible in the aqueous environment of the intestine. This step will determine to a large extent the activity of lipase in digesting the fats to mono and di glycerides, which is the second step. The hydrolysis by lipase enzyme involves the release of fatty acids from position one and three of the glycerol backbone in the triglyceride molecule. The ultimate step of this involves the association of bile salts, monoglycerides and free fatty acids to form micelles, which move through the unstirred water layer and thereafter the components are absorbed by gut cells.

Overall, the digestion of fats is a complex process requiring adequate amounts of bile salts, pancreatic lipase and colipase. The function of colipase, which is a co-factor present in pancreatic secretions, is to aid in maintaining the lipase in an active configuration at the lipid-water interface. Colipase binds to the surface of lipid droplets and acts as an anchor for lipase allowing pancreatic lipase to digest triglycerides. Lack of any one of these essentials will impair the digestion and absorption processes. Bile is the main source of endogenous fat and fatty acids which plays an important role in digestion and absorption of fat. Bile works as an emulsifier in the digestion process and in formation of mixed micelles which are crucial for the absorption process. Various factors that affect the digestibility of fats are as follows:

1. AGE OF BIRD: New born chicks have minimal ability to digest and absorb fat. This can be mainly attributed to two reasons namely, inefficient secretion of bile salts and poor lipase activity. It has been reported that the secretion of endogenous enzymes including lipase, trypsin and amylase increased many folds (20-100) between 4 to 21 days post hatch. However, it was observed that lipase activity increased much slower than other enzymes. The ability to digest and absorb fat in birds develops rapidly after the first few days of life and increase with advancing age. Various workers

described that absorption of fats improved significantly as the age of birds increased. Low fat digestibility of young birds not only leads to wastage of costly nutrient but also leads to low AME. In a study, AME of fats in broilers fed diets containing vegetable oil and increasing levels of tallow at 2nd, 4th, 6th and 8th weeks of age was determined. Results revealed that the AME of both fat sources increased between 2nd to 4th weeks of age, thereafter no further increase was noticed. The increment in AME was greater in tallow than vegetable oil. The lower AME in young birds were attributed to poor emulsification rather than deficiency in lipase activity.

2. DEGREE OF SATURATION OF FATTY ACIDS: Ability of fats to yield energy depends upon its chemical structure. Carbon chain length, degree of saturation and the location of double bonds in fatty acids, all have an impact on the digestion and absorption of fats. Degree of saturation of fatty acids has a key influence on the AME of fats. Animal fats such as tallow usually contain very high amount of saturated fatty acids; especially palmitic and stearic acids which are poorly digested and absorbed by poultry. Saturated fatty acids need a much higher concentration of bile salts for their emulsification and micelle formation before they are absorbed. Impact of the absence of bile acids was higher in the solubilization and absorption of saturated fatty acids than that of unsaturated fatty acids. As a result, oils from plants sources such as soybean oil which comprises high amount of unsaturated fatty acids were digested and absorbed more than animal fats. The length of the carbon chain in fatty acids also affect their digestion and absorption, short chain fatty acids being more digestible. The ratio of unsaturated to saturated fats also influenced the AME of the oils with an increasing proportion of unsaturated fat in a fat blend associated with higher AME. Some studies also suggested that blending of saturated and unsaturated fats may improve fat absorption and there may be a synergistic response with such blends.

Distribution and position of fatty acids in the glycerol molecule is an important factor that affects the fat digestibility. During fat digestion process, triglycerides are hydrolyzed by the action of pancreatic lipase with end products being two free fatty acids and monoacylglycerol. The specific arrangement of saturated and unsaturated fatty acids on the glycerol moiety of a triglyceride molecule can contribute to the differences between digestion of fat types. Pancreatic lipase shows specificity for the fatty acids esterified to glycerol in the 1st- and 3rd- positions and leaves the 2nd position monoglyceride intact to be absorbed as such. The fatty acids in the form of monoglycerides have greater solubility for micelle formation than the same fatty acids released from the 1st- or 3rd- positions, which were more nonpolar, insoluble and less digestible.

3. FAT QUALITY: Quality of fats also has a profound effect on their digestibility and energy value. In practice, fat quality is determined mainly based on the level of impurities, free fatty acids and the rancidity of fat. Impurities in fat were usually measured as moisture, impurities and unsaponifiables (MIU). The maximum acceptable value of moisture is 10 g/kg fat. Impurities are determined as the percentage of insoluble fraction of fats or oils in petroleum ether and should be less

than 10g/kg fat. Other criteria were determination of unsaponifiables which include sterols, pigments, waxes etc. with maximum level of 10g/kg of fat. Another method that is often used as a good indicator of fat quality is the level of free fatty acids (FFA). When fatty acids are not bound to triglycerides, they exist in free form and are called as free fatty acids. It has been reported that digestibility and the AME of fats are depressed with increasing concentrations of FFA. Fats with lowest FFA values when incorporated in the diet of birds could provide highest AME values in both young and older birds. Another important factor which leads to appreciable loss in fat quality is oxidative rancidity. Oxidative rancidity is a process that results in the degradation of fatty acids and occurs in unsaturated fatty acids due to oxidation of the double bonds. It affects the odor, color, flavor and decreases the nutritive value of fat. Several methods are used to evaluate oxidative rancidity in fats and oils including peroxide value and active oxygen method (AOM).

Peroxide value is the commonly used indicator of fat oxidation and expressed as milliequivalent (meq) of peroxide per kg fat. It was observed that a slight rancid odor was developed in animal fats when peroxide levels reach 20 meq/kg, whereas the rancid odor in vegetable oils started developing at around 80 meq/kg. Since the concentration of unsaturated fatty acids are very high in vegetable oils like soyabean oil, they tend to be more sensitive and prone to oxidation particularly when stored at high temperatures. Oxidation of fats has negative effects on poultry performance and the quality of meat. It has been reported by various workers that feeding a diet with oil supplemented with high degree of oxidation resulted in lower body weight gain and feed intake. The oxidised oil contained substrates such as aldehydes, ketones etc., which may result in the development of rancid flavors and odors, and reduced the palatability of feed.

4. NON-STARCH POLYSACCHARIDES (NSP)

NSP's exhibit an antinutritional effect in the diets and are primarily responsible for negatively affecting the digestibility of various nutrients including fats. NSP's such as arabinoxylans and β -glucans increase the digesta viscosity and reduce the digestibility of nutrients by impeding the diffusion of digestive enzymes and substrates, and the contact between nutrients and absorption sites on intestinal mucosa. The negative effect of NSP's on digestibility remains pronounced on fats than other nutrients. This can be attributed to high intestinal viscosity caused by soluble NSP's that slow down the gut motility and impair diffusion and convective transport of droplets of emulsified fat, fatty acids, mixed

micelles, bile salts and lipase within intestinal contents. Impaired fat digestion resulting from the increased bacterial proliferation in intestinal tract may have a systemic effect on the gut secretions and intestinal morphology. The increase in bacterial activity may also increase the deconjugation of bile acids. Deconjugated bile cannot be reabsorbed and will be excreted. Poor digestion of fat may occur due to reduced recycling and the resultant low concentration of bile salts in birds fed with diet containing high levels of NSP's.

5. CALCIUM LEVEL IN FEED: Dietary calcium level has a profound effect on utilization and fat digestion. Digestion of fats yield free fatty acids and monoglycerides. These free fatty acids can react with other nutrients in the feed to form soluble or insoluble soaps. If insoluble soaps are formed with minerals such as calcium, both the fatty acid and the mineral will be unavailable to bird. It has been suggested that phytate, as calcium-phytate, may be involved in the formation of insoluble metallic soaps in the gut. Some type of fatty acids and dietary calcium levels are reported to have a deep effect on calcium metabolism and soap formation in broilers. Higher calcium levels in the feed resulted in decreased retention of fat due to soap formation, with potential for soap formation greater in saturated fatty acids when compared to unsaturated fatty acids such as oleic acid. Higher concentrations of calcium in diets containing animal fats may further increase metallic soap formation and lower the energy derived from lipids.

