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Poultry Fortune

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Govt allows import of 12 l t GM Soyameal

Move will help the Covid-hit domestic Poultry and Livestock industry

Dear Readers,

The September 2021 issue of ***Poultry Fortune*** is in your hands. **In the News section, you may find news about–**

Govt of India allowed import of 12 lakh tones of GM Soyameal. This move will help the Covid-hit domestic poultry industry. The government on

August 24 relaxed norms to allow import of 12 lakh tones of de-oiled and crushed genetically-modified (GM) Soyabean as poultry feed with the Environment Ministry clarified that there was no concern from the environmental angle as it does not contain any living organism, a statement issued by the Ministry of Commerce and Industry said. The relaxation of the import norms will benefit poultry and other livestock farmers, who have been affected badly after Soyabean meal prices soared across the country. The imports will be allowed till October 31.

The Soy Food Promotion and Welfare Association, an organisation representing soybean food processing industy, has urged Prime Minister Narendra Modi to allow the processing industry to import 50,000 tons of food specialty Soyabeans from the US duty free. In it's plea to the Prime Minister, Mr K. Sarat Chandra Kumar, President, Soy Food Promotion and Welfare Association, said that the beans could be allowed into the country at "Zero" duty under tariff rate quota since food specialty Soyabeans are not grown in the country.

Soyabean and groundnut are season's favorites for growers. Surge in oilseeds prices seen aiding the trend along with Government initiatives. There is everything rolling in favour of oilseeds this year that could lure growers to planting crops such as soyabean, groundnut, sesame or sunflower. Thanks to shipment problems in Brazil and China's unending appetite for Soyabean, edible oil prices have nearly doubled currently compared with last year. The Centre has set a tentative target of producing 26.2 million tons of oilseeds during the current Kharif season. This has been set despite the target being missed last year.

Alltech South Asia, part of Alltech, a global animal health and nutrition company, announces its seventh annual Alltech Art Contest for school children. The competition will accept paintings between August 20 – October 5, 2021. The winning entries will be featured in the 2022 Alltech Calendar and awarded cash prizes and certificates. "Zero Hunger: Food for every breath" is the theme of this year's art contest.

CLFMA organized a webinar on "Animal Husbandry Infrastructure Development Fund" in association with the Department of Animal Husbandry & Dairying on 28 July 2021.

Central Poultry Development Organization & Training Institute under Government of India, Ministry of Fisheries, Animal Husbandry & Dairying, a premier Institute located at Hessarghatta, Bengaluru organized a one day online discussion forum – on Trends In Poultry Health, Season-1 organised by CPDO&TI in association with Indian Federation of Animal Health Companies, on August 12.

Natural is future 2.0 is a webinar series organized by Natural Remedies Pvt Ltd in July 2021, where they invited eminent speakers across the globe to share their thoughts on the most relevant topics of the animal health industry. Dr Jayaraman, a renowned poultry breeder specialist in the Indian sub-continent, discussed on providing practical solutions to the challenges of breeder's health at different stages to improve performance and productivity.

Bangladesh offers hope for corn shipments. With corn (maize) prices rising in the domestic market due to demand from the poultry and starch sectors, its exports have slowed down, particularly to South-East Asia. Factors such as spread of Delta variant of Corona Virus in countries such as Vietnam and Thailand and high freight charges have affected its shipments. However, exporters are now focusing on Bangladesh as they enjoy freight advantage and are able to send the consignments through various modes of transportation, traders say.

Contd on next page

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Poultry Fortune

Our Mission

Poultry Fortune will strive to be the reliable source of information to poultry industry in India.

PF will give its opinion and suggest the industry what is needed in the interest of the stakeholders of the industry.

PF will strive to be The Forum to the Stakeholders of the industry for development and self-regulation.

PF will recognize the efforts and contribution of individuals, institutions and organizations for the development of poultry industry in the country through annual Awards presentation.

PF will strive to maintain quality and standards at all times.

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Environmental Guidelines for poultry farms. Guidelines for poultry farms were developed in the year 2015, which was applicable to poultry farms handling above one lac birds. As per Central Pollution Control Board (CPCB), Ministry of Environment, Forest and Climate Change, Govt. of India, classification of industrial sectors, 'Poultry, Hatchery and Piggery' are categorized into 'Green'. The poultry farming consist of the following unit operations. Breeder Farms (Breeding),

Hatchery Farm (Hatching) Layer farm and Broilers are given as a Special Feature which is useful to the concerned segments of poultry sector in India.

In the Articles section -- Article titled ***Efficacy of Phyto-chemicals on the Performance of Broilers,*** written by G.V. Bhaskar Reddy and other authors highlighted that this article discusses about efficacy of various phyto-chemicals / herbal formulations on growth, performance and immunity of broilers. It emphasizes on effect of different traditional herbs on improving the gut health of poultry and also overall well being of birds. Different herbal feed additives and its active components and they were elaborated along with its limitations.

Another article titled ***Phage Therapy*** As A New Hope written by Justyna Andrysiak highlighted that Bacteriophage will be the future of poultry for preventing various issues related to E.coli and Salmonella in the farms. Bacteriophage also strengthens Gut Health leading to improved performance parameters in breeder, broiler and layers.

The article titled ***Improve Protein Digestibility for Health and Performance,*** written by Global Animal Nutrition Team highlighted that the goal for producers is to implement an effective feed strategy that boosts protein digestibility – irrespective of the variability of the source – and prevents a sub optimal outcome. So rather than allowing conditions in the gut to develop that are detrimental to the animal's health, this nutritional intervention will actively help to create a favourable nutribiotic state and deliver the related performance benefits. This is the premise behind Danisco's broad spectrum protease. With the ability to cleave a peptide chain at almost any position, Axtra Pro ensures valuable amino acids are made available for muscle deposition and growth. Trials have shown it can improve the amino acid digestibility of feed ingredients by 12% in birds aged up to 21 days fed a corn / soybean meal diet and by an average of 2.8% in broilers aged 25 - 34 days fed a corn / meat and bone meal diet.

M.A.Nazeer
Editor & Publisher
Poultry Fortune

Centre allows import of 12 lt GM soyameal

Move will help the Covid-hit domestic Livestock industry

New Delhi, August 24: The government on August 24 relaxed norms to allow import of 12 lakh tonnes of de-oiled and crushed genetically-modified (GM) soyabean as poultry feed with the Environment Ministry (MoEF) clarifying there was no concern from the environmental angle as it does not contain any living organism, a statement issued by the Ministry of Commerce and Industry said. The relaxation of the import norms will benefit farmers, poultry farmers and fishermen, who have been affected badly after soyabean meal prices soared across the country. The imports will be allowed till October 31.

