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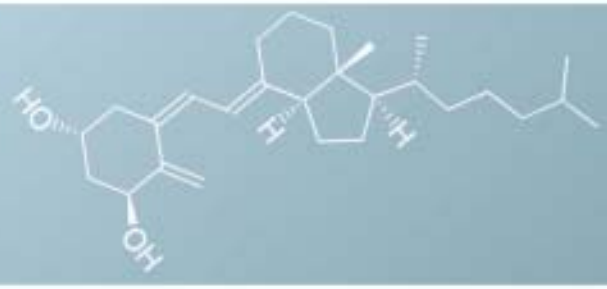

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POULTRY LINE

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INDEX OF ADVERTISEMENTS

The Reference in Prevention for Animal Health

HIPRA, a true reference in prevention for animal health

INTRODUCTION

HIPRA is a multinational veterinary company dedicated to the research, production and marketing of products for prevention in Animal Health

Our history spans more than half a century and do currently occupy one of the top positions amongst pharmaceutical companies producing Biologicals for the veterinary industry worldwide.

At HIPRA we are convinced that the future lies in prevention. In fact, R&D is the core of our knowledge. Currently, 16% of HIPRA staff and 10% of annual turnover are dedicated to R&D and Regulatory Affairs. There is a single objective to all of this: to generate and apply the latest scientific advances in the development of innovative solutions that provide differential advantages.

We are specialists in developing innovative preventive solutions that make it possible to identify existing threats on any poultry or livestock farm before they occur, in such a way that we can act to prevent them or minimize their effects. We have a broad range of highly innovative Biological products, an advanced diagnostic service and our own line of Diagnostic kits.

The company is carrying out a steady and solid process of international expansion and has its own branches in 38 countries and two strategically located production plants, one in Europe (Spain) and another in South America (Brazil). Together with a worldwide distribution network, HIPRA's products are available to customers in more than 100 countries across the five continents.

The company's future strategy is clearly expressed in its vision: to be the reference in prevention for Animal Health. HIPRA has a great potential for growth and the most products launched in recent years, and this line will continue in the coming years. This enables us to continue our international expansion, while always maintaining the independence that we are characterized by and the entire dedication to the world of animal health and serving our customers.

COFFEE WITH PETER

Interview with Peter Saey, Zone Director, Asia and Oceania

QUESTION -Could you please tell us about HIPRA's history, current status and company's vision?

ANSWER -Vocation of leadership. That is what has always marked the activity of HIPRA: **a veterinary pharmaceutical** company dedicated to the research, production and marketing of solutions for Animal Health.We develop vaccines with high added value, by applying the latest scientific developments.

Our history spans more than half a century. Currently, when you look at Biologicals,HIPRA occupies one of the top positions amongst pharmaceutical companies for the veterinary industry worldwide. It is the combination of experience, advanced technology and a team that is fully dedicated to developing innovative products that provides differential advantages to our customers. Besides vaccines, HIPRA has been building for over 15 years on a international network of high-end diagnostic services as well. In customer surveys, this is widely acknowledged as another differential factor of paramount importance. Also, we are the only Animal Health Laboratory which has its own line of diagnostic kits: CIVTEST™. These reagents for veterinary diagnostics have been developed by our R&D Department in collaboration with numerous leading laboratories.

Our future strategy is clearly outlined in our vision: To become the reference in prevention for animal health by offering innovative biological and pharmaceutical products, diagnostic kits and advanced diagnostic services.

We feel both convinced and proud about that vision. That's why we have been promoting it in such a clear way for many years now.

QUESTION – In the last decade, HIPRA has become more and more specialized in developing biological products. Please explain to us, why has such a strong commitment been made in this field?

ANSWER – At HIPRA, we are convinced that the key to ensuring animal health lies in prevention, the more so at a time like the present in which the industry is undergoing major changes. We see that the market still relies on treatment as the first option for disease control. However, HIPRA is fully committed to promoting the alternative of prevention as a more efficient way of dealing with the pathologies that affect our farms worldwide. We are convinced that the use of vaccines is both a more economic and effective option in the battle against animal diseases. Very important, this is essential for reducing the amount of antibiotics in the food chain, thus, decreasing potential problems related to resistance.

QUESTION – You mentioned that HIPRA products possess a differential high added value. What exactly does this differential value mean?

ANSWER –We know the criteria according to which veterinarians make their choice when deciding on the right vaccine. Our products provide the Animal Health professionals not only with the commitment that will protect against diseases but more importantly an efficacy that will eventually bring a return in profitability to the farmer.

We control all levels of the product creation process (from initial product research to its manufacture in our own production plant and to its final marketing). This gives us the flexibility and knowledge to be constantly innovating, designing and developing new products that contain the differential value we seek.

Talking about HIPRA INDIA, we managed to register five vaccines for the poultry industry in a first phase. There are two vaccines for Newcastle disease, another for Gumboro disease, one for Coryza and one against Salmonella in breeder and layer. However, this is no more than the beginning. Currently we have 12 more vaccines in the regulatory pipeline for India, for both poultry but also cattle. Some of those vaccines will be ready in less than a year from now. One of the expected to be ready early ones is a high-end coccidiosis vaccine for breeders and layers, which will be on offer along with its dedicated HIPRAspray device, also developed by HIPRA, offering the possibility to the farmer to control and store all relevant vaccination data in a very easy way.

QUESTION – In quantitative terms, what role does R&D play in the HIPRA business model?

ANSWER - Research and Development is the core of our knowledge. Currently, **16%** of HIPRA staff and **10%** of annual turnover are dedicated to **R&D** and **Regulatory Affairs**. If you compare these numbers to those of other players in this industry, you will find that HIPRA's focus on R&D is higher than the common standard.

QUESTION – Looking into the future, what new challenges are expected in the short and long term?

ANSWER - HIPRA is facing the future with confidence because we have the experience and knowledge needed to meet the future challenges of our industry.

In particular, we are carrying out a steady and solid process of international expansion. We currently have our own branches in 38 countries and, soon, there will be new ones directly providing our products and services to customers. We also have two strategically located production plants, one in Europe (Spain) and another in South America (Brazil). Together with a worldwide distribution network, we make our products available to customers in more than100 countries across five continents.

Our future strategy is clearly expressed in our vision: To be the reference in prevention for animal health. From my point of view, this is particularly well thought out in an environment like today's, in which the creation of large companies resulting from mergers and acquisitions among multinational pharmaceutical companies is increasingly common. In an industry where the business in based on mid-to-long term projects, HIPRA remains as a highly valued alternative for customers and distributors for now and the future.

HIPRA has a great potential for growth. The establishment of new subsidiaries and the launch of new and innovative vaccineshave enhanced the rapid growth of the company. HIPRAwill be the company with the largest number of new vaccines launched on the market and plans to continue **investing** in **vaccines** and **diagnostic tools** whileexpanding its activity in both **devices**and **traceability.** HIPRA has a clear desire for independence as a stand-alone company, exclusively dedicated to the world of animal health.

QUESTION – What is the current situation of HIPRAINDIA and what is it its future?

ANSWER– Our commitment with India is for the long-term. First, we will dedicate time and resources to register any novel vaccine that offers a potential solution for the Indian market. But it also goes the other way round: being India one of the biggest global players in livestock, we will take the specific needs of its industry in account when taking decisions on future product development.

On the other hand, likewise we do in other areas in the world, we won't just be offering products only. As explained before, our diagnostic service philosophy is a basic pillar in our strategy. That will have to be brought to India as well. So are the medical devices, our diagnostic kits and our HIPRA University education programmes, just to name some.

We want to learn from the Indian AH industry and contribute to make it better.

Last but not least, people are at the very centre in our company. A premium product taking care of by a not so excellent team will never reach its full potential. Therefore, we take care of people and only search for the best professionals in every market. In this sense, India is not any different than what HIPRA has been doing for many years. Excellence, Optimism and Credibility, these are the three basic values we look for in every individual, regardless her or his role in our organization.

The Reference in Prevention for Animal Health

HIPRA launch event

HIPRAorganized its first company launch event at India's largest poultry hub in the city of Hyderabad on 28th May, 2019 at Hotel Novotel. The event was initiated with the press conference in the afternoon. The press conference had in its panel Mr. Peter Saey, Zone Director Asia & Oceania, Ms Panicha Thanahiranchai, Regional Manager, Asia & Oceania, Dr. Shyam Vane, Business Manager, HIPRA India and D.S. Subramaniam, Distributor, HIPRA India.

Dr. Shyam Vane, Business Manager, HIPRA India addressed the gathering and welcomed the press reporters representing various national News Channel and Poultry Journals. Later he invited Peter Saey, Zone Director Asia & Oceania to initiate the press meet. Following this, Peter Saey, Zone Director Asia & Oceania, had given a corporate presentation on HIPRA. He informed the guests regarding company's history, vision, mission and future goals. He also described about its aim to be the reference in prevention for animal health by ensuring the best quality vaccines for poultry both in terms of efficacy and even safety. Peter Saey, Zone Director, even briefed about the recent activities of the HIPRA in the poultry industry worldwide.

Post the press conference, the launch event was conducted in the evening which was attended by delegates from the poultry industry of Andhra Pradesh, Telangana and also from other parts of India. The event was attended by layer and breeder farmers, integrators and reknowned poultry consultants from the field of poultry industry as well.

The event commenced with the welcome address by Dr. Shyam Vane, Business Manager in which he introduced the HIPRA team and invited Peter Saey, Zone Director, Asia & Oceaniaand Ms Panicha Thanahiranchai, Regional Manager, Asia & Oceania, to start the occasion with the inauguration of HIPRAto announce the initiation of its technocommercial operations in India.

After the inauguration, Peter Saey, Zone Director, enlightened the delegates with a corporate presentation on HIPRA giving an insight on the company strategies, briefing about its range of products and services, including its future plans, the facilities it has worldwide and its team. Explaining about the company strategies he threw light onHIPRA's vision to be the reference in prevention for animal health. Peter Saey, Zone Director, even described about its global positioning giving an idea

about the vaccines and diagnostic kitsHIPRAhad developed till date. The audience were informed about the technological solutions which HIPRA offers through smart vaccination which is a state-of-the-art vaccination techniquefor the hatchery with specific precision mechanisms and has HIPRAlink Software for the traceability of synchronized vaccination.Peter Saey, Zone Director, even elaborated about HIPRA'sown diagnostic service called Diagnos in 9 different areas. The importance of the continuing educational programme called HIPRA University which the company offers in the field of disease prevention intended for veterinarians was very well described by him. At the end, Peter Saey, Zone Director, concluded his presentation by thanking the entire HIPRA team along with the distributors and requested them for extending their support in future for establishing HIPRA in the Indian Poultry Industry.

It was followed by detailed and comprehensive presentations on HIPRAVIAR CLON – Live cloned vaccine against Newcastle disease, HIPRAVIAR CLON/IB H120 - Live combined vaccine against Newcastle disease and Infectious bronchitisby subject matter expert Dr. Shyong Weh Ong, Regional Technicaland Marketing Specialist, Asia Oceania from Malayasia. He apprised the delegates about the advantages of cloned vaccines of HIPRA. He stressed upon the advantages HIPRAVIAR Clon which can be administered to all types of birds providing long lasting immunity without manifestation of secondary reactions. Dr. Shyong Weh Ong shared more ideas on HIPRAVIAR CLON with his vast field experience

in HIPRA. He highlighted on efficacy and safety of HIPRAVIAR CLON against Newcastle disease by sharing valuable information based on the various published field trial reports conducted across various countries. It was interesting to know how HIPRAVIAR CLON is beneficial to prevent all genotypes of Newcastle. The interaction of the HIPRA technical team with the poultry experts in each of the areas were very informative and useful.

He also presented on CORIPRAVAC, a trivalent inactivated vaccine with oil adjuvantagainst Infectious Coryza containing inactivated *Avibacteriumparagallinarum* (serovars A, B, C).

Dr. Kakoli Ahmed, Technical and Marketing Manager, HIPRA India presented on HIPRAGUMBORO CH/80 – Live cloned vaccine against Infectious bursal disease and also Avisan Secure – Killed vaccine against Salmonellosis.She emphasized about the benefits of using HIPRAGUMBORO CH/80 against Gumboro disease. While presenting on Avisan Secure, she mentioned that in view of major food and animal feed safety concerns, HIPRA has taken key initiatives to provide an effective and safe vaccine against *Salmonella enteritidis* and *S. typhimurium*.It is well proven in published scientific trials that HIPRA products are highly efficacious, safe, for profitable and sustainable poultry production. Vaccination with AVISAN SECURE will allow the producer to optimize the microbiological quality of table eggs and prevent *Salmonella enteritidis* and *S. typhimurium* which are the most common sources of food poisoning through poultry products.