CONCLUSION: Fats are an expensive source of energy in poultry diets and its digestion and absorption is a complex process. Ability to digest and absorb fat was limited in young birds particularly in first few weeks. There is still ambiguity as to, if this poor digestion in the first week of chick life is due to deficiency of lipase or bile or both. But sufficient quantities of bile salts for proper emulsification of fats in the gut is necessary for its maximum digestion and utilization. So, a good strategy to improve fat digestion in young birds and throughout the lifecycle in general should consider the use of external supplementation of emulsifiers or most preferably natural bio-surfactants like lysophospholipids, lecithins, etc. This complement the bile salts in proper emulsification and the miscibility of fats or oils, especially of animal fats in the gut which ultimately leads to its efficient hydrolysis by lipase enzyme. There is a distinct advantage of lysophospholipids over other emulsifiers as they are more hydrophilic than phospholipids, have one fatty acid residue per molecule and can form spherical micelles in aqueous solutions leading to improved emulsification in the gastrointestinal tract. Lysophospholipids can also form small sized micelles and are more effective than bile and soy lecithin.

V. Yadagiri Reddy
Chairman & Managing Director



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PRESS RELEASE

Trouw Nutrition India signs declaration of intend during Trade mission



During the Trade mission with Mr. Mark Rutte (Prime Minister of the Netherlands) and Mrs. Carola Schouten (Minister of Agriculture, Nature and Food Quality) on May 24th in New Delhi, a declaration of intend was signed for a large Dairy project with **Trouw Nutrition India**, SmartDairy, Van Hall Larenstein University of Applied Sciences, Larive International and Baramati Agricultural Development Trust.

In India, the milk yield per animal remains relatively low. The smallholder production system suffers due to insufficient awareness of good farm management practices and lack of access to credit and high-quality production inputs.

DairyTechIndia, a consortium of Dutch and Indian Dairy specialists, wants to improve the average yield and quality of milk produced by smallholder farmers and increase their income level.

They envision to do this by improving quality and availability of feed, concentrate and increasing the knowledge levels and capabilities of farmers by setting up model dairy farms in which farmers will be trained on feeding practices & technology, animal husbandry & farm management.

This will be done through a multi-annual, multi-stakeholder Public Private Partnership.



Science and Innovation Series Mycotoxin: Knowing, Assessing and Managing the Risk EW Nutrition



EW Nutrition under Science and Innovation series organized a series of interactive symposiums on Mycotoxins: Knowing, Assessing and Managing the risk at major five locations in four countries in South Asia for Poultry Industry: Kolkata and Panipat in India, Dhaka in Bangladesh, Kathmandu in Nepal and Colombo in Sri Lanka. The series of technical seminar focuses on mycotoxin risk management using the Mycotoxin risk tool and new innovations in the field of feed preparation. Key Speaker of the event were Mr. PersakPredrag, Ms. Marisabel Caballero, Ms. Malin Lange and Dr. Shirish Nigam. Mr. PredragPersak, Chairman of Animal Nutrition Committee European Feed Manufacturers' Federation, presentedhis research and development on practical technique to produce low cost high performance feed. He showcased how feed additives help in stabilizing gut functionality &

health and reduce the need for antibiotics therefore improving productivity. He has successfully developed and tested a pilot food for broilers with minimum use of soybean andwith 6% of crude fiber. Ms. Marisabel Caballero, Global Technical Manager for Poultry, EW Nutrition focused on improvement of gut health through nutrition and toxin management. She shared the impact of toxins on the overall health of the poultry because of gut and mycotoxin interactions. Mycotoxins get absorbed by the gut and what is not absorbed, affects the liver functionality. Ms. Caballero showcased the competency of Mastersorb Gold in binding the mycotoxins as well as the bacterial toxins by various in-vivo trials.Mastersorb gold results in better liver function, improved feed intake, improved body weight and therefore higher profits to the customers.





Ms. Malin Lange, Product Manager- Mastersorb, showcased Master Risk Tool to the audience. Master Risk Tool is the one stop solution to real time accurate toxin profile analysis. EW Nutrition took this opportunity to launch its dedicated website for the toxin analysis: www.masterrisktool.com. The toxin profile testing is being done on Charm EZ mycotoxin testing machine by the highly proficient and trained team members of EW Nutrition. Mycotoxin testing machine is being able to test the mycotoxin profile in real time with 95% accuracy. Master risk tool is then used to analyse the data of the tests done. The master risk tool at www.masterrisktool.com is an open source for analysing the data of the mycotoxin profile analysis. Very soon EW Nutrition is also going to launch a dedicated resource for finding information on toxin management at www.toxin-management.com.

Dr. Shirish Nigam, Managing Director, South Asian subsidiary of EW Nutrition, promised to work closely with the customers to increase their productivity and profitability using latest tools, technology and information. He reiterated the commitment of EWN as partner in progress. Dr.



Nigam discussed in detail regarding the macro and micro economic environment of the poultry business in South Asia. He focused on the fact that holistic approach is required for a healthy gut. As the profitability of the poultry lies in the gut, not one product or process, but a bundle of actions is required for maintaining a healthy gut.

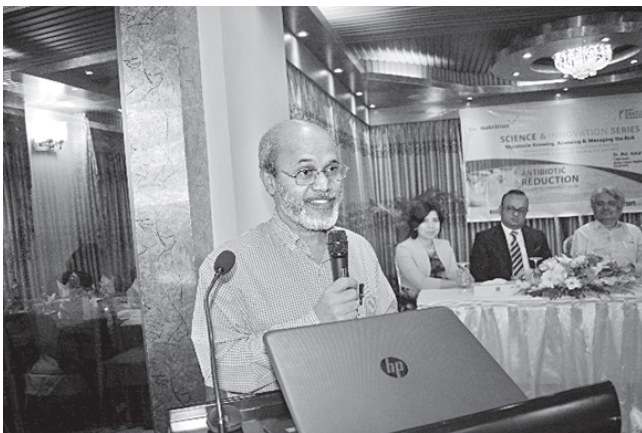
The interactive event was attended by more than 230 poultry consultants, nutritionists, and veterans of the poultry industry at the five locations. Area experts were invited to be the external speakers for the events to share the local perspective on Mycotoxins with the audience. In Dhaka, Mr. Eric Brum, FAO representative of Bangladesh was the external key speaker for the event. He discussed in details regarding the action of antibiotics in the animals pointing out the AMR issues in Bangladesh. He discussed the initiatives of BARA in Bangladesh to sensitize the people on the issue of antimicrobial resistance and motivate them to find innovative solutions. Dr. Md. Ainul Haque, Deputy General, Bangladesh farm gate was the chief guest of the event. In Karnal, Dr. Mahendra Chaudhari, who is a veteran of poultry industry and





also a consultant to EW Nutrition was the guest speaker for the event. He spoke at length regarding the gut health management. Using the various trial data, he showcased the side effects of mycotoxins on the overall performance of the poultry. Dr. Nimal Priyankarage, Veterinary Research Officer at Veterinary Research Institute, Srilanka was the guest speaker for the event. He gave his insights on the Status of Mycotoxins in Animal Feeds in Sri Lanka.

The event concluded with vote of thanks by Dr. Rafiqul Islam in Bangladesh, Mr. Rishi Badalin Nepal, Dr. Buddhika in Srilanka, Mr. Avik in Kolkata and Mr. Kingshuk Chakraborty in Karnal. EW Nutrition believes in the power of knowledge sharing and focuses on reducing dangerous substances from the environment, foster sustainable production, improve animal health and welfare and thereby increase the customer profitability. EW Nutrition extends warm regards and sincere thanks to all those who took time out of their busy schedule and joined us for the enlightened discussions.



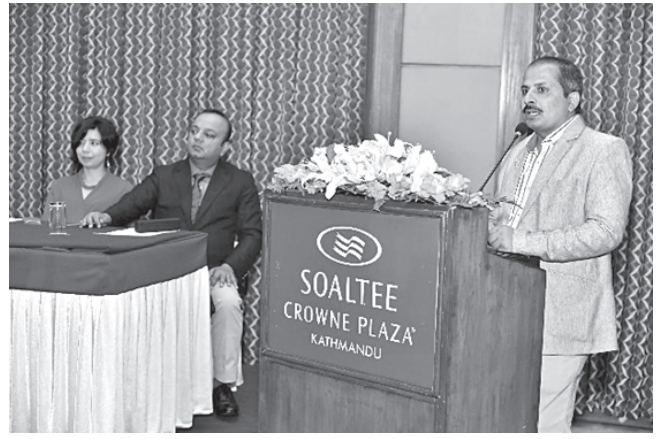
About EW Nutrition:

EW Nutrition GmbH is a dynamic company, globally active with a strong science based product portfolio in the field of functional, innovative feed & food additives. The current product portfolio includes Natural Egg Immunoglobulins (Globigen®), Toxin Solutions (Mastersorb®), Microencapsulated Secondary Plant Compounds (Activo®), MOS (Bgmos®), Slow Release Source of Nitrogen (Prote-N®), Complementary Feed Supplements (Stimuvital®), Sanitary and Care Products (Agrochemica®, Humavet®).