Breather for livestock sector:

The poultry industry has been leading the demand to allow import of GM soyameal, stating that soyabean meal prices have topped Rs 1 lakh a tonne. Prices of soyabean meal

The imports will be allowed till October 31

surged as soyabean prices increased in line with the global trend in view of soyabean crop in South America being affected. In addition, production of palm oil and sunflower have also been affected across the globe due to Covid pandemic and drought-like conditions.

Currently, soyabean is quoted at Rs 97,500 a tonne at Indore in Madhya Pradesh, the hub of soyabean industry, while soyabean meal at Rs 87,000. Prices of both have tended to ease of late on reports of the Centre allowing imports of GM soyameal, besides the pending arrival of the new soyabean crop. The relaxation by the Centre came after clarification and prior permission from MoEF that "since soya de-oiled and crushed cake does not contain any living modified organism, this Ministry has no concerns and no objection for import of soya cakes from an environmental angle".

Armed with the no-objection certificate from the Environment Ministry, the DAHD approached the Commerce Ministry requesting it for facilitating import of the soyabean meal through Nhava Sheva (sea port) and Petrapole border (land port). An official communication from the Director-General of Foreign Trade asked authorities at respective ports to do strict monitoring to ensure that the import quantity of 12 lakh tonnes is not breached, the statement said.

"Application of provision as in Condition 6 (b) of General Notes Regarding Import Policy Schedule — I (Imports) of the ITC (HS) 2017 is relaxed to allow imports of 12 lakh tonnes of crushed and de-oiled GM soya cake (only non-living organism) under ITC HS codes 23040020 and 23040030 from Nhava Sheva port and LCS Petrapole, till 31st October 2021 or until further orders, whichever is earlier," it said.

Rising input costs:

The surge in soyabean meal prices resulted in input costs rising for the poultry sector, which in turn passed it on to the poultry item consumers. This resulted in broiler chicken prices soaring to over Rs 250 a kg recently. On the other hand, anti-GMO (genetically modified organisms) activists have opposed the Centre's decision to allow the import of GM soyabean meal. "What the Union Ministry of Environment, Forest and Climate Change and Genetic Engineering Appraisal Committee have reportedly stated is highly objectionable and legally untenable," the coalition for a GM-Free India said in a statement on August 13, according to a report published in The Hindu Business Line.

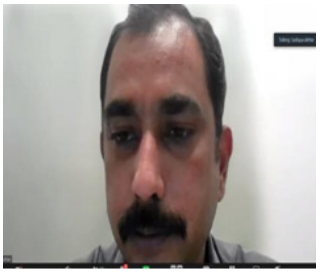
Webinar held on Animal Husbandry infrastructure Development Fund

28 July 2021: CLFMA organized a webinar on **"Animal Husbandry Infrastructure Development Fund (AHIDF)"** in association with the Department of Animal Husbandry & Dairying on 28 July 2021 from 15:00 hrs / 3:00 pm onwards. Dr O.P. Chaudhary, Joint Secretary (NLM/PC) Department of Animal Husbandry & Dairying, Govt. of India, Dr S.K. Dutta, Joint Commissioner, Department of Animal Husbandry & Dairying, Govt. of India, Dr Lipi Sairiwal Assistant Commissioner, Department of Animal Husbandry & Dairying, Govt. of India, Shri Sadique Akhtar, Team Leader, PMA (Manager, Grant Thornton Bharat LLP), Shri Udit Paliwal, Program Management Expert, PMA (Consultant, Grant Thornton Bharat LLP) from GOI showed their valuable presence for the Webinar. Dr O. P. Chaudhary, Joint Secretary (NLM/PC), Department of Animal Husbandry & Dairying, Govt. of India was unable to connect the Webinar.

Dr S.K. Dutta, Joint Commissioner, Department of Animal Husbandry & Dairying, GoI

CLFMA's Second Online Webinar on the AHIDF with Government of India started with Opening Remarks & Introduction by Dr S.K. Dutta, Joint Commissioner, Department of Animal Husbandry & Dairying, Govt. of India. He briefed on the AHIDF (Animal Husbandry Infrastructure Development Scheme) of Rs 15,000 Crores, under which, animal feed component was also included. He said that, the scheme enables the beneficiary to take the benefit of 90% the loan

from the Bank, on which, 3% interest subvention is provided by the GOI., apart from this there is also a provision for availing 25% of the total borrowings as credit guarantee.



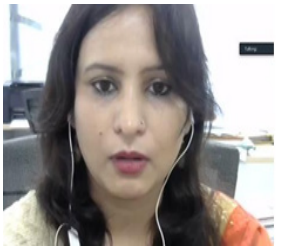
A short movie on AHIDF scheme was played during the Webinar to give a glimpse of the entire Scheme. Shri Sadique Akhtar, Team Leader extended his thanks to the participants. He welcomed Shri Neeraj Kumar Srivastava, Hon'ble Chairman of CLFMA. Shri Suresh Deora, Hon'ble Secretary of CLFMA. He has also thanked Mr Divya Kumar Gulati, Dy. Chairman of CLFMA and all the participants & Dr Lipi Sairiwal, Assistant Commissioner, Department of Animal Husbandry & Dairying, Govt. of India to participate in this program. He welcomed all the participants and the member of CLFMA for giving their valuable time to participate in the webinar.

Neeraj Kumar Srivastava, Hon'ble Chairman, CLFMA of India

Chairman, Mr Neeraj Kumar Srivastava introducing CLFMA OF INDIA to the panellists and participants and gave a presentation on "Emerging Trend and Prospects of Feed Manufacturing". He said that, CLFMA was very enthusiastic about this Webinar as the AHIDF scheme of Rs 15,000 Crores floated by GOI., and the same is very beneficial for the upliftment of the Livestock Industry. He also briefed on CLFMA policy, which included three core values viz.