At the end of the technical presentations Dr. Shyam Vane, Business Manager, thanked the gathering for their active participation in the launch event.

After the first launch in Hyderabad similar regional launch events were conducted in other parts of India as well in series to spread the awareness of HIPRA's entry in the Indian poultry market and its unique products. The regional launch were organised at Namakkal on 29th May, and at Coimbatore on 30th May and with this the first phase of company launch concluded.

During this phase, Dr. Shyam Vane, Business Manager, delivered the corporate presentation at Coimbatore and even Namakkal giving a clear picture of HIPRA as multinational biological company and its quality vaccines to the delegates present followed by the technical presentations by Dr. Shyong Weh Ong and Dr Kakoli Ahmed.

Dr. Shyam Vane, Business Manager, at the end of the technical sessions thanked all the audience for their active participation in the launch events.

The events concluded with a good note followed by networking dinner and group photography.

Dr. Shyam Vane, Business Manager had extended his special thanks to each and every HIPRA distributor and the Key Account Managers individually for their active participation and cooperation in organizing the events at each place making it a success. He once again welcomed them all to the HIPRA India team. Our team of Key Account Managers have - Mr. Vikash Kumar (North Region), Mr. Sourav P Das (West Region), Dr. V Palani Kumar (Tamil Nadu and Karnataka Region), Mr. Manikyala Rao Andey (Andhra Pradesh and Telangana) and Mr. Dibyendu Pal (East Region). The distributors for HIPRA India are: Mr. D. S. Subramaniam, Tara Enterprises, Mr. Sugumar Gopi, HindusthanAnimal Care,Mr. Mohan Sridevi , (Sri Sara Groups, Gokul Traders), Dr.Atul Deshmukh, (H. R. Multiples), Mr. Pintu Das, (Das Drug Centre) and Mr.Manjit Singh Kooka, Astra Marketing.

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HYDERABAD MEET

HYDERABAD MEET

COIMBATORE MEET








COIMBATORE MEET

NAMAKKAL MEET

NAMAKKAL MEET








Winter Challenges of Poultry Farming

Gourab Basak[1], Rupam Malakar[2], Udit Jain[1], S. K. Bharti[3]

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Poultry section is the most organised sector in Indian agricultural industry. Its production rate in terms of eggs and meat and overall growth have shifted to many folds than the recent past years. Thus, the marketing scope is enhancing dramatically. Basically, poultry production is done on three segments, viz., layers, broilers and backward/family (both for egg and meat purposes) production. Henceforth, the key point of achieving success is to keep the flock healthy. As a result, utmost care should be taken to have the birds disease free. This can be achieved by following prescribed vaccination schedule, balanced diet and hygienic housing and overall satisfactory farm management. Temperature plays an important role in poultry industry as its effect can be seen directly on the poultry birds. Therefore, precautionary steps should be adopted specially in winter hours of the year. At this period of time, the immunity of the birds goes down which results in microbial infection in the birds. A few of the commonly encountered diseases in this period are discussed below briefly.

1. Chronic Respiratory Disease (Infectious Sinusitis, Mycoplasmosis): Caused by *Mycoplasma gallisepticum* in chickens, turkeys, pigeons, ducks, peafowl, passerine birds. Characterised by sticky, serous exudate from nostrils, foamy exudate in eyes and swollen sinuses, especially in the broiler birds. Air sacs may be infected in birds developing respiratory rales and sneeze. Symptoms usually vary slightly among different species of the birds. It spreads through nasal discharges and droppings. Turkey manifests it in two forms. In Upper form, watery eyes, swollen nostrils and infraorbitals, caseous exudate, respiratory rales, unthriftiness etc. and in lower form, air sacculitis are the prominent symptoms. *Mycoplasma synoviae* commonly affects both chickens and turkeys causing Infectious Synovitis. Clinically it is indistinguishable from the previous one. But synovitis infected birds show lameness, swollen joints, stilted gait, formation of breast blisters and birds infected with the respiratory form exhibit respiratory distress. Greenish diarrhoea is common in dying birds. Also, *Mycoplasma meleagridis* affects turkeys of all ages. But poults are the worst sufferers with higher mortality. The situation aggravates when there is secondary bacterial infection because of compromised immune system. Increased ventilation without drafts reduces the spread and severity of the disease.
2. Infectious Bronchitis: Is a highly infectious and contagious respiratory disease of birds caused by Corona virus. It can occur at any stage but young chicks under 6 weeks of age are more susceptible. They possess sneezing, coughing, gasping, tracheal rales, lachrymation, nasal discharge with swelling of sinuses and face. Distinct respiratory noises can be heard during night. Egg abnormalities with poor egg quality can be seen in laying birds due to damage of functional oviducts. Strict hygienic managemental procedures and vaccination are the key points to overcome the disease. It transmits directly very rapidly within the flock. Other pathogens like *Mycoplasma* or *E. coli* increases the severity and duration of the disease.
3. Infectious Coryza: Is another upper respiratory tract disease of chickens caused by *Homophiles paragallinarum*. The birds show sneezing, mucus like discharge from opening of nostrils and eyes and have facial oedema. Here, the older

birds suffer more. Conjunctivitis, swollen wattles and dyspnoea can be observed in severe cases. Factors predisposing to CRD, Infectious Bronchitis, *E. coli* or *Pasteurella spp*. etc. aggravate the condition. One more such upper respiratory tract infection in chickens, pheasants, peafowl and turkeys occurs by Herpes virus known as **Infectious Laryngotracheitis** having similar signs of dyspnoea, gasping, coughing to mucus and blood, nasal and ocular discharge, sinusitis.

4. Avian Influenza (Bird Flu): One of the deadliest contagious disease caused by Influenza type A virus. The virus not only affects respiratory system but also digestive, urinary and reproductive organs of poultry. Generally, influenza doesn't depend on any season. Most often outbreaks occur due to disbalance of body immunity. Transmission occurs directly. Affected birds will have coughing, sneezing, rales, anorexia, depression, drop in egg production, softened egg shell and diarrhoea with very high mortality rate (almost 100%). Strict biosecurity and vaccination (Inactivated influenza virus vaccines) are the key to restrict the disease.

The different contagious diseases indicate that prevention is the only effective way to control such illnesses. Hygiene, sanitation, strict biosecurity and procurement of birds from disease free stocks are the weapons of preventive measures. Maintaining the recommended vaccination schedule is the best control step of any disease. Availability of 3400 Kcal/kg ME and 23% protein in feed is mandatory in winter. Also, proper housing and managemental practices need to be given emphasise. An east-west arrangement of the houses/sheds increases the sunlight duration in this period. Besides, proper segregation or culling of the infected and recovered birds, appropriate disposal of dead birds with their secretions, excretions and litter, thorough disinfection of the poultry houses and equipment, restricted movement of poultry equipment and people are the basic necessities to have a healthy poultry farming.

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Turkey Management

Bloch Rameez, KandhaniPravin and Chamadia Bilal

Figure 1. Wild turkeys feeding in low-growing vegetation.

Turkey (MeleagrisGallopavo) is a large gallinaceous bird of the family Meleagridae that is native of North America, domesticated in Europe and are now important source of food in many parts of the world. Turkey occupies an important position next to chicken, duck. Guinea fowl and quail in contributing the most evolving sector which is playing a significant role in augmenting the economic and nutritional status of varied population. They are reared for meat only and its meat is the leanest among other domestic avian species.

Turkeys are not classified into breeds, however seven standard varieties are available, Bronze, White Holland, Bourbon red, Narragansett, Black, Slate, Beltsville small white.

Management Practices in turkey:

Incubation: The incubation period is 28 days in turkey.

There are two methods of incubation.

(a) Natural incubation with broody hens:

Naturally turkeys are good brooders and the broody hen can hatch 10-15 numbers of eggs. Only clean eggs with good eggshell and shape should be placed for brooding to get 60-80% hatchability and healthy poults.

(b) Artificial Incubation: In artificial incubation, eggs are hatched with the help of incubators.

The temperature and relative humidity in setter and hatcher are as follows:

	Temperature (Degree F)	Relative humidity (%)
Setter	99.5	61-63
Hatcher	99.5	85-90

Egg should be turned at hourly intervals daily. Eggs should be collected frequently to prevent soiling and breakage and also to get better hatchability.

Brooding: In turkey, 0-4 week period is called as brooding period. However, in winter brooding period is extended up to 5-6 weeks. As a thumb rule the turkey poults need double hover space as compared to chicken. Brooding day old poults can be done using infra-red bulbs or gas brooder and traditional brooding systems.

Points to be noted during brooding:

• The floor space requirement for 0-4 weeks is 1.5 sq.ft. per bird.

• The brooder house should be made ready at least two days before the arrival of poults.

• The litter material should be spread in a circular manner with a diameter of 2 meters.

• Poult guard of at least 1 feet height must be provided to prevent the poults from wandering away from source of heat.

• Starting temperature is 950 F followed by weekly reduction of 50 F per week up to 4 weeks of age

• Shallow waterers should be used.

Turkeys are not the best starters in their life and will really need some tender loving care to get them safely through the first four weeks of life. The average mortality rate is 6-10% during this period. Young poults by nature are reluctant to eat and

drink in the first few days of life, primarily because of bad eyesight and nervousness. Hence, they have to be force fed.

Litter materials:

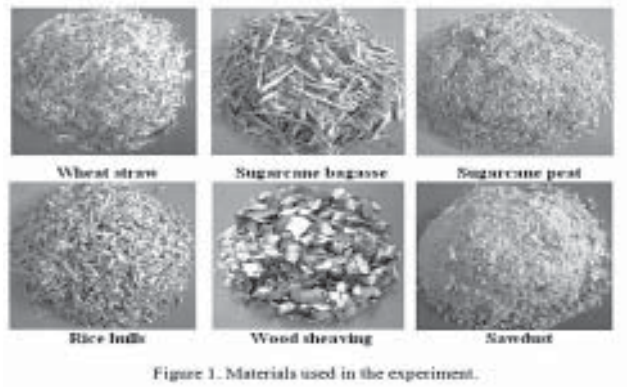

Figure 1. Materials used in the experiment.

The common litter materials used for brooding are wood shavings saw dust, paddy husk, chopped saw etc. The thickness of the litter material should be 2 inch at the beginning and may be increased to 3-4 inch in course of time by gradual addition. The litter should be raked at frequent intervals to prevent caking.

Housing:

1. Housing protects turkeys form sun, rain, wind, predators and provides comfort.
2. In hotter parts of the country the long axis of the house should run from East to West.
3. The distance between two houses should be at least 20 meters and the young stock house should be at least 50 to 100 meters away from the adult house.
4. The width of the open house should not exceed 9 meters.
5. The height of the house may vary from 2.6 to 3.3 meters from the floor to roof.
6. An overhang of one meter should be provided to avoid the rainwater splash.
7. The floor of the houses should be cheap, durable and safe preferably concrete with moisture proof.

When turkeys are reared under deep litter system, the general management conditions are similar to that of chicken but care should be taken to provide adequate floor, waterer and feeder space to accommodate the large bird.

Floor, feeder and waterer space requirement of turkeys:

Age	Floor Space (Sq. ft.)	Feeder Space (cm) (Linear feeder)	Waterer Space (cm) (Linear waterer)
0-4 weeks	1.25	2.5	1.5
5-16 weeks	2.5	5.0	2.5
16-29 weeks	4.0	6.5	2.5
Turkey breeder	5.0	7.5	2.5

The temperament of turkeys is usually nervous; hence they get panicky at all stages. Hence entry of visitors in to the turkey's house should be restricted.

Feed: The methods of feeding are mash feeding and pellet feeding.

1. The energy, protein, vitamin and mineral requirements for turkeys are high when compared to chicken.
2. Since the energy and protein requirements for the both sexes vary they must be reared separately for better results.
3. Feed should be given in feeders and not on the ground.
4. Whenever change is made from one diet to another it should be carried out gradually.
5. Turkeys require a constant and clean water supply at all times.
6. Provide more number of waterers during summer.
7. Feed turkeys during the cooler parts of the day during summer.
8. Provide shell grit at the rate of 30-40 gm per day per bird to avoid the leg weakness.