EW Nutrition is located in Germany (headquarter and subsidiaries Agrochemica and Humavet) but is present in different locations with EW Nutrition USA (Des Moines), GRASP (Curitiba, Brazil), EW Nutrition Japan (Gifu), EW Nutrition China (Beijing), EW Nutrition South East Asia / Pacific (Singapore), EW Nutrition Turkey (Istanbul), EW Nutrition South Africa (Johannesburg), EW Nutrition Australia (Griffith NSW), EW Nutrition Poland (Puszczykowo), EW Nutrition South Asia (Delhi NCR) and EW Nutrition Vietnam (Ho Chi Minh City).

For more information, visit www.ew-nutrition.com







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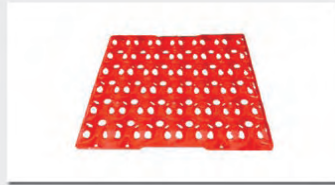
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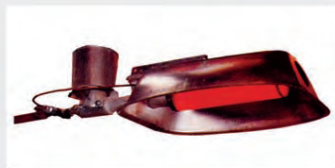
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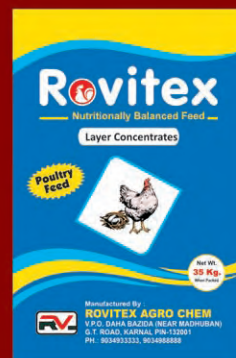
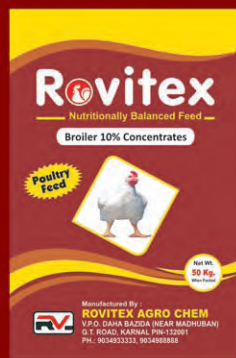
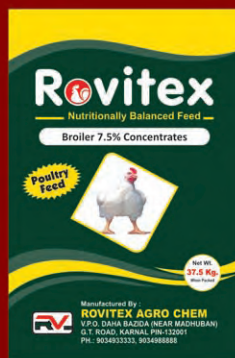
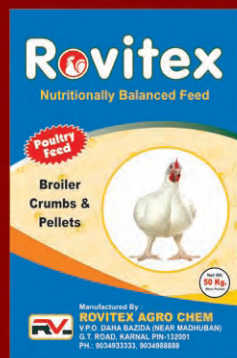
- ❖ Broiler 10% Concentrates
- ❖ Broiler 7.5% Concentrates
- ❖ Broiler 5.5% Concentrates
- ❖ Broiler 3.5% Concentrates
- ❖ Broiler 2.5% Concentrates
- ❖ Broiler 1.5% Concentrates

Layer Concentrates:

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FLIES CREATE MISFORTUNES

Core issues remain unanswered

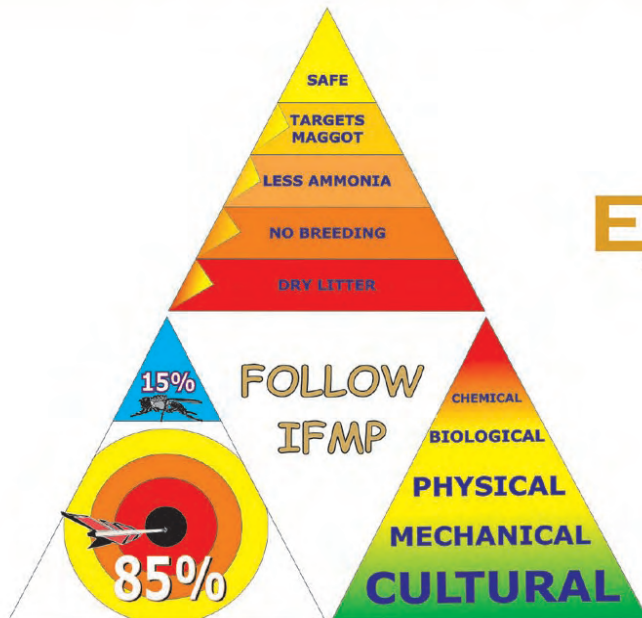


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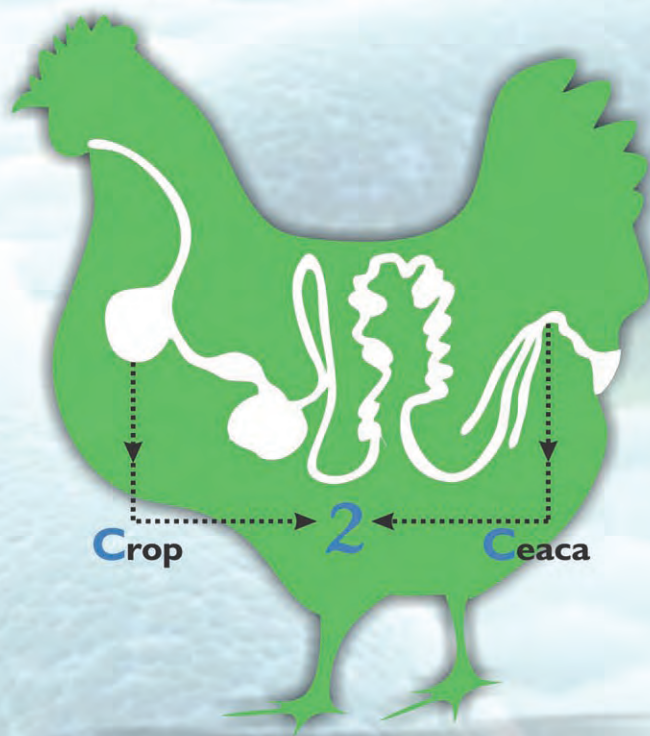
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PRESS RELEASE

Alivira launched Specific Multi-Strain Probiotic Formulation - “Perf-Act™”

Gastrointestinal tract of adult chicken is inhabited by more than 800 species of microbes. Intestine mucosa is exposed to these bacterial harmful secretions like endotoxins, phenols etc, which can have detrimental effects on both intestine and host's overall performance. The growth of these microbes depends on gut architecture & its environment (pH & oxygen level). Intestinal health gets compromised by various factors like change in diet, mycotoxins level in feed, Gut environment and enteric infections like necrotic enteritis, E. coli & Salmonellosis. Alivira AHL is committed to provide perfect solutions to poultry farmers for better bird health and productivity. With the same quest & extensive research, launched its **Multi-strain probiotic “Perf-Act™”** in India in May 2018.

“Perf-Act™ is blend of selectively chosen specific Multi-strain probiotic, having high concentration per gram, highly thermostable, scientifically proven product and already well accepted in the international market. “Perf-Act™” not only helps to improve production performance but also improves immuno-modulation & reduces incidences of enteric diseases. Hence support Crop to Caeca(C2C) Protection.

In Lonavala recently, “Perf-Act™” was launched by Mr. Manish Gupta, CEO & MD along with Mr. Gaurav Agarwal, Head, Poultry business with other team members. The

technical presentation on **Perf-Act™** was given by Dr. Sanjay Gapat, Product Manager & explained the concept of Complete Gut Care that is Crop to Caeca (C2C concept) in the august gathering. The research Trials on **Perf-Act™** conducted at BARC, Thailand were explained by Dr. Rupesh Rane, GM-Business Development.