1. Membership Value
2. Visibility and Credibility of the Organization
3. The recognition and influence.

Chairman, Mr Neeraj Kumar Srivastava also briefed on the Poultry Feed Scenario & Industrial Scenario, current soaring price of the grains, especially the soybean meal & other protein sources which has created a huge havoc in the livestock industry. He gave an outlook of the challenges / difficulties faced by Livestock Sector during Covid 19, rising feed cost Post Covid-19 and gave the opinion of implementing better value chains, trainings, equipment, equipment's, and employee's safety. He briefed on the pivotal role played by CLFMA for the upliftment and sustainability of compound feed industry and animal farmers, present ongoing trends and how the Livestock Industry could be helpful in reviving the Animal Husbandry Sector in the Country.



Dr Lipi Sairiwal, Assistant Commissioner, Department of Animal Husbandry & Dairying, GoI

Dr Lipi Sairiwal, Assistant Commissioner, Department of Animal Husbandry & Dairying, Govt. of India explained AHIDF Guidelines and the entire process of application process in detail, which are available on the GOI. She has also guided on how to apply for the loan to all the participants.

Website: dahd.nic.in & ahidf.udyamimitra.in

Shri Udit Paliwal, Program Management Expert, Dr Lipi Sairiwal, Assistant Commissioner, Dr S.K. Dutta, Joint Commissioner, Shri Sadique Akhtar, Team Leader interacted very well in Q&A Session with the participants and tried to resolve every question and for any further queries, they requested to contact either CLFMA OF INDIA or directly on the website, where contact details are available, so that they can try to handhold and help the related stakeholders.

He said the, AHIDF fund was a very good project for people in Industry whether they are Farmers, Section 8 companies, Proprietor, Partnership Firm, etc., as they can avail interest subvention of 3% on 90% of the Loan. He appreciated Dr Lipi Sairiwal for presenting the detailed guidelines of the scheme. He suggested the Government of India to consider the following requests to be included under the scheme:

1. Please expand the scope of the Scheme;

2. To add some more products like feed supplements and additives, by pass fat, breeder broiler and hatchery farms;

3. To link up this scheme with CGTME scheme. Where, there is a non-collateral loan up to Rs 2 Crores & he said that, if this scheme is combined with CGTME Scheme CLFMA will be very grateful to the whole Ministry.

Suresh Deora, Hon'ble Secretary, CLFMA

Closing Remark was made by Shri Suresh Deora, Hon. Secretary of CLFMA.

Mr Suresh Deora, Hon. Secretary CLFMA extended thanks to everyone on behalf of himself and CLFMA for organizing this webinar & requested Dr S K Dutta, Joint Commissioner that Government of India shall consider CLFMA's requests.

Vote of thanks was proposed by Shri Sadique Akhtar, Team Leader, PMA (Manager, Grant Thornton Bharat LLP)

Total participation for the Webinar was 150 & 63 participants registered for the same.

Anandan Elected the President of NTA

Namakkal:

Mr Anandan of Ommurgan Enterprises has been elected as the new President for Namakkal Traders Association.

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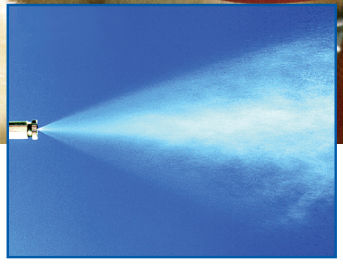

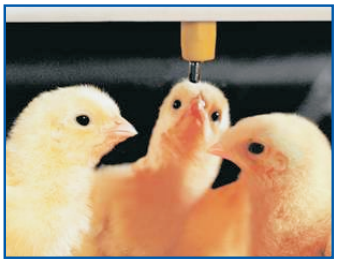

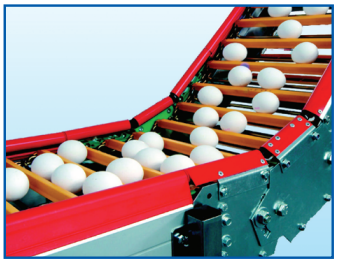

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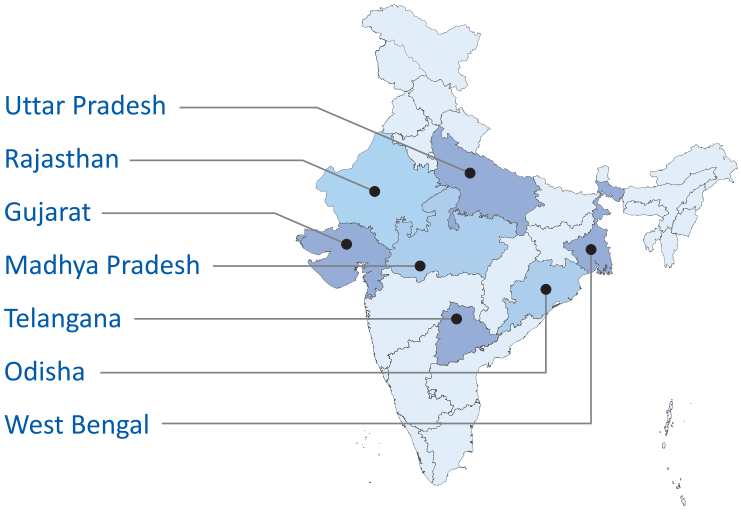

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Current Breeder Challenges Need-Gap analysis and Solutions

-Dr Raina Raj, Head of Marketing, Natural Remedies Pvt Ltd

Natural is future 2.0 is a webinar series powered by Natural Remedies Pvt Ltd, where we invite eminent speakers from across the globe to share their thoughts on the most relevant topics in the animal health industry. In July, we had the privilege of hosting Dr Jayaraman, a renowned poultry breeder specialist in the Indian sub-continent. His discussion was aimed at providing practical solutions to the challenges of breeder's health at different stages, to improve performance and productivity.

Dr Jayaraman started his talk with the quote:

"If we understand the underlying problem, then we understand how to overcome it". His talk was divided into three major sections based on the different stages, of the breeder's life such as the brooder, grower, and layer phases, for easy comprehensio

"HEALTHY BUSINESS STARTS WITH HEALTHY ANIMALS."

Brooding Phase Challenges:

He brought the focus to the incidence of lameness being higher in male birds in the brooding phase. At an early age, the birds start to limp or drag their body on the floor, one of the reasons attributed to this could be transportation stress. But if the symptoms progress as the birds grow and the number of birds showing these symptoms increases, the issue needs to be addressed. The birds may show postural defects, such as bowed legs or bent hocks. The lesions are evident in the hock region; the joint appears swollen and red. On closer examination, swelling in the plantar regions of the bird's feet can also be noticed. In an autopsy, the hock joints would show inflammatory changes. What causes these symptoms? Popular belief is to justify these symptoms with calcium, phosphorus, vitamin D3 deficiencies, or faulty brooding. With evidence from a peer-reviewed journal, he mentioned that "Staphylococcus is a potential pathogen in broiler breeders" that causes lameness.