Nutritional Requirements of turkey:

Items	Male	0-4	4-8	8-12	12-16	16-20	20-24	Adult/ Breeder
	Female	0-4	4-8	8-11	11-14	14-17	17-20	17-20
ME/kg diet		2800	2900	3000	3100	3200	3300	2900
Protein (%)		28	26	22	19	16	14	14
Lysine (%)		1.6	1.5	1.3	1.0	0.8	0.65	0.6
Methinine (%)		0.5	0.45	0.38	0.33	0.28	0.23	0.2
Calcium (%)		1.2	1.0	0.85	0.75	0.65	0.5	2.25
Phosphorous (%)		0.7	0.6	0.5	0.5	0.4	0.4	0.6
Vitamin A(IU)		4000	4000	4000	4000	4000	4000	4000
Vitamin D3(IU)		900	900	900	900	900	900	900
Choline (mg)		1900	1800	1300	1100	950	800	1800
Niacin (mg)		70	70	50	50	40	40	30

Economic Parameters in Turkey Farming

Male – Female ratio	1:5
Average egg weight	65gms
Average day old Poult weight	50gms
Age at sexual maturity	30weeks
Average egg number	80 -100
Incubation Period	28 days
Average body weight at 20 weeks	4.5 – 5 (f) 7-8(m)
Egg production period	24 weeks
Marketable ageMale Female	14 -15 weeks 17 – 18 weeks
Marketable weight Male Female	7.5 kg 5.5 kg
Food efficiency	2.7 -2.8

Average feed consumption up to marketable age MaleFemale	24 -26 kg 17 – 19 kg
Mortality during brooding period	3-4%

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DiagnosticEnzymology – In Domestic Animals

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Clinical enzymology is the discipline that studies and tests enzyme activity in serum, plasma, urine or other body fluids for the purpose of helping to establish the diagnosis and prognosis of disease and to screen for abnormal organ function. There are various factors that affects the serum enzyme activity like organ specificity, subcellular location of enzyme, mechanism of enzyme release, clearance from blood, rate of induction of enzyme synthesis. The clinical analysis of certainenzymes will be highly helpful for differential diagnoses of various clinical conditions.

Alanine aminotransferase

Alanine aminotransferase (ALT), formerly known as glutamic pyruvate transaminase, catalyzes the reversible transamination of L-alanine and 2-oxoglutarate to pyruvate and L-glutamate. ALT activity is found in several body organs, but the magnitude of activity varies dramatically with the species. In dogs, the ALT activity per gram of liver is four times greater than in other organs. In horses, cattle and swine, the ALT activity per gram of tissue differs little in liver when compared to muscle. ALT,which is found in cytoplasm of hepatocytes is also found in mitochondria but generally at lower concentration.Half-life of ALT in blood is not clearly defined.

Aspartate aminotransferase

Aspartate aminotransferase (AST) formerly known as glutamic oxaloacetic transaminase catalyzes the transamination of L-aspartate and 2-oxaloglutarate to oxaloacetate and glutamate. AST activity is relatively high and in similar amounts in liver and in skeletal and cardiac muscle, but it varies between species. AST is located in the cytosol but is in higher concentrationin mitochondria. Half-life of AST is 7-8 days in horses and 163 min in dogs. An increase in serum AST activity is observed with both reversible and irreversible injury to hepatocytes and can be seen following hepatocellular injury and cholestasis. Because serum AST activity cannot differentiate between hepatocellular or myocyte injury, further testing is often required using organ specific enzymes such as sorbitol dehydrogenase or creatinekinase.

Sorbitoldehydrogenase

Sorbitol dehydrogenase is a cytosolic enzyme and also known as iditol dehydrogenase. The highest activity of SDH activity is in liver followed by kidney. It's a liver specific enzyme in almost all species. Half-life of SDH in cat is 3-4hrs and 5hrs in dogs. SDH analysis is essential in dogs in two important conditions that includes(i) in dogs with traumatic muscle injury, where there is increased serum ALT and CK activity, determination of SDH activity will quickly rule out whether there is concurrent hepatic injury and(ii) SDH activity determination in dogs in conjunction with ALT activity to determine whether there is persistent hepatocellular injury.Serum SDH activity is of greater value than serum AST activity in large animals because of its increased specificity for hepatocellular injury.

Glutamate dehydrogenase

Glutamate dehydrogenase is a mitochondrial enzyme and it catalyzes the removal of hydrogen from L-glutamate to form the corresponding

ketamine acid that then undergoes spontaneous hydrolysis to 2-osoglutarate. Liver has the highest concentrationof GDH activity. In all species, increase in serum GDH activity are considered liver specific. Because GDH is a mitochondrial enzyme, it is released only with the irreversible cell injury.

Gamma glutamyl transferase

Gamma glutamyl transferase functions in the gamma glutamyl cycle where it catalyzes the transfer of gamma glutamyl groups from gamma glutamyl peptidesto other peptides,amino acid and water. GGT is found in highest concentrationin kidney, pancreas, intestine and mammary glands of dogs, cattle, goat and sheep but at much lower concentration in mammary gland of horses. Liver has lower concentration of GGT as compared to kidney but varies between species with highest liver GGT concentration in cattle, horses, sheep and goat. GGT is a membrane bound enzyme and most of the serum GGT activity is contributed by liver as compared to kidney and pancreas.

Alkaline phosphatase

Alkaline phosphatase, which is a membrane bound enzyme hydrolyzes the monophosphates or pyrophosphates at alkaline pH as well as physiological pH and it plays a role in bone mineralization by the hydrolysis of pyrophosphate, which is a potent inhibitor of mineralization. Cells of liver, bone, kidney, intestinal mucosa and placenta have greatest ALP activity. An increase in serum activity of ALP is mainly contributed by liver whereas intestinal ALP(IALP) is not found in blood.

Lipase

Lipasehydrolyzes the triglycerides to monoglycerides. It is of interest in the diagnosis of pancreatic disease. Half-life of lipase in dogs is 1-3hrs. Activity assays for serum lipase is used classically for the diagnosis of acute pancreatitis in dogs.

Amylase

Amylase cleaves the alpha-D-(1-4) glycan linkage of starch and glycogen. It is found in higher concentration in the pancreas of cat and dogs. Half-life of serum amylase in normal dogs is 1-5hrs. Serum amylase is routinely used as a screening test for acute pancreatitis

Trypsin and trypsinogen

Trypsin is a serine proteinase enzyme produced by the pancreas in the form of proenzyme trypsinogen. Pancreas secrete trypsinogen into the intestine where it is converted by enterokinase to trypsin. Species specific immunoassays for trypsin activity are referred as trypsin like immunoreactivity (TLI). These immunoassays detect both trypsin and trypsinogen. Trypsin like immunoreactivity has been most useful in the detection of canine exocrinepancreatic insufficiency(EPI).

Creatine Kinase

Creatine Kinaseis mainly a cytoplasmic enzyme that catalyzes the exchange of phosphate moiety between creatine phosphate and ATP. In myocardial and skeletal muscles, CK allows energy storage as creatine phosphate when demand is low. But when energy is needed for muscle contraction, CK catalyzes the transfer of high-energy phosphate from creatine phosphate to ADP to form ATP. CK activity is in the greatest concentration in skeletal muscle followed by heart, diaphragm and smooth muscle and then brain.There are two distinct subunits of CK, referred to as the M(muscle) and B(brain) subunits. These combine randomly to form three isoenzymes of CK: CK-MM, CK-BB, CK-MB. Half-life of CK is 2-3hrs in dogs. In domestic species, CK activity is mainly used as a marker of skeletal muscle injury associated with trauma, nutritional myopathies, exercise induced muscle injury or congenital myopathies.

An Introduction to the use of Enzymes in Poultry Feed

Contributed by technical team of Rossari Biotech Limited AHN Division - **Dr. Shruti S.,**
Dr. Vishal Surve, Dr. Aashaq Hussain, Dr. C. Seenivasan, Dr. Anish Kumar & Mr. Edward Menezes

When feed enzymes were first used more than a decade ago, their acceptance was limited to phytase applications for reduced phosphorus excretion. Although feed enzymes have been utilized for many years, we have only scratched the surface as research on feed enzyme technology.The greater understanding of feed enzyme use comes at an ideal time as the demand for high-quality protein continues to rise. With advancements in management and technology, animals are in production for a relatively short time. Producers need to get smarter about optimizing animal production in a sustainable manner — and enzymes offer an opportunity to do that.

Dealing with indigestible ingredients

Poultry and swine diets traditionally contain highly digestible corn and soybean meal as base ingredients. A corn-soybean meal diet is about 85 percent digestible, leaving approximately 15 percent of the diet unavailable to the animal. The indigestible portion is increased in young animals that have minimal endogenous enzymes production within their digestive tracts. Not only are these costly ingredients not being utilized, they are also causing detrimental effects in the gut. Undigested nutrients cause gut irritation and possibly diarrhea creating sub-optimal conditions affecting nutrient absorption. This is another situation where enzymes can play a part. Farmersoften look into alternative ingredients due to commodity price fluctuations. This creates a challenge as these ingredients have low digestibility and contain an increased amount of anti-nutritional factors.

Basic Functions of enzymes in feed

Although all enzymes function similarly when supplemented in animal feeds by improving the efficiency of raw material digestion, nutritionists can use them to take different approaches. Each enzyme offers different characteristics that affect their dietary inclusion rate: their need for protective coatings, where they work within the animal's gut, and their overall efficacy.

One of the most interesting and important factors of enzyme function is that each type has a very specific role within the animal. Each enzyme type acts on a substrate to start its chemical reaction within the body. However, only a certain enzyme can fit into a certain substrate – similar to a lock and key.

Benefits of using enzymes:

1. Reduction in diet costs when the ingredient price matrix allows.
2. Growth or feed efficiency can be improved as a result of nutrient release, resulting in a decreased cost per pound of meat.
3. Enzymes can also play a role in enteric health management. High-fiber diets alter the viscosity of the gut, and excess fermentation can result in mortality. Pathogenic bacteria can also thrive with an excess of dietary nitrogen.

Type of commercial feed enzymes and target substrates

Enzymes, by definition, are chemicals or catalysts released by cells to speed up specific chemical reactions. This definition accounts for enzymes released in the digestive tract to aid in the digestion of food. Today, these same enzymes can be effectively manufactured and added to animal feeds.

Phytase

Phosphorous (P) is an expensive mineral and two thirds of the total plant phosphorous is found as phytic acid. The phytic acid molecule has six phytic acid moieties that have high affinity to several cations. One mole of phytic acid can bind upto 6 moles of Ca/P. Phytic acid also chelates other mono & divalent cations like Zn, Mg, Na, K, rendering them unavailable for the birds. Poultry have virtually no endogenous phytase activity and hence, there is little digestion of phytate bound phosphorus and mono, divalent cations. Phytase enzyme catalyzes

Following table outlines the target substrate & ingredient against which they have an action against:

Enzyme	Target substrate	Target feedstuff
Phytases	Phytic acid	All plant-derived ingredients
β-Glucanases	β-Glucan	Barley, oats, and rye
Xylanases	Arabinoxylans	Wheat, rye, triticale, barley, fibrous plant materials
α-Galactosidases	Oligosaccharides	Soybean meal, grain legumes
Proteases	Proteins	All plant protein sources
Amylase	Starch	Cereal grains, grain legumes
Lipases	Lipids	Lipids in feed ingredients
Mannanases, cellulases, hemicellulases, pectinases	Cell wall matrix (fiber components)	Plant-derived ingredients, fibrous plant materials

Three classes of enzymes (phytases, carbohydrases, and proteases) are typically considered for use in poultry feeds-

a step-wise dephosphorylation of phytate series of lower inositol phosphate esters (myo-inositol pentaphosphate to myo-inositol monophosphate) and ultimately to inorganic P. Thus, phytase improves the availability of Phosphorus and other mono & divalent cations (Zn, Ca, Mg, K, Na).

Carbohydrases

The carbohydrase class of enzymes includes xylanases, glucanases, and amylases. They break down and degrade carbohydrates such as fiber, starch and non-starch polysaccharides into simple sugars that provide energy for use by the animal.

Grain sources such as corn, barley and wheat have hard coatings on the outside. Much of the coating is physically broken up during feed mill processing, but not completely. The fibrous portion of grain cell walls is indigestible, and 10 to 20 percent is getting through. Carbohydrases will attack and degrade these starchy grain molecules. Corn provides a majority of the energy in a typical poultry diet. Amylase is a starch digesting enzyme that helps to digest more of the starch found in corn. Amylase increases starch digestibility, thus providing more available energy. Xylanase, on the other hand, releases energy from the fibrous portion of grains and grain byproducts.

Proteases

Proteases improve the digestion of proteins and increase amino acid availability, which helps release valuable nutrients. They also break down anti-nutritional factors associated with various proteins. Raw ingredients with low amino acid digestibility respond greatest to an exogenous protease.Birds consuming the traditional corn-soybean meal diet cannot utilize 100 percent of the protein fraction. Therefore, adding protease enzyme to the diet will enhance amino acid digestibility and animal performance.

Conclusion

The animal production industry is dynamic. Feed ingredients, animal genetics, disease challenges and consumer demand are some of the factors that are constantly changing and providing new challenges for the farmers. With over one-third more mouths to feed, the UN Food and Agriculture Organization (FAO) predicts that 70% more food will need to be produced by 2050. Meat production will have to grow by more than 200 million tonne to reach a total of 470 million tonne by 2050. Thus, the future for feed enzymes is very bright. Feed enzymes will play a major role in efficiently supporting the growth in animal derived protein and food products needed to feed the world in an affordable and sustainable way.