About Alivira Animal Health Limited

Alivira Animal Health Limited is India's 1st globally integrated animal health company specializing in the manufacturing of active pharmaceutical ingredients (APIs) and finished dosage formulations. Alivira AHL is a 100% subsidiary of Sequent Scientific Limited, a company listed in India on the Bombay Stock Exchange of India (BSE) & National Stock Exchange of India (NSE) with strong heritage – Promoted by the founders of Strides Shasun Limited. Alivira's focus on R&D is taking company even further, and Alivira is committed to applying cutting-edge resources to improve health and well-being at every stage of animals' lives. Over the last 20 years, Alivira has become one of the world's leading producers of APIs & amongst few dedicated integrated veterinary companies in the world with First USFDA approved veterinary API facility in India; Presence in 95+ countries with 6 manufacturing facilities and 4 R&D centers; 475+ products across 12 dosage forms and 1600+ employees world over. **For more details visit www.alivira.co or contact info@alivira.in**

Glimpses of PERF-ACT™ Product launch



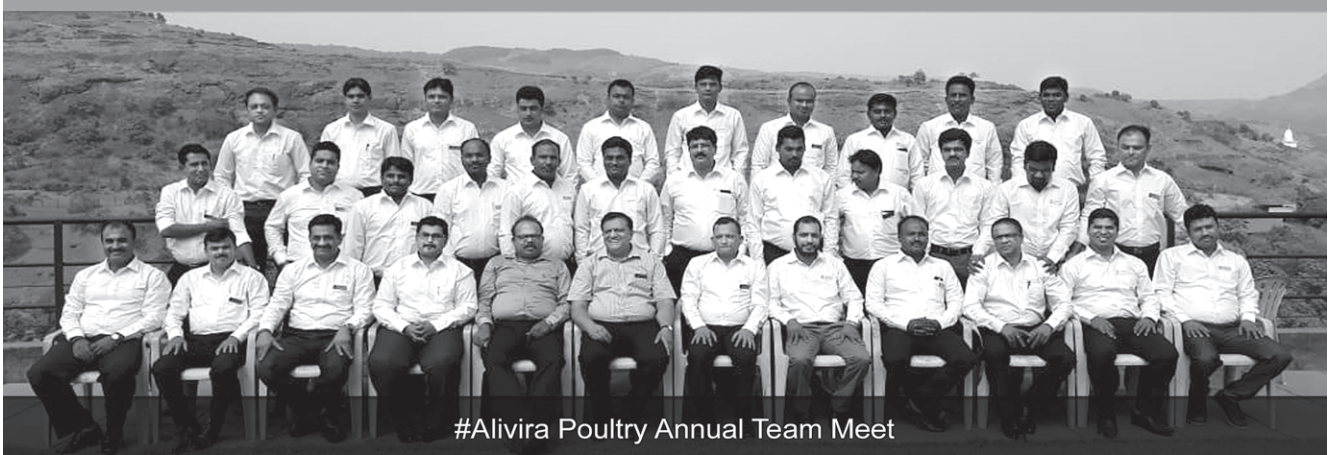
Selfi With PERF-ACT™
Mr. Prasad Lad (Head HR),
Mr. Manish Gupta (MD),
Mr. Gaurav Agrawal (Poultry BU Head)



Selfi With PERF-ACT™
Dr. Rupesh Rane (GM-BD),
Dr. Sanjay Gapat (Product Manager)



Product presentation By Dr. Sanjay Gapat - Product Manager



#Alivira Poultry Annual Team Meet

Natural Remedies Celebrates World Veterinary Day



Last Saturday of April, is World Veterinary Day, a day to recognize the importance of the veterinary profession. We at, Natural Remedies took this opportunity to celebrate & recognize the contribution of senior veterinarians to the noble profession of veterinary science & animal health industry.

The occasion was graced by 15 senior veterans from various parts of country who are responsible for milestones achieved by industry today. Overall more than 100 people attended this event including veterinarians who are part of Natural Remedies & equally contributing to organization's growth.

As a token of appreciation, senior veterans were felicitated by Mr. Anurag Agarwal MD & CEO of Natural Remedies and Chairman Mr. R.K. Agarwal.

Distinguished speakers addressed the fraternity by sharing their experience on industry and how veterinary as a profession has evolved in these years. They also guided the young veterinarian's on how to grow professionally and contribute to industry in a better way. This celebration was extended on Pan India veterinary community by Natural Remedies Field Team.

In one single day we met more than 2700 doctors, 100 veterinary hospitals and expressed our gratitude on this special day.

Veterinarians play crucial role in the development of more sustainable animal husbandry practices, improving not only the health of animals, but also the health and

wellbeing of people and the environment. As said by Will Roger, the best doctor in the world is the veterinarian. He can't ask his patients what is the matter-he's got to just know. That's why Natural Remedies take the opportunity to salute best doctor in the world and feels proud to serve this fraternity

About Natural Remedies-

Natural Remedies is the leading herbal healthcare company in India, headquartered at Bangalore.

We manufacture & market herbal veterinary & human healthcare products which are scientifically validated, effective, safe and consistent. We are present across various locations in India and rapidly growing in the major markets across the globe. Natural Remedies is recipient of prestigious awards like Asia's best healthcare brand by Economic Times 2017 & Company with Great Manager 2017 by People's business & Times group. For more details, kindly visit www.naturalremedy.com



BASF and BIOMIN to introduce new phytase to unlock vital nutrients for Vietnam's feed industry

- New phytase Natuphos E helps swine, poultry and aquaculture better utilize phosphorous, amino acids and energy, resulting in economic and environmental benefits
- Unprecedented enzyme stability has set new benchmark for feed phytase technology globally
- BIOMIN Vietnam, as key distributor, will be responsible for the distribution of Natuphos E in the Vietnamese market



Da Nang, Vietnam – June 4, 2018 – BASF, the first company to market a phytase for feed almost 30 years ago, has once again set a new standard in phytase technology with Natuphos® E. As a new generation phytase which helps pigs, poultry and aquaculture better utilize phosphorous and other key nutrients, Natuphos E ensures more productive and sustainable output for the animal feed industry and local farmers. BASF will

be launching the product in Vietnam, and BIOMIN Vietnam will be responsible for the distribution in the country.

“BIOMIN is honored and excited to bring Natuphos E to the Vietnamese market with BASF. This cooperation has been built on a strong relationship and trust that we developed over time. Innovation and quality are our focus and we look forward to building our partnership

and further developing the business footprint of both BIOMIN and BASF in the region,” said Marc Guinment, Managing Director, BIOMIN Asia Pacific. “High quality products, good access to the market and sound technical support are the keys to success in any market,” said Stephen Crisp, Regional Sales Head, BASF Animal Nutrition Asia Pacific. “BIOMIN is a multinational company with a strong market presence and penetration in Vietnam. Through our partnership with BIOMIN, feed manufacturers and farmers will benefit from considerable cost savings through a more efficient diet. Natuphos E releases phosphorus, amino acids and energy which can be utilized by the animal. This makes Natuphos E the most efficient choice available in the market.”

The majority of phosphorous in grains and oilseeds is bound to phytic acid, an anti-nutritive factor found in feed. Phytate-bound phosphorous cannot be absorbed well by animals such as pigs and poultry, and is therefore excreted and lost as a potential nutrient. As a result, manufacturers need to supplement the feed with either inorganic phosphates or very effective phytases to make sure the animals are supplied adequately with the required amounts of the essential phosphorous.

Natuphos E also releases other valuable nutrients, making animals generally more efficient at digesting their feed. This leads to less excretion of undigested phosphate, which, as a result, helps reduce water pollution.

In addition to Natuphos E, BIOMIN Vietnam will also be responsible for the distribution of Natugrain® TS, a feed enzyme containing highly purified NSP-degrading enzymes, in the Vietnamese market.

The two companies officially announced the partnership as part of the 20th anniversary celebration of BIOMIN Vietnam.

Manufactured by BASF in Germany, Natuphos E delivers superior pelleting and premix stability in

challenging environments and feed-production processes, in addition to a long-term shelf life stability. To date, the new phytase has been launched in some 10 countries in Asia Pacific and recently in the European Union market.

About BASF: At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. The more than 115,000 employees in the BASF Group work on contributing to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio is organized into five segments: Chemicals, Performance Products, Functional Materials & Solutions, Agricultural Solutions and Oil & Gas. BASF generated sales of €64.5 billion in 2017. BASF shares are traded on the stock exchanges in Frankfurt (BAS), London (BFA) and Zurich (BAS). Further information at www.basf.com.

About BIOMIN

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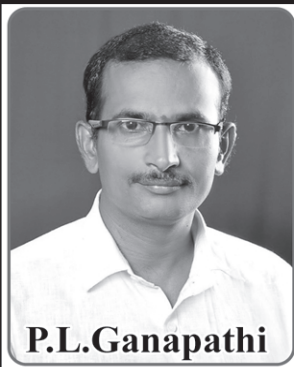
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PRESS RELEASE

Trouw Nutrition India opens new laboratory and office in Hyderabad



Trouw Nutrition India, a Nutreco Company, held the **Laboratory and Office Opening Ceremony** on 11 June 2018. With almost 100 attendees from all over India the event was a huge success.