Staphylococci are opportunistic bacteria that invade through breaks in the skin surface (beak and comb trimming). As a management practice, the first beak trimming happens at 1 - 2 weeks, making the birds susceptible to infection. Hence, he suggested that it is essential to start antibiotic treatment post beak trimming. He suggested the use of penicillin or penicillin derivatives such as strepto-penicillin, benzathine penicillin (long-acting) and amoxicillin as the drugs of choice since they can reach the synovial joints.

Why is the incidence of lameness higher in male birds? In his opinion, one of the probable reasons could be that male birds have longer shanks as compared to female birds and the other reason is that male birds also undergo comb trimming, which facilitates the entry of staphylococcus.

Dr Jayaraman suggested the use of a probiotic in the first week of life for the birds and dosing them with antibiotics post beak trimming along with anti-mycoplasmic therapy in the second week. Since these practices are known to give good results.

Growing Phase Challenges:

In the next phase, he selected to discuss intussusception. **Intussusception** is the telescoping of one part of the intestine into another. Its physical manifestation is called prolapse. The incidence is usually high when the feed is changed from chick mash to grower mash. This happens in growers, but by 10 - 12 weeks its incidence gradually decreases. The commonly known causes are pecking, low fibre, excess pressure or irritation in the intestine, necrotic enteritis or subclinical coccidiosis. But Dr Jayaraman brought other causes into attention, such as bacterial (Escherichia coli, Clostridium and Campylobacter) and parasitic causes (internal worm infestation, Coccidia, Eimeria necatrix). Hence, he recommended the use of anti-coccidial drugs around 28 days of age.

The other cause is feed restrictions. The cases of intussusception are mostly seen after 7 - 10 days after a period of feed restriction. The incidence is higher in heavier body weight birds (above average body weight) because they tend to compete to consume as much feed as possible, leading to reverse peristalsis of the distal intestine leading to intussusception. He also suggested that if the cumulative feed consumption for the specific duration is optimal as per the feed company's recommendations, generally this problem doesn't happen. The way to solve this issue is to measure and titrate the feed such that there is less competition.
The solutions that Dr Jayaraman suggested were dark out of grower sheds; monitoring cumulative feed consumption for a specific duration; usage of anti-coccidials is essential (even in caged birds there are incidences of coccidiosis); he strictly suggested avoiding the use of antibiotics and recommended the use of natural plant extracts and probiotics.

Laying Phase Challenges:

Male depletion is high in the layer phase. In general, the male to female ratio is 1:10 or 1:9 in laying houses. Dr Jayaraman pointed out that, the sheer number of male birds doesn't guarantee good fertility. Both the number and the quality of the males are equally important. In the

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cage system for artificial insemination (AI), the male birds are milked for the collection of semen. When the frequency of milking increases (every alternate day), the quality of semen is reduced. So, by rearing a sufficient number of male birds and giving them adequate rest between milking, the male birds can maintain a good quality of semen. **Practically preserving the males** on the farm is just as important. He proposed that good management is when female mortality is 8% and male mortality is 10%. But in later stages, the male mortality is twice that of females, hence the remaining males are used more frequently for semen collection, leading to poor quality of semen. Also based on a scientific report, Dr Jayaraman suggested that the major cause of male depletion, 33.8% is because of staphylococcal infection.

To combat male mortality, Dr Jayaraman recommended a rotation of antibiotics like OTC-LA with penicillin, amoxicillin and Tylosin. As age advances, the semen quality and quantity deteriorates, so he suggested supplementing the birds with male fertility enhancers.

Female non-layers:

Addressing challenges in **female birds** Dr Jayaraman suggested identifying the **non-layers.** It can be done at the time of insemination. The non-layer birds will show difficulty in eversion; pin bones will be placed closer; the vent will be dry; the beak and shank will be yellow. He listed several reasons for birds to become non-layers.

The causes may range from poor management, bacterial, viral, parasitic and nutritional causes.

1. Management issues, if the flock doesn't have uniformity such that it has higher body weight birds and low body weight birds in large proportion. During feed withdrawal, the higher body weight birds get less feed allocation. At this time, the body of the bird goes into conserving energy mode for maintenance and the bird becomes a non-layer.
2. During bacterial or viral infections, the birds show symptoms of low feed consumption. But on treatment, they get better. But some infections seep into the oviduct and cause trouble, leading to non-layers.
3. The nutritional issue is a large umbrella and it is hard to pinpoint one nutritional cause for non-layers. In general, nutrients must be optimally provided, keeping trace minerals in mind.
4. External parasites like lice and mites. Dr Jayaraman opined that lice infestation is well known, but in the recent past, red mite infestation has been increasing. Red mites affect the birds during the night hours and cause anaemia but also lead to non-layers. He suggested some key issues be taken care of while doing the anti-parasitic treatment. Firstly, is maintaining proper pressure (psi) while spraying the anti-parasiticidal. Secondly, the time of application should be a few hours before lights out, so that the medication is effective and it acts on the mites which infest the birds during the night. He also advised the use of herbal products to treat parasitic infestations. And for internal parasites, de-worming in caged birds is also necessary.

Dr Jayaraman suggested general treatment for non-layers, with ovulotonics, which are herbal preparations when given at the right time, helps the birds to rebound. He also mentioned that we tend to pay attention to only visible non-layers, but what about the birds which are going to be non-layers in the future? In his experience, when ovulotonics are given at 40 - 45 weeks of age, good results are noticed.

Disease challenge during peak production:

Dr Jayaraman mentioned that now a days broiler breeders lay eggs just like layers and have a good peak. To support their performance, the birds should be protected from basic challenges through **immunization.** He further explained that the words immunization and vaccination are not synonyms. Birds may have been vaccinated, but not necessarily immunized. The immunity of a bird is compromised even after vaccination. If the vaccine is not spaced out properly or if birds are immunocompromised, the expected titre will not be achieved. Hence, instead of repeating vaccination, immune-boosters and immunomodulators can be used to achieve higher titres. Supplementing the birds with vitamin E, selenium, glucomannan, herbal and algal immune boosters were suggested along with the proper spacing of the vaccines.