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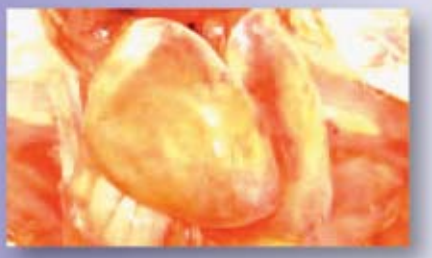

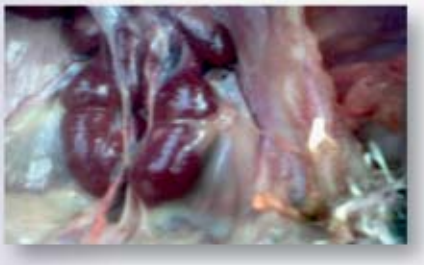

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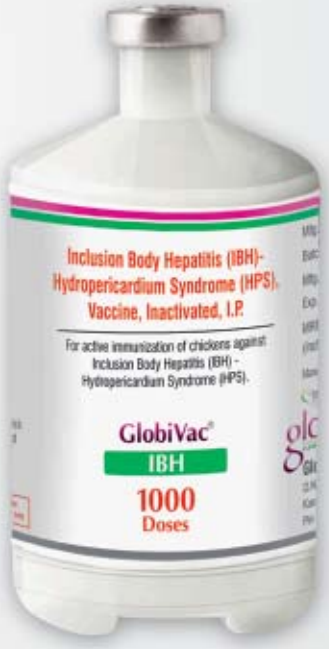

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Better Nutrition Through Biotechnologies

How Poultry housing can reduce stress and optimize performance

Author: By **James Donald, P.E**. Professor & Director of the National Poultry Technology Center, Biosystems Engineering Department at Auburn University, in Alabama, USA

In this guest blog, James Donald of the National Poultry Technology Center at Auburn University shares his thoughts on the role and importance of the poultry house and environmental control.

As an agricultural engineer who has specialized in poultry housing and environmental control for most of my career, one of the primary principles one learns is that the performance of birds has a tremendous amount to do with the physical environment surrounding the bird.

The value of stress minimization during all phases of production from the hatchery to the final shipping date is an important concept in antibiotic-free (ABF) and 'no antibiotics ever' (NAE) production. Stress allows many types of challenges to thrive in birds, weakening their immune systems, causing sickness and the need for treatment.

Proper air quality and air temperature have been two factors at the basics of good production and good environmental control. However, the concept of minimizing stress needs to be expanded beyond just proper temperature and air quality.

Tunnel housing has overturned old rules

Poultry scientists, veterinarians, primary breeders and others have long published and used ideal temperature curves for rearing their birds. And, until the mid-1980s when tunnel ventilated poultry houses began to become very popular in the United States, the idea of maintaining perfect target temperatures was one of the utmost guiding principles in rearing birds.

To a lesser degree, humidity was considered an important factor, but being at the correct temperature seemed to be the first axiom of good environmental control with rearing temperature adjustments made for relative humidities that were above or below the ideal humidities of between 50 to 70%. In pre-tunnel ventilated poultry house rearing, an old rule of thumb often used was that if temperature (in degrees F) + relative humidity exceeded 160, birds were in heat stress. This old rule does not fit tunnel housing applications in use today.

Understanding Thermal Neutrality

If one examines the methods of heat transfer to or from a bird, we know that convection, conduction, radiation and respiration are the four primary methods. In instances of good environmental control, conductive heat transfer is often negligible. Birds must maintain thermal equilibrium if they are going to grow and gain or reproduce efficiently:

- Convection
- Conduction
- Radiation
- Respiration

Thermal equilibrium does not mean being at the correct target ambient air temperature. While ambient air temperature is a big factor, thermal equilibrium means that the amount of heat generated by the bird (primarily from the digestion of feed) is released or dissipated in a manner to not cause the bird to experience stress or burn calories in doing so.

An ideal state of thermal equilibrium would mean that the bird's heat generation and its dissipation were in balance, with the least amount of calories being burned for body maintenance functions. A panting bird can be dissipating the heat that is generated from within the body, but it won't be doing it efficiently and some of the ingested feed calories will be "wasted" by spending that energy on the panting process. For cold birds to maintain equilibrium, calories are often burned to maintain warmth, thus

robbing the bird from maximizing the number of calories available for growing and gaining or reproduction. In both cases, the bird is likely to be in a stressed condition.

Example of accelerated convective heat removal

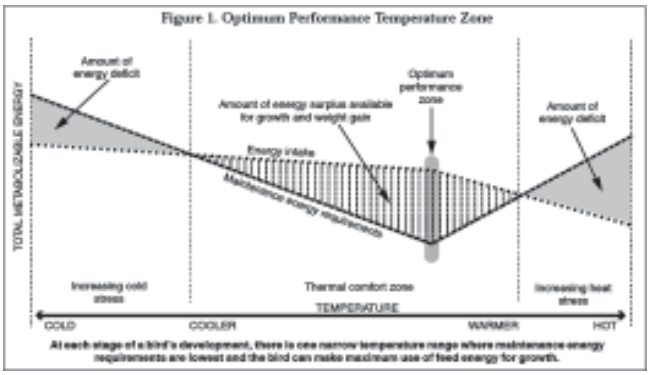
In many of our classes or lectures, we often use the example of what is a perfect temperature for a 5 lb (2.27Kg) bird. Some might say about 70F (21.1C). In still air in a humidity range of 50-70%, this bird could likely be at perfect thermal equilibrium with minimum calories utilized for body maintenance functions.

However, the same 5 lb bird at 86F (30 C) in a 400 fpm (2 m/s) breeze might also be at thermal equilibrium with very low calories for body maintenance functions, eating, growing, and gaining just the same as the 5 lb bird at 70 F in still air. Body maintenance calories are similar to the comfortable bird in still air. This is an extreme example, but this accelerated convective heat removal is the one tool that is at the bedrock of tunnel ventilation and environmental control. It is a concept that is hard to grasp and hard to teach.

A MULTITUDE OF COMBINATIONS

There are hundreds or even thousands of combinations of temperature, air velocity and relative humidity that might prove out to be very efficient for growing and gaining with minimum body maintenance, and thus minimum stress.

Figure 1. **Optimum Performance Temperature Zone**



There is no exact formula, but an abundance of guidelines, and the final indicator is bird behavior through observation, and then the poultry house management to optimize this principle of optimum comfort zone, minimum body maintenance and minimum stress. This principle of thermal neutrality can be used in brooding and in all phases of growing broiler, broiler breeder pullets and broiler breeder hens.

Figure 1 is a graphic illustration of this concept, and is a concept that every poultry house flock manager must understand.

The environmental controller might be right on the target ambient air temperature setting put into the program, but it must be adjusted or tweaked for the highest level of growing, gaining, performance and stress minimization.

Stress Minimization 24 Hours Per Day, Every Day

The maximum growth potential of the day-old chick is determined by the breed chosen and is part of the bird's genetic programming. This maximum potential is etched in stone upon arrival at the farm. (Read The Importance of Day Old Chick Quality).

However, whether or how far this growth potential is actually realized depends largely on the quality of the broiler house and the quality of the broiler house environmental management. When birds are unstressed by temperature variations, poor air quality, wet bedding or disease, they are able to maximize their growth by taking in adequate feed and water.

Environmental management is the key to achieving the grower's goal of achieving maximum flock live weight in the shortest time frame and at least cost.

Concept of Body Maintenance

Another key point to understand about the process of converting feed to broiler meat is that birds have a strict priority system dictating that feed nutrients always go first to satisfying body maintenance functions, such as maintaining internal body temperature.

The feed nutrients that can be used for growth and gaining weight are only the amounts left over after the bird's survival needs are met. Under conditions such as severe heat or cold stress, feed/water deprivation, respiratory stress or disease, a broiler flock may divert feed entirely to maintenance and gain little or no weight during a 24-hour period.

If body maintenance functions cannot be met, the bird is open to infectious agents and sickness. So, in other words, for example, a forty-day old broiler must meet its maintenance requirements before it can become a 41-day broiler by weight. This is why we must strive to maintain an optimum stress-free environment for birds, in which they have to use the

least amount of feed for maintenance, and can use the most feed nutrients for weight gain.

The poultry house design and the environmental control mechanism must be high precision tools to do this if we are going to extract the maximum genetic potential that is available.

As mentioned above, the bird's internal heat balance is the most critical factor in maximizing growth. When the surrounding air temperature is too cold, the bird has to use feed energy just to keep itself warm. If the air temperature is too warm and the air is still (no wind), the bird has to expend feed energy in panting or lifting its wings to shed excess internal heat and keep its own temperature from going too high.

Moving air over the bird (accelerated convective heat removal) helps carry heat away from the bird's body. If still air is too warm for bird comfort, getting the air moving provides a wind-chill effect that creates a lower experienced or effective temperature. On the other hand, if still air is too cool for bird comfort, any wind (draft) will make the bird experience an even lower effective temperature and it will have to use more feed energy to stay comfortable. Bird growth is maximized only when the effective temperature — the temperature experienced by the bird — is within a certain optimum range, not too hot and not too cold, as shown in Figure 1. Effective temperature cannot be measured.

Bottom Line

Whenever two similar broiler flocks show a marked difference in overall performance, the bottom line is that the difference in performance will be the result of a difference in body maintenance requirements.

Figure 2. **Feed Energy Birds Can Use for Growth vs. Body Maintenance DuringGrowout**

The specific causes might be identified as temperature extremes, drafts or chills, which drain heat away from the bird's body, better or poorer air quality, different feeding/drinking patterns, infectious causes, etc. But always the flock with the lowest maintenance requirements will shift the most nutrients into growth, which will be reflected in better overall performance. (Figure 2).

PRESS RELEASE

Biomin®

BIOMIN Announces Positive EFSA Opinion for Digestarom® DC as Zootechnical Additive for Poultry

On 11 June 2019, the European Food Safety Authority (EFSA) Panel on Additives and Products or Substances used in Animal Feed (FEEDAP) published a favorable Scientific Opinion on the safety and efficacy of Digestarom® DC in broilers, layers and minor avian species.

The Scientific Opinion noted that the feed additive "has a potential to increase the growth performance of chickens for fattening when incorporated into feed at a minimum application rate of 65 mg/kg complete feed; the conclusion can be extended to chickens reared for laying and extrapolated to minor poultry species reared up to the point of lay."

"This represents an important step in achieving EU authorization of Digestarom® DC as a zootechnical feed additive," commented Dr Antonia Tacconi, Global Product Manager Phytogenics at BIOMIN. "We always appreciate the scientific and rigorous work of the FEEDAP Panel in reaching its conclusions," she added.

"Considerable effort, expertise and dedication by our knowledgeable R&D teams at the BIOMIN Research Center and our top notch sales and technical teams in the field have made this achievement possible," noted Dr Tacconi. "They ensure that BIOMIN consistently leverages scientific innovation to support our clients' successes in real-world commercial settings. It also attests to the helpful role that phytogenics can play in food animal production throughout the globe."

Performance boost

Supporting birds to achieve good gut performance means higher productivity and economic gains for producers. "What sets Digestarom® DC apart is the performance benefits, pelleting stability, ease of handling and a documented mode of action," stated Dr Tacconi.

The triple-action formulation of Digestarom® DC incorporates the innovative Biomin® Duplex Capsule technology that ensures the plant-based active compounds are delivered where they are needed to be most effective. The three modules include: 1) promoting appetizing and endogenous secretions, 2) gut microbiota modulation and 3) gut protection.

Global campaign continues

BIOMIN first introduced Digestarom® DC at VIV Asia in March 2017. In April 2018, BIOMIN submitted an EU dossier for Digestarom® DC as a zootechnical feed additive in broilers.

The firm introduced Digestarom® DC to customers in Europe, the Middle East and Africaat EuroTier in November 2018.

"We look forward to the opportunity to further demonstrate the various ways in which phytogenic compounds and our extensive Digestarom® line can benefit feed and livestock producers based on their specific needs," Dr Tacconi concluded.

Utilization of Neem Leaf Meal in Poultry

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Introduction

Poultry Industry, one of the major role players of Livestock sector, having the highest growth rate is facing one set back ahead their ultimate success, i.e. growing feed cost. The annual egg production, the per capita availability of eggs per annum and growth rate of egg production has reached 95.2 billion, 74 eggs, and 8%, respectively in the year 2017-18 (DAHD-2018) in India. Majority of the population in India still subsists in villages and they are getting access only to 25% of total poultry products, as commercial poultry farming is limited to urban and semi urban areas. Irregular supply of feed and fluctuations in the feed prices is a constant threat to the poultry feed supply as well as the industry. Hence forth, it becomes imperative to intensify the efforts in search for cheaper, abundant and locally available alternatives that have no direct dietary value to man, for the sustainable production. Also, the consumeristic health conscious society of the modern day is looking forward for the intake of low antibiotic residue items in their menu. In this context, Neem leaf meal (NLM) is an ideal candidate for the poultry industry to make their production economically viable and environmentally sustainable.