Trouw Nutrition is the global leader in innovative feed specialties, premixes and nutritional services for the animal nutrition industry. With the mission "*Feeding the Future*" forming its essence, Trouw focuses on research and innovation for sustainable development. Trouw has always believed in solution-based approach rather than transactional. The opening of new Customer Service Laboratory in Hyderabad is part of the efforts in being a complete solution provider to the customers.

The new laboratory of Trouw Nutrition India is a dedicated feed analytical laboratory for the customers. The laboratory aims to provide varied analytical assays for complete feed, raw materials and water, using state-of-the-art equipments, modern techniques and highly qualified laboratory technicians. This laboratory is part of the MasterLab - Global Trouw Nutrition laboratory. The global connect allows to standardize the analytical techniques in a faster way so as to provide accurate and reliable reports.

Dr. Saurabh Shekhar, Managing Director, Trouw Nutrition India says about the developments that, "India is a key priority market and focus for both Nutreco and Trouw. Opening of new office and laboratory are a part of these expansion plans. Further, as an organization we believe in "Customer-first" approach and with the new laboratory we aim to provide better services to our customers. "

The ribbon cutting ceremony was conducted by Mr. Haiko Zuidhoff, Managing Director, Trouw Nutrition Asia Pacific. He congratulated the Indian team on the opening of new office and laboratory and wished success for the future.

The Lab and Office opening ceremony was preceded by a seminar on innovative offerings of Trouw Nutrition. The seminar began with Dr. Chandani Parihar, Marketing Manager, Trouw Nutrition India welcoming the guests and setting the tone for the day.

Dr. Saurabh Shekhar welcomed the guests and gave a brief overview of the operations of Trouw Nutrition India. He explained that in a world with limited natural resources and growing pressure on the feed-to-food value chain, Trouw Nutrition is at the heart of changes. Our mission "*Feeding the Future*" is the starting point of all we do and reflects our ambition to be the global leader in animal nutrition and aqua feed. Trouw Nutrition works closely with customers to increase their productivity and profitability; our strong belief and investment in research and innovation is helping to realise the necessary growth for farmers and integrators. Dr. Shekhar also gave the audience an overview of the company's global operations and the key focus areas.

Mr. Peter Bom, General Manager, Trouw Nutrition MasterLab spoke about the expertise of Trouw Nutrition: MasterLab and NIR. Salient features of his presentation are:

- Quality control in a feed mill should be practiced at all 5 stages: incoming raw materials, process control, formulations, finished products and nutrition.



This is possible either through laboratory analysis or smart on-site instruments.

- Trouw Nutrition's global Customer Service Laboratory service called **MasterLab** is a specialized feed laboratory.
- With 30 labs across the globe, MasterLab offers analytical support on R&D, development of customer service tools as well as internal analytical standardizations.
- One can never know the true value in analytics, only high sample volumes can help in more precise analysis. The advantage with Trouw is the years of experience and high quality laboratories across the globe. Our NIR expertise also stems from these high quality laboratories that improves accuracy and leads to precision feeding.
- With the objective of bringing the lab to the sample, Trouw also believes in analysis at customer sites through internet based technology that provides quick and reliable advice to customer.

Dr. Sabiha Kadari, Technical Support Manager, Trouw Nutrition India discussed NutriOpt and Precision Feeding. Key points discussed by her are:

- There are large variations between and within countries in the nutritional value of raw materials. This variation of nutritional value impacts preciseness of feeding.
- Precision feeding is required to get a competitive edge and more frequent optimization of formulations based on NIR analysis results can help in achieving that.
- **NutriOpt** is the modular precision-feeding system offered by Trouw Nutrition that helps to achieve financial and animal production goals through

precise real-time analysis, modelling, calculation and technical support.

- NutriOpt helps to reduce the risk of complex decisions, to bring transparent decision making and to optimize nutrition for improved profitability.
- Through NutriOpt, Trouw Nutrition also offers additional nutritional intelligence to meet species specific challenges. For eg. Split-feeding concept in layers to improve egg production.

Mr. Lennart Oosterbaan, Teamleader NIR, Trouw Nutrition MasterLab further added on to the previous discussion about bringing the lab to the sample. Salient features of his presentation are:

- Traditional lab services are unable to meet the high quality demands of feed industry for fast, accurate and low costs analysis.
- Trouw Nutrition with 20 years of experience and R&D knowledge have developed a way to handle the demand through **NutriOpt Mobile NIR** or **NutriOpt On-Site Advisor**.
- NutriOpt Mobile NIR offers portability and flexibility without samples leaving the site i.e. farm or feed mill.
- This on-the-spot testing, powered by comprehensive NutriOpt Nutritional database, helps to improve performance and profitability through informed decision-making based on real-time advice.

Post the interactive session, a workshop on use of NutriOpt desktop NIR and NutriOpt Mobile NIR was conducted. The workshop was attended with enthusiasm by the participants and was highly appreciated.

Note: For further information on Trouw Nutrition India product and services, pl contact customercareindia@trouwnutrition.com







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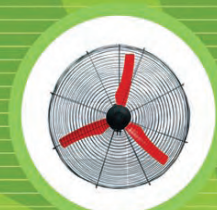
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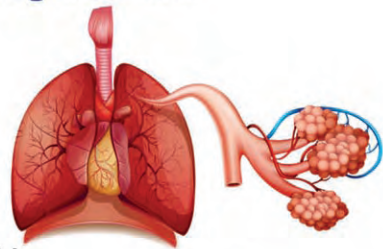
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ONE18: The birthplace of ideas



ONE: The Alltech Ideas Conference celebrates the transformative power of ideas and a man who revolutionized the agriculture industry, Dr. Pearse Lyons

[BENGALURU, India] – True to its name, ONE: The Alltech Ideas Conference 2018 kicked off by showcasing some of today's most innovative ideas, all the way from the gene level to disruptive changes to the future of food and how we produce it. Often described as a nexus of global agriculture and the premier business conference in the region, the thought-provoking presentations firmly established ONE18 as the birthplace of life-changing ideas.

The conference, held May 20–22, 2018, welcomed 3,504 attendees from 76 countries in its 34th year. One hundred speakers gave 153 presentations, 2,044 guests attended the International Dinner and the conference welcomed 205 ONE Club members, 101 journalists and eight startup pitches as part of The Pearse Lyons Accelerator. The unique late-stage, agri-tech accelerator run by Alltech and Dogpatch Labs aims to address a diverse set of challenges facing agriculture today.

To achieve innovative change, it takes leaders with the ability to see what others cannot, something both Leonardo da Vinci and Dr. Pearse Lyons, Alltech's late founder, had in common, said Dr. Mark Lyons, president of Alltech.

"He and Dad 'happened to things,' as Dad put it," he said. "And that thing was called 'life.' Sometimes life

happens to us. These two individuals seemed to impact life as much as it impacted them."

That is why, for the first time in the conference's history, Alltech bestowed a double award recognizing Dr. Pearse Lyons.

"He was constantly encouraging us to be the best we could be for those around us so that they could flourish and become the best they could be," said Mark, reflecting on Dr. Lyons' goal that Alltech should be built on passion, excellence and fun. "He wanted them to live with those values he had, and that excellence, something that he and my mother shared — maybe she even more so."

The **Alltech Medal of Excellence**, Alltech's highest distinction, was awarded to Dr. Lyons for his work as a visionary scientist. As an entrepreneur and a tireless innovator, Dr. Lyons utilized his scientific expertise in yeast fermentation and his acute business sense to revolutionize the animal feed industry through the introduction of natural ingredients to animal feed. In the past 10 years alone, his scientific achievements have been listed in more than 300 patents.

Additionally, he was recognized with the **Alltech Humanitarian Award** for having a boundless philanthropic spirit. The award is bestowed annually to

someone of strong character who uses their platform to positively influence and inspire those around them.

"We cannot replace Dr. Pearse Lyons, nobody can," said Mark. "But if we start to think like him, if we can get 10 people, 100 people, 1,000 people thinking like him, imagine what we can achieve together."

Beth Comstock, former vice chair of General Electric, shared three strategies to embrace and create innovative change. Change, she said, starts with giving yourself permission, making room for discovery and embedding learning — and failure — into your operating system.