Fatty liver syndrome (FLS):

He gave examples from his experience and mentioned that breeder producers notice the FLS in their birds post-peak. It is caused due to a mismatch between the energy supplied (excess) and that of the bird's actual requirement, toxins or damaged liver. Hence, it is important to understand the bird's requirements and be cautious during feed allocations and feed withdrawal. To treat FLS, he suggested choline supplements, either herbal or synthetic and / or liver tonics.

Egg production failed to recover after a challenge:

Dr Jayaraman mentioned that in recent days, the major problem is posed when the birds do not come back to normal egg-laying after recovery from toxin, viral or bacterial challenges. He suggested that when recovering from challenges; please do not wait for a long duration to bring the production to a normal level.

Respiratory disease complex (RDC):

He mentioned that RDC was very common. It may be caused due to coryza, mycoplasma, ornithobacterium (ORT) or avian metapneumovirus. A thorough investigation needs to be done to narrow down the cause of respiratory distress. He recommended treating

the flock with drugs like tiamulin, tilmicosin and tylan. To avoid resistance to the drugs, shuffling and rotation of antibiotics can be followed. He recommended herbal products and essential oils to protect the birds from respiratory distress.

Enteritis:

He spoke about enteritis and emphasized that it can be caused by several reasons; toxins, worms, bacterial infection, hormonal, etc. but common practice is to treat the flock with antibiotics, which isn't right. Removing the root cause of enteritis is a good approach. But when one is unsure, herbal anti-diarrheal preparations can be used.

He concluded his talk by stating that breeder management is an art that combines balancing health, nutrition and biosecurity aspects. There will be challenges. The way to get through them is by understanding the root cause, with diagnostics and scientifically tackling the problem for better performance and profitability. Dr Jayaraman answered the questions posed by the participants as below:

At what age should the feed restriction be practiced?

Dr Jayaraman mentioned that the restriction of feed between male and female birds is different. There is a difference of one week. The breeding company's recommendations should be followed. For instance, 3 - 4 weeks of age is the right time to start the restriction, but the duration must be followed as per the producer's recommendation. But the important thing is to study the cumulative gain for 5 weeks and correlate it with the average feed given in grams. Based on this, nutritional modifications should be made.

How do we treat tapeworms in birds?

He opined that tapeworms have been noticed in recent days, especially if there is a presence of ants in the sheds. Broad-spectrum anthelmintics like albendazole or levamisole have been known to work well. But the dosages of the anthelmintics should not be confused with those of immunomodulatory doses. He would personally prefer albendazole to treat tapeworms.

How to control egg breakage in older birds?

Dr Jayaraman mentioned that egg breakage in older birds is physiological to some extent; it cannot be completely avoided. But through nutritional manipulations, one could reduce the incidence. The nutrient specifications for calcium and available phosphorus are slightly different for older birds as compared to those for other birds, which should be followed as per recommendations.

The calcium source in the feed should be split into slowly available (70%) such as grit and readily available (30%) like calcite powder.

The egg size in older birds is larger and the bird's body frame tends to be larger. This can be addressed through bodyweight management, along with linoleic acid and methionine level management, which will provide better eggshell quality. Additionally, supplementing with slightly higher doses of trace minerals can help this condition.

What could be the reason for feather loss in birds?

Dr Jayaraman suggested that improper nutrition, or imbalanced sulphur-containing amino acids in feed and stress may lead to feather loss post-peak. If specific birds show feather loss, this could be considered the first indication of non-layers. But if there is feather loss in all the birds, the protein requirement is not being met as per the recommendation, which needs to be checked.

What may be the reasons for the prolapse in the layers, in mid-lay?

He suggested that the prolapse has to be differentiated if it is an intestinal prolapse or an oviduct prolapse. In intestinal prolapse, enteric substances are secreted into the oviduct, leading to inflammation, cloacitis and ascending infection occurs. In intestinal prolapse, we need to treat the enteric causes.

If it is an oviduct prolapse, it is an ascending infection where parts of the oviduct is exposed and infected. If the cage mat isn't well maintained, birds pick up the infection from the floor mat, leading to ascending infection. It can be treated topically with oxytetra cycline long-acting (OTC-LA) ointment and neem oil. And infusing OTC-LA into the oviduct should help the recovery of the birds.

What is the minimum gap that should be given between two killed vaccines?

Dr Jayaraman opined that ideally, 4 - 5 weeks is the minimum. But the decision needs to be taken depending upon the titre. Some vaccines like IBH are given in the first week and the next dose is only after 20 - 22 weeks, but the gap for coryza vaccine is only 8 - 10 weeks. Hence, it depends if the vaccine is bacterial or viral; if it is for a parent or commercial, the decisions are made on this basis.

Can toxins in feed change the internal and external quality of eggs?

Dr Jayaraman explained that the effects of mycotoxin on egg quality are well documented. There are effects both internally and externally. There is a change in the thickness of the shell. While internally, blood spots can be noticed. Vitamin A deficiency is usually attributed to blood spots in eggs, but mycotoxins can also cause blood spots.

Is there any way to control double-yolk egg condition in early production?

He answered that double yolk eggs are a problem of mismanagement of the actual feed requirements of the birds and what is supplied to them. When challenging birds with more feed with an interest in gaining faster peak, it leads to jumbo eggs, which will lead to a higher incidence of peritonitis and egg retention along with increased mortality.

The other reason is light stimulation. When birds have reached the desired body weight but haven't matured yet, they are challenged with overstimulation of light. This can lead to jumbo

eggs. Hence, proper management of bird feed increments and light stimulation are important to control double yolk eggs.

What is the reason for the white legs in poultry birds?

He mentioned that in his experience, he had seen white legs in some broiler breeds and has found a correlation between white legs when birds are given feed devoid of maize.

In broilers, would you suggest the same treatment for tapeworms?

He suggested that treating broilers for tapeworms may not be judicial. On the other hand, he also mentioned that the farmers use Areca catechu or betel nuts soaked water. 1kg of betel nuts soaked in water for 1000 birds, which has been effective. Secondly, control of ants is very important, which would give the best result for the next flock.

At what age, during brooding, should the light be stopped? After brooding, at what age should one introduce antibiotics?

Dr Jayaraman recommended that in the first two weeks, 22 - 23 hours of light is important, and then gradually taper down to natural light. Antibiotics can be introduced on the day or the next day of beak trimming.