Neem *(Azadirachta indica*)

Neem, scientifically known as *Azadirachta indica* belongs to the family meliaceae, a tropical evergreen tree which is widely distributed in Asia, Australia, Africa and other parts of the world. Neem, a fast growing tree, grows in a extensivearray of soils and it is a robust tree which can flourish in poor dry soils without irrigation. Neem tree is also known as the nature's gift to mankind,the tree for many occasions, the tree of the 21st century and a tree for solving global problems.The short, usually straight trunk has a moderately thick, strongly furrowed bark that has a garlic-likeodour and a bitter, astringent taste. Botanical study reveals that the neemleaves are imparipinate, 20-38cm long, crowded near the branch end, oblique, lanceolate, deeply and sharply serrated. The neem plant is rarely leafless and is usually in full foliage even during months of prolonged drought (NRC, 1992).Two species of *Azadirachta* have been reported, *Azadirachtaindica* A. Juss, a native of Indian subcontinent and *Azadirachtaexcelsa*Kack from Philippines and Indonesia. *Azadirachtaindica* A. Juss, commonly found neem plant, has been well known in the Indian subcontinent. It is grown from the southern tip of Kerala to the Himalayan hills, in tropical to subtropical regions, in semi-arid to wet tropical regions, and from sea level to about 700 metres (NRC, 1992).

Neem is one of the very few shade-giving trees that thrive in drought-prone areas. Miliacin forms the bitter principles of its leaves (NRC, 1992). These compounds belong to natural products called triterpenoids (Limonoids). The active principles are slightly hydrophilic, but freely lipophilic and highly soluble in organic solvents like, hydrocarbon, alcohols, ketones and esters (NRC, 1992). Neem leaves exhibit immunomodulatory, anti-inflammatory, antihyperglycaemic, antiulcer, antimalarial, antifungal, antibacterial, antiviral, antioxidant, antimutagenic and anticarcinogenic properties (Tiwari *et al.,* 2014). Owing to these properties, neem leaf meal has been tried as a feed additive in animals. An abundantly available biopolymer,Chitosan in combination with neem leaf meal can be supplemented in the diet of broiler chickens to reduce the abdominal fat. In non-pesticidal management (NPM), neem is a key ingredient providing a natural alternative to synthetic pesticides. Also, it acts as an anti-feedant, repellent, and egg-laying deterrent, protecting the crop from damage. Neem cake is often sold as a fertilizer.Azadirachtina chemical in neem has

positive effects on pests, and deformental effects on viruses, mites, fungal pathogens, plant parasitic nematodes, intestinal worms, bacteria, molluscs, and protozoan parasites such as coccidian species(NRC, 1992).

Medicinal Properties of Neem

Neem leaves have been used to treat skin diseases like eczema, psoriasis;leprosy, eye disorders, bloody nose, intestinal worms, stomach upset, loss of appetite, skin ulcers, diseases of the heart and blood vessels (cardiovascular disease), fever, diabetes, gum disease (gingivitis), and liver problems. The leaf is also used for birth control and to cause abortions.The bark is used for malaria, stomach and intestinal ulcers, skin diseases, pain, and fever.The flower is used for reducing bile, controlling phlegm, and treating intestinal worms.The *A. indica* leaf exhibits a wide range of pharmacological activities viz., antiinflammatory, anti-hyperglycaemic, anti-ulcer, anti-malarial, anti-fungal, anti-bacterial, anti-viral, anti-oxidant, anti-mutagenic anti-carcinogenic, immunomodulatory and various other properties without showing any adverse effects. Azadirachtaindica leaves also contain compounds with proven antimicrobial activity. The antimicrobial activity of extracts of neem leaves against such micro-organisms as *Staphylococcus spp., Streptococcus spp., Pseudomonas spp.* and *Escherichia coli*, and some fungal strains have been reported.

Composition of Neem leaf meal

The nutrient composition ofNeem leaf meal is 9% moisture, 20.52% crude protein (CP); 16.45%crude fibre (CF); 4.25% ether extract (EE); 7.00%total ash and 42.78% nitrogen free extract (NFE). Leafmeal contained macro minerals (per cent) that is Ca (0.71),P (0.28), Mg (0.75), Na (0.58) and K (2.00) and microminerals (ppm) that is Cu (34), Zn (18), Fe (745), Co(10), Mn (60), Cr (0.8) and Pb (27)(Ansari *et al.,* 2012).

Effect of Neem leaf meal on Poultry

Extensive research has been carried out in chickens about the supplemental effect of neem leaf meal. Broilers fed diets supplemented with 2.5 g/kg of Neem leaf meal had significantly greater body weight than those fed diets with 1.25, 5.0 g/kg of leaf meal and controls birds at 28 and 42 days of age. Also, birds fed diet with 2.5 g/kg of leaf meal had significantly highest dressing percentagethan birds fed diets of 1.25 or 5.0 g/kg of leaf mealand control groups at 42 d of age (Ansari *et al.,* 2012). Serum and tissue cholesterol significantly decreased with increasing the levels of leaf meal. Researchers found out that *Azadirachta indica* leaf meal fed to broilers gave live performance levels similar to those of the antibiotic growth promoter and observed improvements of 8.1% in daily gain and 7.7% in feed conversion ratios in 17-day-old poults. The daily weight gain at 42 days of age was improved from 3.61 to 8.96% in broilers fed diet supplemented with leaf meal thanantibiotic (Ansari *et al.,* 2012). Supplementation of neem leaf powder @ 1-2 gm/kg feed increases the live body weight of broilers with improvement of feed efficiency in the leaf powder fed groups when compared with control antibiotic group. Similar studies with salinomycine and *A. indica* fruit as feed additive and anti-coccidial in broilers manifested better results in terms of weight gain. The rise in weight gain is due to thepresence of macro and micro minerals in *A. indica* leaf meal. The higher body weight gain in broilers consuming leaf meal could also be due to its appetite- and digestion stimulating, anti-bacterial and hepato-protective properties, which aid to lessenthe microbial load of birds and enhanced the feed consumption and feed efficiency of the birds indicating neem as an ideal substitute to the existing antibiotic growth promoter. Also, there is a significant progress in relative weight (liver, heart and gizzard) when adding the neem leaves powder to drinking water by 40 ml/l.The greater bursa and thymus weight in birds supplemented leaf meal as compared to the negative control suggests that leaf meal supported these lymphoid organs. The leaf meal potentiated immune response in the experimental broilers (Ansari *et al.,* 2012).

Serum cholesterol levels were observed to decrease progressively with increasing dietary levels of *A. indica* leaf meal (Ansari *et al.,* 2012). This reduction in serum cholesterol level of broilers fed leaf meal diets possiblypropose a general decrease in lipid mobilisation. This is due to the indirect inhibitory effects exerted by the neem leaf meal at the levels of HMG-CoA reductase, a key enzyme in cholesterol biosynthesis. This suggests that leaf meal diets were capable of dropping serum cholesterol, thereby helping to reduce the deposition of cholesterol in the skin and muscles. This correspondinglyindicates that *A. indica* leaf meal should be used to produce animal product with reduced cholesterol content. The reduction in total cholesterol in serum reflects the hypocholesterolemic properties accredited to the defatted part of the leaves which are rich in fibrous content and may block intestinal cholesterol absorption. Neem leaf meal contains different compounds that is Quercetin-3-O-b-D-glucoside, Myricetin-3-Orutinoside, Kaempferol-3-O-b-D-glucoside, Quercetin- 3-O-glucose and L-rhamnoside. It is accepted that these compounds either partially or wholly may be responsible for anti-hyperlipidermic activity of *A. indica* leaves. The liver functioning, after the supplementing of neemleaf meal was studied and the decreased activities of SGOT, SGPT and ALP in serum evidenced the positive effect of leaf meal on liver parenchyma of the birds. According to Bhatti and Dil (2005), alteration in serum enzymes activity under stress conditions occur due to malfunctioning of liver, as degenerating and necrotic cells leak enzymes from cytoplasm. Studies verified the non-hepatotoxic nature of *A. indica* and that the unaltered and normal activities of serum SGOT, SGPT, ALP as well as retained architecture of liver after *A. indica* treatment. Also, the *A. indica* leaves contained quercetin and rutin compounds which are extensively studied bioflavonoid in the class of flavonols. It is well-established that quercetin, one of the most abundant flavonoids, is a more powerful anti-oxidant than the other anti-oxidant nutrients such as vitamin C, vitamin E and b-carotene. The increase of 8.5%in growth hormone level might be due to the presence of amino acids particularly arginine present in *A. indica* leaves ,that provides a regularity system which results in secretion of growth hormone and ultimately facilitate uptake of amino acids in proteins. The maximum tolerance level of Neem leaf meal as stated by Obikaonu *et al*., 2012 is 10% in starter broilers but Esonu *et al*., 2006 included 15% in laying birds. The proximate composition of neem leaf meal indicated it as a good source of protein with crude protein values range of 18.10-20.68% (Obikaonu *et al*., 2012, Esonu *et al*., 2006). Shihab *et al.*, 2017 reported that Neem leaf powder supplemented @ 2g/kg had a positive role to improve ND and IBD immunity and the qualities of productivity and physiological for broiler chicks.

Haematological parameters indicates the physiological status of birds and its deviation can be utilized in assessing the response of birds to various physiological situations.The significantly higher value of PCV, Hb and RBC indices (MCV,MCH and MCHC) of the birds on neem leaf meal diets relative to the control group is an indication that the birds were not anaemic (Ansari *et al.,* 2012). The high concentration of Hb in birds fed diets of leaf meal is due to hepato-stimulatory and hepatoprotective effects of leaf meal resulting in the synthesis of more Hb in the bone marrow which is under the control of erythropoietic factors released by hepatic cells. The nutritional factors affected the blood profiles of birds and this implies that up to 2.5% inclusion of leaf meal had a positive effect on the relative quantity of blood cell as well as total volume of blood. Serum proteins are involved in transport of important body substances, and maintenance of normal distribution of water between blood and tissues through osmotic pressure. Serum protein content were found to be elevated in birds fed leaf meal at 2.5% levels (Ansari *et al.,* 2012 and Obikaonu *et al.,* 2011). Laying birds can tolerate 5% – 15% dietary levels of Neem leaf meal (NLM) without deleterious effects and that carcass weight, dressed weight, liver, heart and gizzard weights were significantly increased at 5%

dietary level of NLM. Neem leaf meal has been tested as an alternative feed ingredient in poultry production. Studies showed an increase in yellowish colour of cockerel shanks when NLM was included in their diets. Also, there is a deeper egg yolk colour with increase in NLM inclusion. Esonu*et al.* (2006) reported that 15% inclusion of NLM in the layer diet increases both hen-day egg productionand egg yolk colour. So, NLM may be used as a natural colourant for chicken products.

Conclusion

Azadirachta indica, commonly known as neem, has attracted worldwide attention in recent years, owing to its wide range of medicinal properties. Based on the research studies carried out, it may be concluded that *A. indica* leaf meal can be included in the diets of broiler chicks up to 2.5 g/kg without any deleterious effects on their performance, serum biochemical constituents and haematological indices. The use of antibiotics in boilers should be discouraged this can be replaced with *A. indica* leaf meal. Moreover, the dietary supplementation of *A. indica* leaf meal may lead to the development of low-cholesterol chicken meat as demanded by health-conscious consumers. Also, neem leaf meal can be used as an alternative by the poultry sector for antibiotics.

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Failure of Vaccine / Vaccination and its correcting measure

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Introduction

Vaccine is a substance prepared by biological method to prevent the virus induced clinical symptoms or to protect the animal from invading micro organisms like virus, bacteria, parasites and fungi. Vaccination means exposing of animal to the immunogenic substance of microorganism which actually mimics the causative agents of infection. Upon exposure to different vaccines, the animal realized about nasty behavior of various infectious agents and when the animal encounter these infectious agents later in life, it will immediately destroy those agents by using preformed antibodies or cell mediated pathway.

Importance of vaccine

Vaccine is playing an important role for production of good quality animal products and its byproducts. In the absence of good quality vaccine against various diseases, livestock industry will face huge economic loss due to high mortality and morbidity caused by various infectious agents. Vaccines also playing an important role in zoonotic aspect by preventing various communicable diseases from animal to human or human to animals.

Does the vaccine will protect the animal from disease or only reduce the clinical symptoms?