"I have a confession to make," said Comstock. "I call myself a change-maker, but I have to tell you — I really don't like change. "But, the reality is," she continued, "like change or not, we have to be ready for it."

Dr. Majid Fotuhi, neurologist and neuroscientist, shared his incredible story of growing up as a young man with a thirst for knowledge while trying to escape Iran during the Iran-Iraq War. An expert in the field of memory, Alzheimer's disease, concussion, ADHD and increasing brain vitality in later life, he detailed how his journey to Johns Hopkins University and Harvard University has empowered him to teach others how to take better care of their brains.

Dr. Rodolphe Barrangou, CRISPR expert and professor at North Carolina State University, discussed the potential for the controversial gene-editing technology to revolutionize food production and agriculture.

Dr. Mark Lyons explored the several different ways his father, Dr. Pearse Lyons, compared to the visionary Leonardo da Vinci, including the themes of "curiosity," "demonstration," "sensation," "smoke," "art/science," "the body" and "connection" from the book "How to Think Like Leonardo da Vinci" by Michael Gelb.

Professor Robert Wolcott shared how to develop foresight to survive in an ever-changing market.

"If a customer is telling you they want something, guess who else they are telling?" Wolcott asked the audience at ONE18. "Your competition. So, how do you find out what the customer wants before they want it?"

The clinical professor of innovation and entrepreneurship at the Kellogg School of Management at Northwestern University told attendees the secret to surviving long-term in a disruptive industry.

"We must ask better questions," he said.

Now in its 13th year, the **Alltech Young Scientist** program returned to reward university students for their innovative scientific research. The world's largest agriscience program of its kind culminated at ONE18, where eight finalists-four graduate students and four undergraduate students-presented their research to a panel of international judges.

The undergraduate winner of \$5,000 and a fully funded Ph.D. program at the university of her choice is **Leesa-Joy Flanagan**, representing the University of Adelaide in Australia. Her work focused on the effects of different sources of undegradable dietary protein on lamb growth, daily weight gain and voluntary feed intake.

The graduate winner of \$10,000 and a fully funded postdoctoral position is **Saheed Salami**, representing the University of Catania in Italy. His research investigated cardoon meal as a novel feed and its effect on lamb performance, rumen function and meat quality.

The 2018 Pearse Lyons Accelerator participants include:

- **ENTOCYCLE:** From the United Kingdom, the world's first environmentally controlled, fully automated system to produce industrial levels of Black Soldier Fly protein.

- **SMARTBOW:** From Austria, a SMART eartag sensor to monitor the activity and position of each animal. Provides farmers with information to make reliable decisions.

- **EggXYt:** From Israel, technology that allows hatcheries and chicken breeders to detect the gender of chicken embryos.

- **VENCE:** From the United States, virtual fencing and autonomous animal control. Vence enables management and monitoring of livestock via smartphones.

- **PEN/POINT:** From the United States, a combination of real-time data and nutritional breakthroughs to tackle Bovine Respiratory Disease for healthier cattle and a safer beef supply.

- **Adentro:** From the United States, technology that naturally activates bio-immunity in plants by switching on its defense genes.

- **Truly:** From the United States, personalized supplement programs backed by nutrigenomics research. Designed to help reduce the risk of chronic diseases and to meet daily nutrient needs.

- **Alltech SMART Dairy:** From Canada, a program designed to deploy Alltech's nutrition and ag-tech breakthroughs to farms via nutritionists.

"Six of the 10 participants last year were listed as top 100 agri-tech companies in the world," said Aidan Connolly, chief innovation officer at Alltech. "That is indicative of the companies applying."

Connolly noted that last year's participants in The Pearse Lyons Accelerator were able to access 28 new markets and generate a total of \$50 million in qualified leads.

This year, ONE18 also featured a wealth of inspiring events, including:

- **ONE Fun Run:** Attendees from all over the world gathered together to run through the campus of Transylvania University in memory of Dr. Pearse Lyons.

- **International Dinner:** A night of stories and song welcomed our ONE attendees from 76 countries.

• **Movie showing of “Food Evolution”:** Attendees met at the Kentucky Theatre for a special showing of “Food Evolution” and a panel discussion on the GMO debate and the importance of science in feeding the world.

• **ONE Table Talks:** Attendees gathered around Lexington for interactive dinners with our ONE18 speakers.

• **Alltech Craft Brews & Food Fest:** More than 5,000 people, 325 unique beers and ONE great time came together in celebration of five years of the festival.

• **Kentucky Night Goes ‘60s:** Dinner, dancing and Kentucky Ale® made for a memorable night of fun with friends from across the globe.

Dr. Aman Sayed, Alltech regional director of South Asia and managing director of India, said 43 people from South Asia attended ONE18 to experience how ideas and technology can revolutionize the agriculture industry. ONE is not just a conference, he said, but a meeting that offers a foundation for a better future.

“The animal industry on the Indian subcontinent is growing and embracing technologies in business,” said Sayed. “Customers were particularly excited by The Pearse Lyons Accelerator session.

“This conference of ideas offers a convenient platform to interact with industry leaders and speakers from across globe,” he continued. “We all should experience the ONE conference.”

The conference will return to Lexington, Kentucky, USA, May 19–21, 2019.

Missed a speaker or want to watch a replay of ONE: The Alltech Ideas Conference? The [Alltech Idea Lab](#) gives you the chance to hear talks from the inspiring leaders and future thinkers from ONE18. Access to the Alltech Idea Lab is complimentary, requiring only registration.

Plenary sessions are now available. Interactive focus sessions will be available for viewing on June 29.



One Fun Run



International Dinner



President Club



Young Scientist Award



Focus Session



Ideas Pavilion



Kentucky Night



Alltech One Meeting



Prof. Robert C. Wolcott at



Dr. Lyons family receiving Alltech Medal of Excellence



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Bill Northey at Alltech One



Dr. Mark Lyons, President and Chairman of Alltech with Dr. Rodolphe Barrangou



Beth Comstock during Plenary session



Dr. Majid Fotuhi addressing the gathering at Plenary session



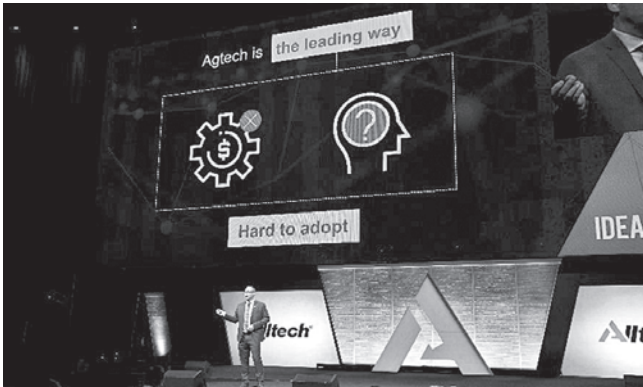
Aidan Connolly addressing the gathering



Dr. Mark Lyons in Plenary



Plenary Session



Pearse Lyons Accelerator Session



Alltech India Team with Customers



Team India



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South Asia Team

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About Alltech:

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Alltech is a family-owned company, which allows us to adapt quickly to emerging customer needs and to stay focused on advanced innovation. Headquartered just outside of Lexington, Kentucky, USA, Alltech has a strong presence in all regions of the world. For further information, visit www.alltech.com/news. Join us in conversation on [Facebook](#), [Twitter](#) and [LinkedIn](#).

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Reference:- The Gazette of India , Page No.-21, No.-155, Date:- 13-04-2018



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Mankind conducts Technical Rendezvous at Kolkata



Vet Mankind aims at the improvement and promotion of the **quality of animal health care** and welfare by making available specialized knowledge and skills along with wide range of proven solutions in the form of Animal Health Medicines.

In sync with this, VET Mankind organized an expert talk on **“Changing Pathogens- A Real Challenge”** delivered by Dr. KS Prajapati, PhD at **Hotel Swissôtel Kolkata** on 25th May, 2018. Many prominent consultants along with 30 Commercial Layer entrepreneurs graced the occasion by their benign presence.

Mr. Debabrata Mandal, DZM, Vet Mankind welcomed the audience & gave a brief about the Mankind poultry business journey in Eastern India. Dr. Pravakar Jailey, an eminent consultant welcomed Dr. Prajapati by presenting a bouquet.