Soyabean, groundnut are season's favourites for growers

Surge in oilseeds prices seen aiding the trend along with Govt initiatives

June 2021:

There is everything rolling in favour of oilseeds this year that could lure growers to planting crops such as soyabean, groundnut, sesame or sunflower.

Thanks to shipment problems in Brazil and China's unending appetite for soyabean, edible oil prices have nearly doubled currently compared with last year.

The Centre has set a tentative target of producing 26.2 million tons (mt) of oilseeds during the current Kharif season. This has been set despite the target being missed last year.

In order to achieve, it is looking to increase the area under kharif oilseeds by 6.37 lakh hectares (lh) by distributing free seed min-kits of higher-yielding soyabean and groundnut varieties. This, the government hopes, will increase the production by 12 lakh tons, yielding over 2.4 lakh tons of edible oil. For this year, oilseeds such as soyabean and groundnut have emerged as favourites among farmers for sowing.

BV Mehta, Solvent Extractors Association (SEA) Executive Director, told BusinessLine that the price farmers have seen in the last few months for oilseeds will encourage them to opt for them in kharif sowing.

Growers may take up crops such as groundnut in Saurashtra, soyabean in Maharashtra and Madhya Pradesh, and castor in Gujarat and Rajasthan. In Madhya Pradesh, farmers are inclined to plant soyabean despite suffering losses last year due to unseasonal rains and fungal attacks.

Stating that the oilseeds area will expand, Mehta said it would be difficult to quantify howmuch the area will increase, as some crops are competing with each other. Personally, he feels that the area under oilseeds may increase for groundnut, soyabean and castor by 5-10 per cent

The Soyabean Oil Processors Association expects the area under soyabean by 5-7 per cent, said D N Pathak, Executive Director of the oil trade body from Indore.

Ample seeds available

Going by Government data, availability of seeds seems to be enough to meet the requirement for the sowing season.

Barring soyabean seeds, availability of all others was in excess of the requirement. (See table) That deficiency can be met from private seed companies, says the Centre.

Towards 'Atmanirbhar'

To become 'Aatmanirbhar' in oilseeds, the centre is looking at expanding the area under soyabean, sunflower and sesasmum in non-traditional areas, including north-eastern states.

Sudhakar Desai, President of Indian Vegetable Oil Producers Association (IVPA), said measures should be taken to increase the area and production of groundnut because it is a non-import substitute oil. "Even a higher MSP in the medium term would be good for this crop," he said. In central Karnataka, farmers are showing more interest in groundnut and sunflower, whereas in the northern districts, soyabean is the preferred crop. In Gujarat, farmers are likely to take increased interest in oilseeds cultivation, primarily due to higher realisations from the oilseeds crops last year. Oilseeds exporter Sanjiv Sawla, Partner at M Lakhamsi & Co, told BusinessLine that newer areas are emerging in other parts of the country for groundnuts.

With inputs from AJ Vinayak, Mangaluru; Vishwanath Kulkarni, Bengaluru; Rutam Vora, Ahmedabad; TV Jayan, New Delhi; Radheshyam Jadhav, Pune; and Subramani Ra Mancombu, Chennai, according to a report published in The Hindu BusinessLine.

Bangladesh offers hope for corn shipments

Exports to South-East Asia slow down as Delta variant spreads; domestic prices rise

August 26:

With corn (maize) prices rising in the domestic market due to demand from the poultry and starch sectors, its exports have slowed down, particularly to South-East Asia.

Factors such as spread of Delta variant of Corona Virus in countries such as Vietnam and Thailand and high freight charges have affected its shipments. However, exporters are now focusing on Bangladesh as they enjoy freight advantage and are able to send the consignments through various modes of transportation, traders say.

Surge in freight rates:

"We have not done any shipments to South-East Asia for almost a month now. The last we exported was a small quantity at $320 (Rs 23,775) cost and freight", said M Madan Prakash, President, Agri Commodities Exporters' Association (ACEA).

"We were offered corn for exports from Andhra Pradesh at Rs 19,000 but it wasn't feasible given the surge in freight rates, particularly for containers", said Prakash, whose Chennai-based Rajathi Group exports agri-commodities such as maize, onions and chilli.

On Wednesday, August 25 the active corn contract on the Chicago Board of Trade was quoted at $5.52 a bushel (Rs 16,100 a tonne).

A Delhi-based trade analyst said a major reason for corn exports slowing down is the Covid shutdown in Vietnam and Thailand, which use the grain for feed purposes.

"Brazil has also made a comeback on the corn front, making it tough for India", he said.

Covid shutdown in Vietnam and Thailand a main reason for decline in exports.

Mukesh Singh, Managing Director, MuBala Agro Commodities Pvt Ltd, said this has resulted in Indian corn losing its competitiveness in South-East Asia.

According to the International Grains Council, corn from Argentina is currently quoted at $236 (Rs17,550) a tonne, while Brazil's grain is offered at $270 (Rs 20,075) and US corn at $254 (Rs 18,875). Though corn prices are over 40 per cent higher year-on-year, they are off their peaks seen this year by 10-20 per cent.

Rise in local prices:

Data from the Agricultural and Processed Food Products Export Development Authority (APEDA) show that Vietnam imported over 2.5 lakh tonnes (lt) of corn during April-May this fiscal. The whole of last fiscal it had imported nearly five lt.

On the other hand, prices in the domestic market have increased by over Rs 2,000 a tonne in the last couple of months, making it tough for exporters to be competitive in markets such as Vietnam and Thailand.

According to the Ministry of Agriculture, corn prices at agricultural produce marketing committee (APMC) yards are currently ruling from Rs 14,500 a tonne in Chhattisgarh to Rs 18,000 in Uttar Pradesh.

From Bihar to Bangladesh:

The Centre fixed Rs 18,500 a tonne as minimum support price for corn last season (July 2020 - June 2021). For the current season, it has been fixed at Rs 18,700.

"We were competitive as long as domestic prices ruled below Rs 16,500 a tonne. Once prices topped that level, we were outpriced", said Singh.

But hope for corn exporters has come in the form of Bangladesh, which is importing a good quantity from India. "We are able to get corn at a competitive price from farmer producer organisation in Bihar, where ample supplies are available. From there, it is easy to transport to Bangladesh", the MuBala Agri Commodities official said.