Vaccines produce an optimum immune response to compete with the rate of multiplication of microorganisms in the animal body and do not allow the infectious agent to establish the clinical infection. Sometimes though the animals are vaccinated, when there is suboptimal immune response, the highly virulent infectious agents can breakdown the immunity of host and causes clinically severe disease.

Window period of vaccines

Vaccine immunogens take time to induce optimum immune response, thus the induced immune response should able to counteract the speed of infectious agent multiplication in the predilection site of virus in the host. The window period means the duration between vaccination and eliciting an optimum immune response. If an animal infected with infectious agent with in this window period animal may exhibit clinically severe disease. Some of the vaccine needs booster vaccination to induce optimum immune response. In the absence of adequate booster vaccine, the animal may not induce sufficient immunity. It leads the infectious agents snatch the host machinery mechanism and utilizes the host sources for its multiplication and animal gets succumbed due to damage of various vital organs.

Vaccination schedule/regime

Based on the window period of each vaccine and as per the epidemiological data, the animal should be vaccinated at least four to six weeks before the expected time of outbreak of any prevalent disease at particular ecological or endemic areas. To ascertain the time of outbreak of any particular organism at particular location, the regular sero-monitoring should be done to know about surveillance ability of any pathogen at particular location. An animal should not be vaccinated if the animal under stress or immediately after transport or after weaning or calving or unhealthy or treated with corticosteroids. Before vaccination, the animal should be dewormed to alleviate the parasite induced stress.

Site and route of Vaccination

Vaccination should be done as per manufacturer instructions, because there are some specific sites (i.e. Intramuscular or subcutaneous) for better processing and presentation of vaccine immunogen to the host immune cells for its active participation in protecting the host from various pathogens. Some of the live attenuated vaccines should not be administered nearby its predilection site, because there may a chance of vaccine induced damage to those specific organs. So, to avoid these vaccine induced pathogenic effect, those vaccines should be administered away from its predilection site in the host.

Failure of vaccine or vaccination

Vaccine failure may be due to either failure of vaccine to elicit optimum immune response or failure in proper vaccination schedule or due to immune-compromised or immune suppressed animals. Thus the failure of vaccine is mainly because of involvement of multiple factor such as animal, vaccine antigens, environment factor and vaccinator or veterinarian (Fig. 1).

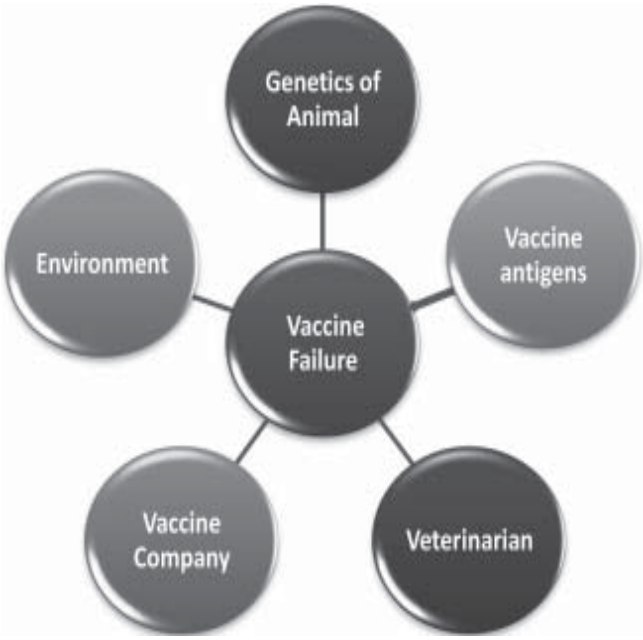

Fig. 1: Factors involved in Vaccine failure

Animal factor

- Generally animals should be healthy in condition at the time of vaccination.
- Some breeds of the animal will be genetically resistant or susceptible against specific pathogen.
- Some of the animal will act as maintenance or amplifying host for some specific pathogens, so care should be taken while constructing the animal house for the definitive host at endemic areas for any specific pathogen.
- Vaccination should be covered all the animals, because the missed animal will act as a carrier for specific pathogen.

Vaccine factor

- Vaccine antigens susceptible to the hot environment and UV rays
- Failure to identify the good vaccine candidates
- Vaccine may revert to wild type from its attenuated stage
- Failure in proper attenuation of infectious agents in live attenuated vaccine
- Failure to select suitable adjuvant to enhance the response of inactivated or killed vaccine

Veterinarian

- Administration of inadequate dose or wrong route of immunization
- failure to boost on time or failure to maintain cold chain
- failure to maintain herd immunity or vaccination of animals which are under stress

Vaccine Company

- Improper inactivation/instability of antigen at the time of storage
- Diluents may get Contaminated
- The prepared vaccine may contain less than the required antigen titre

Environmental factor

Live attenuated vaccines are highly susceptible to heat, UV rays, freezing temperature and frequent

thawing and it results in reduction of vaccine immunogen titre in the vaccines. As per manufacturer's instructions the vaccines should be maintained in the cold chain for storage and avoid unnecessarily storing at freezing temperature when there is no any recommendation from company. Animal should be vaccinated in the early morning or late evening, because animal may be under stress at the hot temperature of the day. To reduce the stress, the water can be sprayed over the animal after vaccination and the movement of the vaccinated animal should be restricted for at least one day. Animal house shed should be maintained with good aeration.

How to address the vaccine failure at field level

A successful vaccination improves the livelihood of animals, animal owner as well as consumers. Improving of vaccines or vaccinations alone cannot helpful to get rid of vaccine failure, also the other factors such as the Veterinarian, animal owner, the animal husbandry department and vaccine manufacturing companies are playing a major role to evanesce the vaccine failures problems (Fig. 2).

Fig. 2: Role of multiple components in successful vaccination

Role of veterinarian in successful vaccination

1. Choose the diluents specifically given along with respective vaccine, because other diluents may contain some other components or different pH, which may decrease the antigen titre in vaccine.
2. Dilute the vaccine immunogen by using wide pore size needle for proper mixing and equal distribution of antigen; because narrow one may retain the some antigen within it, it leads to reduction in antigen titre.
3. Do not store the diluted vaccine for long time, it should be used within an hour or else unused doses should be discarded.
4. Inject the vaccine at the specified site and route as per manufacturer's instructions. Because wrong route/site of immunization cause failure in proper antigen processing and presentation to immune cells.
5. Inject the appropriate dose of vaccine as per manufacturer's instructions. Because lower or higher dose of vaccine cause immune unresponsiveness or immuneparalysis respectively in the host.
6. Choose the vaccine containing strains which are more prevalent in those particular ecological or endemic areas.
7. At the time of combined vaccination, one should ensure that there should not be any side effects or reduction of potency of other vaccine.
8. Veterinarian should have wide knowledge about susceptible or resistant instinct of different breeds of animals. So that he/she can avoid unnecessary vaccination at the particular ecological area.
9. Veterinarians should ensure the maintaining of herd immunity against each disease by vaccinating almost all the animal at their particular area.
10. The animals should be given with booster vaccine after particular time interval of primary

vaccination as per instruction label. The delay in booster vaccination fails to maintain the optimum antibody titre in the host.

11. Veterinarians should use sterilized syringe and needle for vaccination; avoid using disinfectant for sterilizing syringe or needle, because it may cause detrimental effect on the vaccine antigen. Warm water can also be used for sterilizing those instruments.
12. The deworming of animals should be done at least one month before the vaccination, because presence of worms causes parasitic stress to the animal.
13. Veterinarians should conduct regular vaccination camp to maintain herd immunity.
14. Veterinarians should have knowledge about maternal antibody interference against any vaccine. Better to vaccinate the animals three month after birth in case of large animal and one month after birth in case of small animal, because by the time, the maternal antibody gets waned or reduced its titre level in the host.
15. Veterinarians should avoid the vaccinating of sub clinically infected or animal under in incubation period against any disease, because before attain optimum immune response, the animal will exhibit clinical symptoms for those disease. It allows the owner to think wrongly that it might be due to vaccine antigen or vaccination.

Role of animal's owner in successful vaccination

1. Animal should be maintained with balanced diet. Because the amino acids are playing a very much important role in synthesis of pattern recognition receptor or different antibody classes or T cell receptors and various co-stimulatory molecules such as cytokines and secondary messenger molecules in the animal body.
2. Animal's owner should obey the veterinarian's instructions regarding vaccination, deworming and treatment aspect.
3. Owner should have regular consultation with veterinarians for efficient farm management and avoid treating with expired medicines or treating the animals without veterinarian's concern.
4. Owner should convey the clear history about animal's condition to the doctors. Then only the effective treatment can be done to that affected animals.

Role of animal husbandry department in successful vaccination

1. Animal husbandry department should ensure that the timely availability of any vaccine and also should ensure cold chain maintenance of vaccines.
2. Department should arrange sufficient assistant/ attendant for assistantship at the time of vaccination.
3. Department should update the vacancy details of veterinary doctor to the Government on time to time for regular appointment of sufficient doctors.
4. Department should report outbreak of any disease at any location without delay for keeping the epidemiological data's up to date and should assist to know about the sero-surveillance against any infectious agents.
5. Department should develop many regional diagnostic laboratories for quick processing of samples to get results immediately.

Role of vaccine manufacturing company in successful vaccination

1. The company should ensure the attenuation of the entire virulent virus particle in the attenuated vaccines. None of attenuated virus particles should show virulent property in the host system.

2. The company should ensure the inactivation of the entire virulent virus particles in the killed vaccines. Improper inactivation causes vaccine induced disease outbreak.
3. The company should ensure the availability of less as well as high dose containing vaccine vials. Because, the availability of only high dose vials, the small farmers couldn't able to afford to purchase or the unused excess dose may gets wasted or the farmers using it again even after its expiry.
4. The company should collect regular feedback from field level, to improve its vaccine efficacy, potency and safety.
5. The company always should ensure that the preparing vaccine antigen mimics the currently circulating infectious strain. Thus, the vaccine which contains classical strain may not elicit protective immunity against currently circulating variant strain of infectious agents.

Conclusion

The failure of vaccine or vaccination can be addressed not only by the responsibility of veterinarian, but also by others such as the animal owner, Animal husbandry department, vaccine producing company and diagnostic laboratory and administration of optimum dose of vaccine in the recommended site by using sterile syringe and needle to the healthy animals and timely booster will helps to improve optimum immune response which will fight for the better protection of animals against various infectious diseases at any endemic areas and the regular study of surveillance, sero-monitoring and herd immunity level against the entire prevalent infectious organism at any particular place will assure the maximum protection level against the any infectious organisms at any particular endemic area.

Reference

On Request

PRESS RELEASE

trouw nutrition
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From Feed to Fork - Trouw Nutrition offers 360º approach

Trouw Nutrition India, aNutreco Company, is the global leader in animal nutrition with **"Feeding the Future"** as its mission. Aligning with their mission, Trouw Nutrition successfully conducted a seminar on 25th May, 2019 at Panchkulafocusing on two major aspects – Feed Safety and Gut Health. The seminar had a gathering of around 70 key customers, farmers, feed millers and consultants.

The seminar began with Dr. Chandani Parihar, Marketing Manager, Trouw Nutrition India welcoming the guests and setting the tone for the evening.

Dr. Saurabh Shekhar, Managing Director, Trouw Nutrition India, spoke about the new developments at Trouw Nutrition. Trouw Nutrition, part of the SHV Group – a Dutch conglomerate, is at the heart of changes in a world with limited natural resources and growing pressure on the feed-to-food value chain. Trouw Nutrition is a one stop solution provider that has been supporting farmers, integrators and the feed industry around the world for over 80 years. Trouw Nutrition's strong belief and investment of about • 50 million in research and innovation is helping it realise the necessary growth for farmers and integrators in the animal nutrition industry. Dr. Shekhar also gave the audience an overview of the company's global operations and the key focus areas.

Dr. Swamy Haladi, Feed Additives Manager, Trouw Nutrition India had a very interactive session with audience on Mycotoxin Management. Salient features of his presentation are:

- There are many factors that affect mould and mycotoxin occurrence in the feed to food chain and the contamination can happen both in the field and during storage.
- Out of the many mycotoxins, it is important for the farmers and feed millers to focus their efforts on the mycotoxins that are relevant to Indian condition i.e. are found more commonly in the tropical climate and have a lower LD50 value.
- Based on the mycotoxin analysis conducted by Trouw Nutrition in **MasterLab** (the local customer laboratory facility in Hyderabad) and on field through **Mycomaster** (a rapid, cost-effective and accurate analytical tool for on-field mycotoxin analysis) it has been found that 97% samples are contaminated with aflatoxins. Ochratoxins and T-2 toxin were not detected at toxic levels.
- A complete Mycotoxin Management should include understanding of the origin of raw materials to observing the birds for mycotoxin related issues and using solutions that are specific to those issues.
- Trouw Nutrition can help in complete Mycotoxin Management through a combination of their services and products. Services like **Mycomaster** and laboratory analysis at **MasterLab,**can be utilized for quick and reliable analysis of raw materials and feed. This is essential to monitor mould and aflatoxin levels. Products like **Toxo MX,** the best aflatoxin binder with maximum aflatoxin adsorption capacity, can be employed to reduce toxin impact.