Dr. Pramod Malhotra, GM (S&M) Vet Mankind, welcomed the audience & gave the corporate presentation with highlights as:

- Mankind is India's fourth largest pharmaceutical company with a turnover of US\$ 800 million.
- Mankind is the only player to organically reach the top 10 in the past decade.
- Mankind has 19 states of Art WHO-GMP certified USFDA compliant manufacturing facilities.
- Mankind has a strong presence in width & breadth of country by having 18,000 employees as field force .
- In the year 2017, Mankind has commissioned US operation by putting up an office in New Jersey.

Everyone gave a big round of applaud and appreciated the growth path of company.

Dr. Pramod Malhotra welcomed & introduced the guest speaker Dr. KS Prajapati to the audience by highlighting his academic achievements, experience and contribution to the poultry industry. Dr. Prajapati has published 77 research papers in national and international journals of repute, presented 93 papers in various national and international seminars/ symposia/workshops and has published 24 popular articles.

Dr. Prajapati has been closely associated with many Poultry (broilers and layer) farms and Feed millers and has a practical experience of poultry disease challenges in poultry farms.

In his talk, Dr. Prajapati emphasized on changes in viral serotypes which gives titre variations in the flock along with high E.coli challenge. He also discussed about the change in symptomatic expression of viral disease that leads to misleading diagnosis. The open forum was the main attraction of the event wherein everybody participated by putting up their queries to the expert and Vet Mankind team. Solutions were given for the queries of the attendees, which made them visibly satisfied.

Closing Remarks was given by Mr Gaurav Gupta , Product Manager- Poultry emphasizing on the technical strength of the company and Mankind's vision of being dedicated to improve animal health through the wisdom of Quality Medicine at an affordable price.

Keeping in mind the optimism and ethical principles of Vet Mankind, we are committed to organize more such informative seminars for the benefit of Animal Health World.



Mycotoxins Interaction: Hinder For Risk Assessment

Malin Lange, Product Manager

Mycotoxin multi-contamination of animal feed is found very frequently and seems to be the rule rather than the exception in practical diets. Here we present a quick overview on the interactions known.

Mycotoxins represent an exceptional challenge for feed and animal producers:

- They are produced by common moulds,
- Occur in a great variety and number,
- Are sporadic or heterogeneous in their distribution, and
- Their effects on farm animals are seldom recognised as mycotoxicosis.

Among hundreds of known **mycotoxins**, **aflatoxins**, mainly produced by *Aspergillus* species, **ochratoxin A**, produced by *Aspergillus* and *Penicillium* species, as well as **fumonisin**, trichothecenes (especially DON and **T-2** toxin) and **zearalenone**, primarily produced by many *Fusarium* species stand out as the most common contaminants.

Ingestion of these mycotoxins may cause an acute toxicity or chronic disorders, depending on the concentration and duration of exposure. In farm animals this might manifest as decreased performance, feed refusal, poor feed conversion, reduced body weight gain, immune suppression, reproductive disorders and residues in animal food products. Due to their frequent occurrence and their severe toxic properties, many countries appointed legal regulations or guidance for the major mycotoxins to protect animals and human consumers. The current regulations are typically very specific in terms of animal species and even for the production stage considering that mycotoxins affect for example poultry in a different

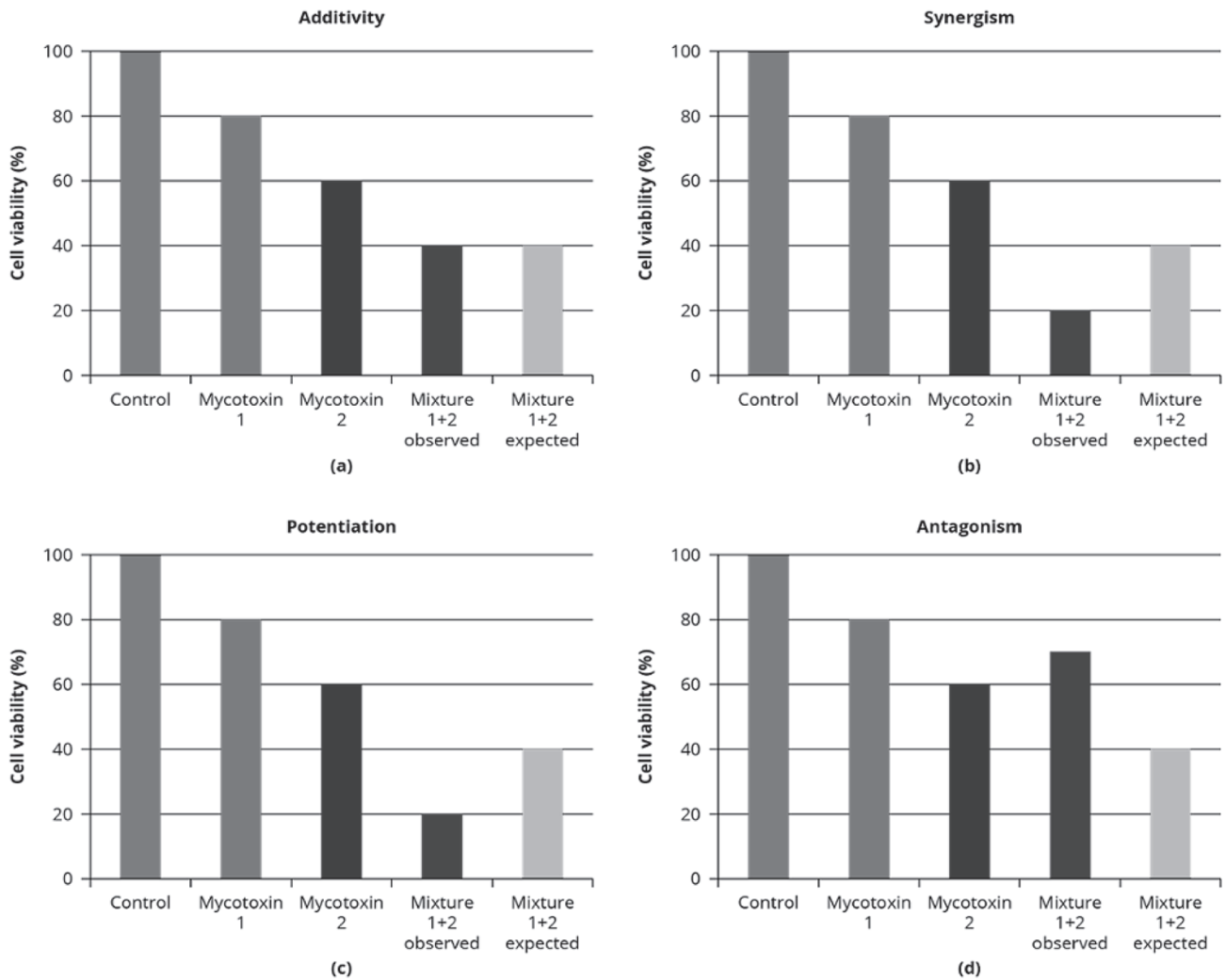
way than cattle and broilers in a different way than breeders or laying hens. The threshold and/or guidance values for each species, however, were determined based on toxicological data from studies investigating a mono-exposure leaving out the possibility of any combined effects of mycotoxins.

If we were able to ensure that the animals were exposed to only one **mycotoxin** at a time, following the regulatory guidelines would allow us to protect our animals in most of the cases. Several worldwide surveys show however, that mycotoxin multi-contamination of animal feed is found very frequently* and seems to be the rule rather than the exception in practical diets. The concurrent appearance of mycotoxins in feed can be explained as follows: Each mould species has the capacity to produce a number of mycotoxins simultaneously. Each species, in turn, may infest several raw materials leaving behind one or more toxic residue. In the end a complete diet is made up of various raw materials with individual mycotoxin loads resulting in a multitude of toxic challenges for the animals. Several researchers showed that the effects observed during multiple mycotoxin exposure can differ greatly from the effects observed in animals exposed to a single mycotoxin, indicating that the simultaneous presence of mycotoxins may be more toxic than predicted from the mycotoxins alone. This is because mycotoxins interact with each other.

The interactions can be classified in three main different categories:

1. Antagonistic
2. Additive
3. Synergistic

Figure 1 - Characterisation of the interaction between mycotoxins (Smith et al., 2016).