Corn is sent by trucks via India-Bangladesh borders, while some shipments are also sent by rail.

"At least 150 trucks laden with corn go to Bangladesh every day as demand for feed in Bangladesh is high", said Singh. This would mean that over one lakh tonnes of corn are being sent across the border every month.

"We cannot be competitive if corn prices are above Rs 18,500 a tonne", he said.

Last fiscal, Bangladesh imported over 12 lt of corn from India. During April-May this year, it bought over one lt, according to APEDA data.

CLFMA to hold AGM & National Symposium on September 24, 25

Hyderabad: The 54th Annual General Meeting (AGM) and 62nd National Symposium of CLFMA of India will be held on September 24 & 25, 2021 at Hotel Taj Deccan, Road No. 1, Banjara Hills, Hyderabad, informed It's Chairman Mr Neeraj Kumar Srivastava.

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PM urged to allow food speciality soyabean imports duty-free

June 2021: The Soy Food Promotion and Welfare Association, an organisation representing soybean food processing industries, has urged Prime Minister Narendra Modi to allow the processing industry to import 50,000 tonnes of food specialty soyabeans from the US duty free.

'Zero' duty

In his plea to the Prime Minister, K. Sarat Chandra Kumar, President, Soy Food Promotion and Welfare Association, said the beans could be allowed into the country at "zero" duty under tariff rate quota since food specialty soyabeans are not grown in the country.

Soyabean is not a staple food in India, hence, the requirement to process and serve the best optimal quality to customers is paramount. Though soya food companies have improved quality, "due to a lack of affordable, high-quality raw ingredients, we feel challenged for new growth opportunities", he said.

Kumar said that inconsistent and inferior raw soyabean quality is the leading cause of dissatisfied consumers wanting better taste, texture and flavour profiles.

"Indian soybeans are oil- and meal-centric, suitable for animal utilisation. There are no food specialty soybeans grown in the country; thus the supply of the same does not exist. While all Indian beans are non-GM, they are also treated as commodity beans regardless of the end use, be it in the food or feed industry," he said.

When soyabeans are needed for food applications, Indian producers grade and select the best beans from the general lots and sell them at a premium price, he said.

But they do not qualify to satisfy the specialty food characteristics and do not match up with the quality standards and expectations for producing retail-end products. As a result, many food processors are now forced to shut down, the soy food promotion body chief said.

According to Sumit Agarwal, Vice President of the Association, due to the lack of suitable food grade specialty soyabeans, food processors are constrained. "This is limiting the business opportunities, job creation, and revenue generation," he said.

Taking into account the requirements of the consumers and food businesses, the association has appealed to the Prime Minister, Agarwal said.

The Soy Food Promotion and Welfare Association said that these soyabeans that need to be imported are non-genetically modified food grade beans grown in the US that have lower oil content, higher inherent sucrose, low oligosaccharide (raffinose and stachyose) and stable protein structures making them highly suitable for food manufacturing.

The Soy Food Promotion and Welfare Association said it represents over 2,000 small, medium and large-scale units across the country that provide low-cost nutrition under the "Nutrition Mission" of India.

Alltech announces seventh annual Art Contest for school children

August 2021: Alltech South Asia, part of Alltech, a top global animal health and nutrition company, announces its seventh annual Alltech Art Contest for school children. The competition will accept paintings between August 20 – October 5, 2021. The winning entries will be featured in the 2022 Alltech calendar and awarded cash prizes and certificates.

"Zero Hunger: Food for every breath" is the theme of this year's art contest. Up to 811 million people still go to bed on an empty stomach each night, and 2 billion people in the world do not have regular access to safe, nutritious and sufficient food.

(Source: UNSDG).

"We are happy to announce the launch of the seventh annual Alltech Art Contest, which is focusing on a unique theme, "Zero Hunger: Food for every breath," said Dr Aman Sayed, managing director, India and regional director of South Asia, Alltech. "Considering food as the most vital need for humans, making it affordable for everyone is essential for a sound living. Achieving Zero Hunger through access to safe and nutritious food needs a multi dimensional approach and should be a shared commitment. We wish for this consciousness to bloom in young minds".

Who can participate?

All students between 5 – 16 years of age can participate in the contest. The competition is open for children in India, Bangladesh, Sri Lanka and Nepal. When? The contest is open for submissions from August 20 – October 5, 2021. The last date artwork will be accepted is October 5, 2021.

Online painting submission rules:

- The artwork must be on drawing paper of A4 size.
- Acceptable art tools include crayon, watercolor, oil paint, acrylic paint, poster colors, color pencils or pastels.

Submission:

The submission is online. Entrants will upload a scanned image of the artwork to the contest website by filling out all the relevant details requested on the page.

Check out the link below to participate and learn more about the Alltech Art Contest.

Website link: https://www.alltech.com/alltech-art-contest-2021

For more details, please contact your local Alltech sales manager or email alltechartcontest@alltech.com.

Contact:

Dr. Manish Chaurasia, Marketing Manager, South Asia mchaurasia@alltech.com; +91 8130890989

Online Discussion Forum (ODF) - on Trends in Poultry Health, Season-1 Organised by CPDO&TI in Association with INFAH

August 12:

Central Poultry Development Organization & Training Institute under Government of India, Ministry of Fisheries, Animal Husbandry & Dairying, a premier Institute located at Hessarghatta, Bengaluru organized a one day online Discussion forum – on TRENDS IN POULTRY HEALTH, SEASON-1 ORGANISED BY CPDO&TI in association with Indian Federation of Animal Health Companies, on August 12.

Poultry sector in India is a techno-commercial sector with contribution of nearly 1.5 lakh crores to the GNP with about 6 million people being employed directly or indirectly. Poultry Farming Practices in India are one of the best in the world. The Science adopted in Genetics, Nutrition, Management and Disease prevention are one among the best in class matching Global Standards. Presently it is estimated that 4.5 billion broiler population, 250 - 300 million layers and about 3.5 to 4.0 crore broiler breeders are being reared in India. The health specialists have achieved huge task in disease prevention and health management in the country. However, poultry health is a dynamic, ever evolving entity among poultry farming. It is always required to get abreast with the latest knowledge and tips for poultry health management. Hence, this discussion forum is envisaged to outline the present trends in poultry health. Since poultry health is a vast subject, it has been envisaged to conduct in series wise as Season-1, followed by many.