Dr. Sabiha Kadari, Technical Manager, Trouw Nutrition India talked about the integrated approach for a healthy gut environment. Key points of her presentation are:

- Healthy gut is critical for overall bird health as it is directly related to the entry of microbes through feed, water, environment and vertical transmission.

- Antibiotic Growth Promoters (AGPs) have been used since many decades to counteract the ill effects of pathogenic microbes. However, the misuse of AGPs has been related to other problems like destruction of commensal flora, overgrowth of resistant microbes and eventually re-infections, diarrhoea and mortality.
- An integrated and sustainable approach for promoting healthy gut includes covering both feed and water sources. Use of organic acids – small chain fatty acids (SCFA), medium chain fatty acids (MCFA) have been proven to have positive effects on the gut environment.
- Trouw Nutrition can help through products like **Selacid Green**, a synergistic blend of free and buffered SCFAs and MCFAs, thatimproves technical performance of bird and controls both Gram+ive and Gram-ive bacteria .Water quality should also be looked at to ensure good gut health. **Selko pH** is a synergistic blend of free and buffered organic acids, which helps to stabilize water pH and improves intestinal health.
- Trouw also offers water quality testing at **MasterLab** in Hyderabad, part of the largest professional network of laboratory service in animal nutrition industry.

  Mr. Mohit Kumar Agarwal, Sales Manager – North India, concluded the seminar by thanking the participants and requesting the customers for their continued support.

For further information, please contact us at customercareindia@trouwnutrition.com

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 2019

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
Ahmedabad	335	338	341	346	351	356	360	365	370	375	380	385	390	395	400	405	410	415	420	425	427	427	427	427	427	427	427	427	427	427	394.4
Ajmer	282	295	300	302	311	311	315	325	331	336	336	336	341	350	350	360	370	370	375	375	370	366	360	355	375	378	378	381	383	390	346.9
Bangalore	345	350	350	360	365	365	375	375	385	385	395	400	405	415	420	425	425	435	435	435	445	445	445	445	445	445	445	445	445	445	409.83
Barwala	282	290	300	305	305	308	315	325	333	335	336	337	340	345	350	357	365	370	373	373	373	373	360	354	360	370	375	375	376		343.45
Bhopal	315	315	325	335	345	350	352	360	365	370	373	375	375	375	385	395	405	405	415	420	420	420	420	410	405	405	405	407	410	420	382.57
Chennai	375	375	375	375	385	385	395	395	405	405	420	420	430	440	440	450	450	460	460	460	470	470	470	470	470	470	470	470	470	470	433.33
Chittoor	368	368	368	368	378	378	388	388	398	398	413	413	423	433	433	443	443	453	453	453	463	463	463	463	463	463	463	463	463		425.07
Delhi	295	300	310	317	320	320	325	333	342	348	350	350	353	356	362	367	375	382	386	388	388	388	388	380	380	380	387	390	390	392	358.07
Godavari	307	307	310	315	320	325	328	333	338	345	357	364	372	380	388	396	404	412	415	418	420	420	420	420	420	420	420	420	420	420	377.8
Hospet	310	315	315	325	330	330	340	340	350	350	360	365	370	380	385	390	390	400	400	400	410	410	410	410	410	410	410	410	410	410	374.83
Hyderabad	308	313	323	325	330	335	340	345	350	355	365	370	375	380	385	390	395	400	405	410	413	415	415	415	415	415	415	415	417	419	378.43
Indore	305	315	325	325	335	335	340	350	355	360	360	360	365	375	375	385	395	395	400	400	395	395	390	390	405	410	410	410	415	420	373.17
Jabalpur	320	330	340	350	355	358	362	367	372	377	377	377	380	384	393	396	405	413	417	419	419	414	407	405	405	405	420	420	423	425	387.83
Kolkata	350	350	353	358	358	358	362	370	380	390	398	410	412	424	435	443	443	450	450	450	444	444	444	444	444	447	450	453	454	454	414.07
Mumbai	360	363	363	373	380	385	390	395	400	405	410	420	425	430	435	440	445	450	455	460	465	468	472	472	472	472	472	472	472	472	429.77
Mysore	355	355	365	365	365	380	380	390	390	405	405	405	421	421	431	431	441	441	441	451	451	455	455	455	455	455	455	455	455	455	419.47
Nagpur	325	330	335	345	350	355	360	365	370	375	385	390	395	400	405	410	415	421	425	415	415	415	415	415	415	415	415	415	417		389.93
Namakkal	370	370	375	375	375	385	385	395	395	405	405	405	420	420	430	430	440	440	440	450	450	455	455	455	455	455	455	455	455	455	421.83
Pune	340	350	355	365	375	380	385	390	400	400	410	420	425	430	435	445	445	450	455	460	463	463	465	465	465	465	465	465	465	465	425.37
Punjab	295	300	312	317	319	321	325	333	342	349	349	349	351	354	362	364	372	380	385	387	387	387	387	387	377	377	390	390	390	390	357.6
Raipur	325	345	345	357	365	371	371	376	380	385	392	397	400	403	407	411	417	422	425	425	425	415	415	415	415	420	423	425	425	430	397.57
Surat	345	348	350	360	367	372	377	382	400	405	405	410	415	420	425	430	435														390.94
Vijaywada	307	307	310	315	320	325	328	333	338	345	357	364	372	380	388	396	404	412	415	418	420	420	420	420	420	420	420	420	420	420	377.8
Vizag	310	310	310	325	330	335	338	360	360	375	400	400	400	405	408	411	414	417	420	425	428	427	430	430	430	430	430	435	435	440	392.27
Warangal	308	311	316	326	328	333	338	343	348	353	358	368	373	378	383	388	393	398	403	408	413	416	418	418	418	418	418	418	418		376.17

Are you using pesticides in your breeder & layer farms, for pest control ?

*** Reproductive Effects in Birds Exposed to Pesticides and Industrial Chemicals**

- ❊ Acute Mortality
- ❊ Reduced Fertility
- ❊ Sub-lethal Stress
- ❊ Eggshell Thinning
- ❊ Suppression of Egg Formation

Say No to Pesticides on Your Breeder & Layer Farms

Your Only Truthful Solution

LitterMan™

The Complete Litter Control

Poultry Litter Management by *in situ* Composting

❊ **LitterMan** is a Pro-biotic product, natural & safe for the environment, which enables *in situ* composting of poultry manure.

❊ **LitterMan** delivers complete control over poultry manure, minimizing ammonia evolution & incidences of ;
Flies (adult & larvae) &
Ectoparasites (Ticks, Fleas, Red Mites, Lice & Bedbugs)
by breaking down the manure in to simple compounds that make manure unfavourable for their habitat & breeding.

Stop Pesticides Improve Farm Productivity

*D. Michael Fry - Department of Avian Sciences, University of California, Davis, California - Environ Health Perspect 103(Suppl 7):165-171 (1995)

ANSHUMAN® INDUSTRIES

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Wuhan Sunhy Biology Co., Ltd.

- A leading bio-tech specialties company headquartered in Wuhan China.
- Professional suppliers on enzymes preparations, probiotics.
- Founded in 2000, with approximate 400 employees and 4 manufacturing sites.
- Serving more than 3500 customers via domestic and global sale networks.
- National Post-Doctoral Working Station, Academician Working Station RND.
- Vice President of China Feed Association.
- Vice-chairman of China Bio-fermentation Industry Association.
- Vice president of National Feed Enzyme Standard Committee in China.
- Top 10 Enzyme Manufacturer in world.

sunHY 新华扬

Our Enzyme Solutions to Indian Market

- Phytase, xylanase, Protease, Mannanase & Amylase etc.

Sunzyme MAX: (Unique blend from actual NSP's)

- **One Stop Solution** to all multiple enzymes
- **Design as per Actual NSP from Indian** raw material from different territory
- Effectively **Replace the Maize** with Wheat, Bajra or other RM
- **Works** on both **Plant & Animal origin** source of **Protein.**
- **Good Activity** of important enzymes- Phytase, xylanase, Beta Glucanase Mannanase & Amylase etc.
- **Improve Internal protein** enzyme activity.
- Support as **Immunity booster.**
- **Perfect solution** for any kind of feed ingredient.
- Provide **Pre and Probiotics effect** as well.
- **Best ROI and Cost Effective**
- **Dose:** Broiler 500g/ton & layer 350 g/ton

Sunxy: (Advance Cost Effective Solution)

- Only **Intrinsically Heat Stable** at 100 Degree Celsius. (Published in world Carbohydrate conference in 2015, Finland)
- Scientifically proven Xylanase: 160,000 U/g
- **G11** advanced Modified family, give Higher endo-/exo-xylanase activity.
- **Provide** the Monomers and Oligomers.
- Effectively **Degrade both Soluble and Insoluble Arabino-Xylans,** with helps maintain the healthy microbiota by producing xylo-oligosaccharides (XOS).
- Promotes the growth of beneficial bacteria.
- **Optimal activity** at neutral pH, which ensures prolonged action on the substrates in gastrointestinal tract.
- Only xylanase from china which is **EU approved.**
- **Best ROI and Cost Effective**
- **Dose: 100** gm /ton

Bhuvana NutriBio Sciences

Marketing Partner:
Bhuvana Nutribio Sciences
E-7, 2nd Floor,Opp. Gate No. 1, Market Yard, Glutekadi, Pune - 411037. (India)
www.bhuvananbs.com, bhuvanaservices@gmail.com
9850979652, 9396686500

ROSH-C +

Next Generation Stress & Stroke Reliever

BENEFITS

- **Unique & Leading** formulation since last 15+ yrs
- Work better for **Stress and Stroke** (Hot, Cold & Other Stress)
- Power pack blend of **Vit.C 50% and 26+** Ingredient mainly **Heat Regulator, Aspirin, Chromium, Betaine, Minerals, Immune Booster** etc.
- With Special Technology **Vit C coated with Energiser** to prolong Vit C degradation & insta energy source
- **Special Value added agents** helps to protect from stroke after peak heat after 2/3 pm.
- **Balanced Electrolyte** combinations and well maintained **Osmoregulation** proce
- **Achieving Hormonal Balance** to combat stress
- **Quick Relief** to birds
- **Effective** than individual uses of electrolyte, betaine, chromium, vit.c etc.
- **Value for money**

COMPOSITION

"Rosh C+" is Unique blend of Vit.C 50 % & 26 Crucial Ingredients

A. Synthetic Coated Vit C-50%
B. Other Additives-50%
1- Heat regulator
2- Aspirin
3- Chromium
4- Betaine
5- Energiser
6. Electrolyte-SDHP, DSHP, Ca Gluconate, Mg sulphate, Ca hypo phosphate, Ca Lactate etc
7. Minerals
8. Immune boosters

MODE OF ADMINISTRATION

Water : For best results, administer proper calculated dose in morning water before one hour of temperature rise in drinkers (as like vaccine dose) and complete medicated water within 1 hour

DOSE

Water : 15 Gm/1000 birds up to 1kg B Wt. Then after 1 gm / 100 gm extra B Wt.
Feed : 200 Gm/MT

Manufactured By :
ROSH PHARMA
S.No. 159, Phursungi,
Tal. Haveli, Dist. Pune, India.

Marketed By :
BHUVANA NUTRIBIO SCIENCES
E.7, 2nd Floor, Opp. Gate No.1, Market Yard, Gultekadi.,
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Bhuvana

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Pioneers in Poultry Incubators

HI-TECH INCUBATORS & HATCHERS

Killer Cone / Halal Cutting

De - Feathering Machine

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Feed Plant (Feed Mixer & Grinder)

Solar Incubators

For Further Details Please Contact:

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Factory:
Plot No.365 & 366, Gokul Plots, Venkata Ramana Colony,
Near Vasanth Nagar, Kukatpally, Hyderabad-72. A.P. INDIA.

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ALIVIRA

Alivira successfully launched Chick-Pro™ and DiscoTab™ during Annual Meet, 10-12 April 2019 at Indore

Alivira is India's largest and 1st global animal health company offering APIs and formulations. We have state-of-the-art manufacturing facilities in 5 countries including India's only USFDA approved API facility, marketing presence in more than 100 countries and employing 1000+ people. The API business is characterised by long established relationships with Global Top 10 Animal Health companies. Our commitment is to improve animal's life and well-being at every stage of their life.