Additivity occurs when the effect of the combination equals the expected sum of the individual effects of the two toxins (*Figure 1a*). Synergistic interactions of two mycotoxins leads to a greater effect of the mycotoxin combination than would be expected from the sum of their individual effects (*Figure 1b*). A special form of synergy, sometimes called potentiation, occurs when one or both of the mycotoxins do not induce effects whereas the combination induces a significant effect (*Figure 1c*). When the effect of the mycotoxin combination is lower than expected from the sum of their individual effects, antagonism can be observed (*Figure 1d*). In general, most of the mycotoxin mixtures lead to additive or synergistic effects, highlighting a significant threat to animal health and being the major reason that impedes risk assessment. Synergistic actions may occur when the single

mycotoxins of a mixture act at different stages of the same mechanism, e.g. **T-2** increases ROS production while and **AFB1** decreases its clearance, when the presence of one mycotoxin increases the absorption of another or decreases its metabolic degradation.

Be aware of present contaminations. Given their complex interaction, the toxicity of combinations of mycotoxins cannot merely be predicted based upon their individual toxicities. Knowing that even low levels of mycotoxin combinations can harm animal productivity, health, and welfare, it is useful for feed and animal producers to be aware of present contaminations, to be able to link them to the risk they pose for the animal and consequently take actions before the problems appear in the field.

*References are available on request.

PRESS RELEASE

Wisium conducts Technical Seminar at Hyderabad

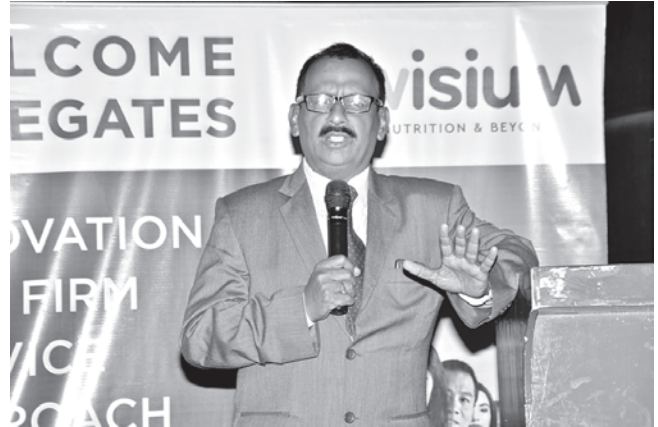


On 16th June 2018 Wisium conducted a seminar on unique topic within –Innovation & Firm Services at Hotel Awasa, Hyderabad.

Wisium is a premix and specialised additives division of NEOVIA (France). Neovia is a leading service provider with high added value services for animal's health. It guarantees food quality and traceability combined with innovation & reasoned off services.it is presently with its 7 Business activities global.

- **Complete Feed**
- **Aquaculture**
- **Pet care**
- **Premixes & Firm Services**
- **Additives & Ingredients**
- **Animal health**
- **Analytical Lab Services**

The group generates a annual turnover of 1.7 Billion Euros. Company had got 72 production sites operating in 28 countries, with 8800 employees.



Neovia offers a new way to meet the challenges of food & feed safety and reasoned use of services. Its business strategy is resolutely global, innovative & distinctive. This strategy aims to build a unique & resilient business model, based on multi-activities, multi-spices & multi –geographic approach. This gives a consistent & sustainable growth projected for the company.

It 7 business line combined with its presence in 5 geographical areas & expertise's in many animal spices which allows Neovia to provide individualise response to each customer & market .Group has 140 species expert & scientist's to handle customer needs and carry out innovative R& D Project's. This approach is a source of share benefits & real driver for innovation, value creation and differentiation.

At Wisium we offer total customer support for their business development .At Wisium to 30 Million feeds to globally every year. Wisium operates in 50 countries more than 1000 key industrial customers & 300 global experts.





Wisium offers Nutrition & Beyond through a local approach of production management .It offers feed producers a strong & dedicated partnership focusing in creating value through enhancing performance on quality, productivity & profitability.

Two Seminars were conducted in Southern part of India with partnership of SDC Agrovet India Pvt Ltd.

From the Executive director for SDC Agrovet India Limited.

Mr Murthy welcomed the guest at Hotel Avasa on 16th June 2018 & Shelton Hotel Rajmundhry on 18th June 2018 .

From the Business Development Director (Asia)

Mr ERIC Carfii detailed the guest & dignitaries on the plans & future of Wisium India.

From the Regional Business Development Manager

Mr SP Ramakrishna introduced Wisium Team to dignitary's.

From the Nutriionist (INDIA)

Dr Niranjan Jadhav Poultry feed Nutriionist explained their implications of Micro Toxins for animal feed



production. A demonstration of Accuscan a device used to test different Micro Toxin levels in the feed at Farm. Mycro watch app is also developed by Wisium R& D team. This app helps to provide solutions on the results obtained from Accuscan device with the help of correct dose calibration of Micro TOXIN in activator product of wisium T5X.

From the Business Development Director (India)

Dr Sushanta Saha introduced a unique device in "NIRNOW", a device which is ultraportable, which has the capability to test different raw materials & finished feed. This device connected with smart phone & has the potential to scan phone & has the potential to scan and analyse different raw materials used in animal feed. Dr SAHA feels that this is going to be a game changer for the farmers & feed millers for Indian Animal production Industry. This device is calibrated to be used in Animal Production Industry by the R&



D Team of NEOVIA.He showed live demos on how to use t & its potentiality.

At Rajmundhry Mr MV Rao CEO SDC Agrovet India Limited had an introductory speech & explained how these innovations of Wisium help farmers in increasing in productivity.

Mr Ramprasad Business Development Sales Director SDC Agrovet India Limited used his local language skill & innovative way to explain how Wisium Approach could bring value to the customers.

Wisium India has a unique approach for Indian market with Glocal model.

GLO-Global Strategies

CAL –Adaptation to local requirements

This module will surely help the Indian Animal Industry with more productivity, value& results.

PRESS RELEASE

CLFMA CFO Forum to offer unique financial perspectives on Indian livestock sector

The 1st CLFMA CFO Forum discusses, how the sector is transforming from a financial perspective; global factors driving the markets; challenges in supply chain; addressing commodities price risks; and implications of disruptive technologies such as IoT and blockchain for the Indian livestock industry

India, Mumbai, XX May 2018: CLFMA is organizing its first “**CFO Forum**” on **30 May 2018 at Mumbai** for senior-level professionals from various sub-sectors of livestock industry such as poultry, dairy, feed and aquaculture.

B Soundararajan, Chairman of CLFMA of India said “Despite the uncertainty in growth in agriculture, which is predominantly dependent on monsoons, share of livestock sector in the GVA (Gross Value Added) in agriculture GDP rose from 22% in 2011-12 to 26% currently. However, one must not get misguided as these numbers may sound ostensibly small or insignificant. This sector is the lifeline for rural Indians in terms of employment to millions directly and indirectly and its impact is much greater in the socio-economic perspective than one can imagine. This forum aims to offer in-depth analysis of the sector from a financial angle- opportunities and challenges for bankability; attractiveness for investments; macro-economic factors and also global trends in commodities and currency markets as well as the Venture Capitalists and Private Equity players’ point of view.” he further added.

SV Bhave, Deputy Chairman, CLFMA of India opined “This sector is one of the major contributors towards fulfilling the growing food (protein) demand and economic prosperity of the nation. Hence it must remain efficient and sustainable to ensure overall economic growth, poverty reduction,

improving food and nutritional security by enhancing affordability of protein. This forum brings renowned experts from the financial world who will shed light on all the above aspects besides ROI, de-risking the business and addressing the challenges in commodities supply chain. We believe this is one-of-its-kind opportunity for exchanging ideas and mutual learning for the industry professionals.”

“We are thrilled to announce the first edition of the CFO Forum and the response so far is quite impressive. CLFMA will continue to pursue several initiatives like these to bring more value to not only its members but for the entire animal-agribusiness sector.” Raghavan Sampathkumar, Executive Director commented.

About CLFMA of India:

CLFMA of India (www.clfma.org) is the apex organization and the voice of the country’s dynamic livestock sector. Having had illustrious leaders such as Adi Godrej at its helm as Chairmen in the past, the 50-year old industry association is recognized as one among the highly reputed in India. It currently has over 230 members representing diverse subsectors of animal protein value chain including feed manufacturing; poultry, dairy and aquaculture business; animal nutrition and health, veterinary services, machinery and equipment; processing, distribution and retailing of meat; and ancillary services such as banking.



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