We have conducted our annual meet in Hotel Sayaji at Indore in the month of April, 2019. It was three day session designed with special focus on two product launches. Dr. Sanjay Gapat, Senior Product Manager delivered product launch presentation and technical talk on **Chick-Pro™** & **DiscoTab™**. He explained How Superior Gut Compatible Synbiotic - **Chick-Pro™**- Support's Gut Colonisation with beneficial microflora from Day 1, Prevents enteric infections and early chick mortality, Improves Gut Integrity, Immunity & Performance. He also communicated on why first pick of the chick and exposure of beneficial microflora is vital for future gut colonisation. **Chick-Pro™** is the most beneficial symbiotic formulation which gives better results during high challenges.

Being Alivirian, We understand the increasing importance of bio-security programmes in modern 'best practice' farming and are therefore committed to finding ways to help counter the rising threat of bacterial and viral disease. Disease outbreaks increase farm costs, decrease income and have a negative impact on consumer confidence. Effective disinfection is the front line in any farm bio-security programme, so choosing the most convenient, protective and broad spectrum biocidal is very essential. Looking into the current challenges in bacterial & viral disease outbreaks and heavy losses at farmers end, Alivira came up with The Most Convenient & Protective way of Farm Biosecurity - **DiscoTab™**: Protection & Convenience at its Best!

DiscoTab™ is a Broad Spectrum Biocide in an Easy to Use Tablet Form which provides assured protection for poultry operations, Ideal for the pathogen control and first responder in emergency disease outbreaks. **DiscoTab™** is convenient to store and easy to handle which simplifies the preparation of an accurately dosed Biocidal solution in tablet form. Suitable for High & Low volume applications, readily soluble in tap water. Best in multiple operations/applications: Aerial Spray, Surface cleaning, Equipment's washing & Terminal farm cleaning. Dr. Sanjay also explained below mentioned top 4 reasons to buy **DiscoTab™**:

1. Synergistic in Action-Combination of two powerful oxidizing agents
2. Rapid Biocidal -Faster rate of killing
3. Effective in the presence of Organic matter & Wide range of pH
4. User friendly Formulation-Available in Tablet form.

On a final note, Alivira Sales team interacted with Dr. Sanjay & Dr. Gopal for their doubts on newly launched products.

Alivira MD - Mr. Manish Gupta & HR Head - Mr. Prasad Lad showcased their presence and motivated team during annual meet. Our Poultry BU, Head - Mr. Gaurav Agarwal interacted with team on business development FY 2019-20 on way forward and shared Company Vision and Business Goals .There was a Rewards & Recognition ceremony for the achievers and star performers where they were felicitated with mementos. Event was well coordinated by Ms. Moushmi M. - Out HR & Mr. Abhishek M.

www.alivira.co info@alivira.in /alivira-animal-health-limited /aliviraanimalhealthlimited

Alivira Poultry Annual Team Meet

Indore, 10-12 April 2019

ALIVIRA

www.alivira.co info@alivira.in /alivira-animal-health-limited /aliviraanimalhealthlimited

PRESS RELEASE

ONE19 – The Hub of motivation, Inspiration and ONE meaningful Idea

[LEXINGTON, Kentucky] — Alltech recently held the world's largest idea conference, ONE: The Alltech Ideas Conference (ONE19), on May 19–21 in Lexington, Kentucky, the site of its global headquarters.

Over the 35 years that Alltech's annual international conference has been held, ONE has become known as the nexus of the global food and agribusiness industries, bringing together producers and industry experts from around the world to share insights and solutions for today's most pressing issues. As the conference theme suggested, ONE is intended to be a meeting place of people "united by the search for inspiration, motivation and one meaningful idea."

ONE19 began on Sunday, May 19, when nearly 40 customers and staff from South Asia were treated to tours of Alltech facilities and headquarters, as well as some iconic Kentucky sites, including Keeneland racetrack and Taylor Made Farm, a highly successful local horse farm. The day concluded at the International Dinner at Keeneland, where leading account owners from across the globe were able to meet and dine with other attendees.

Monday, May 20 got off to a colourful start with the ONE Fun Run, an annual 5K race held at Lexington's historic Transylvania University. The morning plenary session followed soon after, with the opening remarks given by survivalist, television personality, former British Special Forces serviceman and accomplished author Bear Grylls. Remarking that "life is an adventure that is best lived boldly," Grylls outlined the 4 F's, or the four things that have forged him into the success he is today: failure, fear, fire and faith.

The plenary session continued with a presentation from Alltech President and CEO Dr. Mark Lyons, who shared his new vision for the company and invited the more than 3,500 ONE19 attendees to join with Alltech in "Working Together for a Planet of Plenty™".

The audience was also taken for an exhilarating ride with a light and dance performance from iLuminate.

Alltech then bestowed its highest honours to Bear Grylls and Dr. Richard Murphy. The Alltech Medal of Excellence, a recognition of achievement and character, was awarded to Dr. Murphy, the research director at the Alltech European Bioscience Centre in Dunboyne, Ireland. Murphy, who has worked with Alltech for nearly 25 years, was recognised for his pioneering work in the areas of organic trace element assimilation, microbial enzyme technology and the mitigation of antimicrobial resistance in livestock production. His research has been the catalyst for a revolution in animal nutrition. Murphy also spoke on the conference mainstage about the microbiome, how it functions and how we can better support it, which will have major implications for animal agriculture and for human health

The Alltech Humanitarian Award, which is bestowed annually to someone of strong character who uses

their platform to positively influence and inspire those around them, was awarded to Grylls. The BAFTA award-winning survival expert has completed numerous incredible feats during his life, both on and off the screen. Most notably, he became one of the youngest climbers ever to reach the summit of Mount Everest, and even more incredibly, he did so a mere 18 months after breaking his back in a parachuting accident. Grylls shares his survival experiences, grit and determination with the world on television shows like the Emmy Award-nominated "Man vs. Wild."

Following the plenary session, attendees were able to attend various focus sessions about different species and businesses. Some of those sessions included "Building a finer flock" by Dr.Steve Collett; "Eggciting times ahead: Innovation in poultry production" by Colin Usher; "Make a house a home" by Brian Fairchild; "Food safety and the need for improved pathogen control" by John Kirkpatrick; and "Happy and healthy: Optimising ingredients for bird health" by Robert Beckstead.

Monday came to a close with Kentucky Night at the Alltech Arena at Kentucky Horse Park, where guests enjoyed the music of Abba.

Tuesday, May 22 started with more focus sessions, including "Dairy farms of the future" by Charles Crave; "Get tech savvy on your dairy" by Jefferey Bewley; and "Global milk dynamics" by TorstenHemme. Ms. Akshali Shah, senior vice president of strategy (sales and marketing) at Parag Milk Foods Ltd, presented about "Milk at your doorstep" and shared the success story behind their brand, "Pride of Cows," which has been well-received on a global scale.

Some South Asian customers also participated in a Neogen workshop over lunch with Nick Adams, the global director of Alltech's Mycotoxin Management program.

The final ONE19 plenary session began with Ramez Naam, co-chair of energy and environment at Singularity University, who discussed the future of agriculture.

"The world is facing many sustainability challenges, including food insecurity, depleted water resources and natural disasters, like increased flooding and wildfires," he said. "Additionally, as the middle class continues to grow, we will need to produce 60 to 80 percent more food, including more animal protein, by 2050 — and all with less water and land."

Despite these seemingly insurmountable odds, Naam said he believes that the earth is actually on the path to becoming a Planet of Plenty™ and that agriculture will plan a critical role.

Following Naam was Chris Zook, a best-selling author and advisory partner at global management consulting firm Bain & Company, who discussed the critical role of simplicity in business and the importance of embracing the founder's mentality.

The plenary session also included an award presentation featuring the bright young scientists participating in the Alltech Young Scientist (AYS) competition, the largest agri-science competition for graduate students in the world. Now in its fourteenth year, the AYS competition received submissions from 120 universities in 40 countries. Deeksha Shetty, representing the University of Saskatchewan in Canada, was selected as the 2019 Alltech Young Scientist after presenting her research to a panel of international judges. Her

winnings include US$10,000, as well as career mentorship and networking opportunities with innovative scientists from around the world.

Alltech was also proud to introduce a new award at ONE19. In conjunction with the International Federation of Agricultural Journalists (IFAJ), the IFAJ-Alltech International Award for Leadership in Agricultural Journalism recognizes excellence and leadership exhibited by young journalists. As selected by international judges from Alltech and IFAJ, the recipient of the inaugural award was Denene Erasmus, an editor at Farmer's Weekly, the largest English language agricultural publication in South Africa.

The closing plenary session also featured the announcement that Alltech and UK HealthCare at the University of Kentucky are forging a momentous partnership to support lifelong wellness. The newly created Lyons Family Life Foundation will honour the life and legacy of late Alltech founder Dr. Pearse Lyons.

Speaking to the local and international press gathered for ONE19, Dr. Mark Lyons and Dr. Phillip Chang, chief medical officer at UK HealthCare, explained that the collaboration will focus broadly on total wellness, empowering people to both live well and die well. The initiative was inspired by Dr. Pearse Lyons' lifelong endeavour to "make a difference."

In his closing remarks, Dr. Mark Lyons reiterated his new vision of "Working Together for a Planet of Plenty™". Lyons noted that, 39 years ago, his father took the stage at the same conference and emphasised the importance of producing solutions that benefit the animal, the consumer and the environment.

With each passing year, ONE: The Alltech Ideas Conference proves to be the world's best networking platform for agribusiness leaders from across the globe. Every year, the customers from South Asia who attend are able to experience Alltech's innovative ideas, rooted in the prestigious heritage of Dr. Pearse Lyons.

"ONE is all about vibrant business ideas, interaction with pioneers, planning for the future and exhilarating entertainment," said Dr. Aman Sayed, managing director of Alltech India and regional director for South Asia. "Being in the audience in the plenary sessions and focus sessions is always an unforgettable treat for our customers."

Next year's ONE: The Alltech Ideas Conference, which will be held on May 17–19, 2020, will celebrate Alltech's 40th year in business.

Dr. Mark Lyons and Bear Grylls during the opening plenary session at ONE: The Alltech Ideas Conference (ONE19).

-Ends-

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Presidents club

Kentucky Horse Park tour

Horse park tour

Alltech team with customers at Kentucky Horse Park

Horse park tour

International Night

Alltech India team with customers

International Night

International Night

International Night

Plenary Session

Bear Grylls at ONE Plenary Sesion

Dr. Mark Lyons awarding Bear Grylls with Alltech Humanitarian Award

Dr. Mark Lyons,President and CEO,Alltech during Opening Plenary Session

Dr.Richard Murphy,Alltech Research Director reciveing Medal Of Excellence by Alltech

ONE Fun Run

Focus session

Focus session

Ms. Akshali Shah, Senior Vice President (Parag Milk Foods)presenting in Dairy Session

Kentucky Night

Alltech Young Scientist Award

Alltech Young Scientist Awards

Deeksha Shetty from University of Saskatchewan,Canada, recieving 2019 Global Young Scientist Award

Innovation Hub

Lyons Family with Bear Grylls

Chris Zook and Mark Lyons at ONE Plenary Session

Cocktail Competition

Pears Lyons Accelerator Program

Press Conference

Alltech India team representing the country at ONE

BROILER LIFTING RATES FOR THE MONTH OF MAY 2019

place	1	3.71	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	106	106	106	106	106	106	100	102	104	104	106	106	106	106	106	106	106	106	108	108	110	110	110	110	110	110	110	104	104	106	108
Karimnagar	106	106	106	106	106	106	100	102	104	104	106	106	106	106	106	106	106	106	108	108	110	110	110	110	110	110	110	104	104	102	104
Warangal	106	106	106	106	106	106	100	102	104	104	106	106	106	106	106	106	106	106	108	108	110	110	110	110	110	110	110	104	104	106	108
Mahaboobnagar	106	106	106	106	106	106	100	102	104	104	106	106	106	106	106	106	106	106	108	108	110	110	110	110	110	110	110	104	104	106	108
Kurnool	106	106	106	106	106	106	100	102	104	104	106	106	106	106	106	106	106	106	108	108	110	110	110	110	110	110	110	104	104	106	108
Vizag	108	108	108	108	108	108	108	108	108	108	108	108	108	102	102	100	100	100	100	100	95	95	95	95	95	95	95	89	89	91	93
Godavari	106	106	106	106	106	106	100	100	102	102	102	102	102	97	97	95	95	97	97	97	99	99	99	99	99	99	99	93	93	95	97
Vijayawada	107	107	107	107	107	107	103	103	105	105	105	105	105	100	100	98	98	100	100	100	102	102	102	102	102	102	102	96	96	98	100
Guntur	107	107	107	107	107	107	103	103																							
Namakkal	94	94	97	100	100	100	100	100	100	100	100	100	100	100	96	96	96	96	96	96	96	98	98	98	98	98	98	98	98	98	103

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