This event was organized in association with Indian Federation of Animal Health Companies (INFAH) under the leadership of Mr Vijay Teng, President and Dr Vijay Makhija, General Secretary along with poultry expert members of INFAH.

The Online Discussion Forum started sharp at 10:30 am on 12th August, 2021 by opening remarks from **Dr Mahesh P.S.**, Joint Commissioner & Director, CPDO&TI. He briefed about the legacy of CPDO&TI being an organization built over six decades (1960). Dr Mahesh quoted Hon'ble Prime Minister's speech on 11th of August, 2021 at Confederation of Indian Industries (CII) annual meet in which it was emphasized that Modern India is lead by Unicorns in all the sectors including food sector in India. About 60 unicorns are being established so far since 2011 the first unicorn (valuation of 1 billion dollar) was born in Bangalore. The motivation for poultry sector is, 22 unicorns are established since January 2021 until August. Dr Mahesh mentioned that startups like Licious, Fresh to Home may soon join the bandwagon before December 2021 itself. Further he elaborated that digitalization, consumerism, focus on safe food and health would create more demand for protein foods like eggs and chicken in India with a priority preference for safe and certified traceable products. Hence he advised to adopt latest technologies like Block Chain, Artificial Intelligence and Data Mining to capture a pie in the digital India.

Dr Vijay Makhija, General Secretary, INFAH, made a presentation from Mumbai, Maharashtra digitally about activities of the Organisation which is formed in 2012. At present, it has 52 members representing more than 85 percent of Animal Health Market in India. He mentioned about INFAH's moto being "Healthy Animals, Healthier India". INFAH has focused approach via sub committees on various aspects of health issues related to scientific research in veterinary field. This organization has set out guidelines and working in liaison with government in various committees. This event is organized by members of Biologicals and Biosecurity sub-committee.

Mr Vijay Teng, President, INFAH in his inaugural address through online from Ahmedabad, Gujarat, appreciated the efforts of CPDO&TI organization under Government of India for conducting such innovative programmes through digital gateway. He elaborated on changing preferences in food habits with more focus on protein foods like egg and chicken recipes. He acknowledged government addressing the industry needs for import of GM soya to mitigate the deadlock in shortfall and sky racketing prices of soya. He mentioned that INFAH has career link for the young veterinarians through which they can seek their career prospects and employment opportunities. He assured to extend full cooperation and support to CPDO&TI for conducting many more seasons under Poultry Health series.

Dr Mahindra Chaudhari, Poultry Expert joined from Pathankot, Punjab spoke on the topic "21 days of critical care". In his presentation he elaborated in detail about role of hatchery management with a primary focus on efficient incubation and setter management as a key factor for the foundation of healthy chick which becomes a broiler / layer / breeder. He scientifically narrated various parameters of evaluation of quality of chicks by both quantitative (physical features) and qualitative (body weight, yolk weight, chick length, moisture loss and chick yield data recorded) in addition to bacterial, fungal and viral analysis. Chick quality plays a critical role in determining the health, growth, nutritional efficiency and financial

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returns of the farm. His detailed presentation can be viewed through CPDO&TI youtube channel: **"CPDO&TI TRAINING).**

Dr Jayanth Deshpande, Poultry Expert presented online from Bangalore, Karnataka about the topic "Biosecuring the Farm". In his address he narrated simple practical elements of biosecurity to create a barrier for disease entry to the farm. He categorized these features into three elements namely, Physical Barriers, Biological (vaccine) barriers and Pharmacological barriers. He pictorically explained simple foot dip, shower system, management of rodents etc for effective implementation of biosecurity. He advised farmers with a novel idea of covering the whole poultry house with a simple chicken mesh to prevent rodent, flying birds etc to reduce re-infection of mycoplasma in the units. Clean farms are highly essential for disease control for broilers, breeders and layers. In his final remark, he advised to segregate the farm into four sections namely, dirty, semi-clean, clean and ultra-clean. Further suggested to follow a adequate SOPs to maintain the same. Proper diagnosis, effective vaccination and disinfection coupled with effective physical biosecurtiy is the need of the hour for disease prevention.

Dr M.R. Reddy, Principal Scientist, Directorate of Poultry Research joined online from Hyderabad, Telangana State. He addressed on the topic "Reading Serology", Dr Reddy with his experience of more than 30 year of research elaborated about role of Diagnostics in general and monitoring antibodies through Serology in particular. In his presentation he showed detailed analysis of lab reports with pictorial histograms (Bar charts of antibody titer). The method of understanding of lab reports was convincingly explained in terms of reading, tier groups, geometric mean, arithmetic mean, standard deviation and variance for concluding the reports. The importance of distribution of titers either standard bell curve, left skewed, right skewed and multiple peaks was explained in detail for predicting disease challenge, protection status of birds for various diseases including forecasting of vaccination schedule.

This session was followed by Question and Answers for the speakers conducted by Dr Vijay Makhija. The details can be accessed through Youtube / Facebook link of CPDO&TI and LinkedIn of INFAH.

The final session of the day was Panel Discussion with three eminent experts namely, **Dr Sanjay Gavkare, Mr Milind Limaye and Dr D.K. Dey.** The first panelist, Dr Sanjay Gavkare answered queries by Dr Mahesh P.S. about present status of Research & Development in poultry sector. In his remarks he illustrated various achievements of Indian Poultry Research in Biologicals, Vaccines and Diagnostics to meet the international standards. He emphasized strengthening collaboration between the government and poultry sector.

The second panelist **Mr Milind Limaye** appreciated the help of the government in strengthening the system for disease control and management. However, he requested more joint tie-ups with Institutes like HSADL, RDDLs, CARI etc to take up joint research for solving field oriented problems. Concludingly the third panelist, **Dr D.K. Dey,** narrated about biological subcommittee of INFAH and its contributions in formulating guidelines for better poultry health management. In his remarks, he advised more interaction of youth, general public about "Real Science" behind innovations in Research in solving problems associated with poultry health.

Dr Mahesh P.S., Joint Commissioner & Director, CPDO&TI mentioned that Team CPDO&TI would conduct many such programmes in the coming months. The programme was conducted live on zoom, youtube channel of CPDO&TI along with recordings posted on facebook: cpdoti. bangalore, on youtube: CPDO&TI TRAINING and LinkedIn of INFAH. All are requested to download "Latest App of CPDO&TI" from Google Playstore by typing "CPDO&TI" for Android Version.

Sri S.M. Anwar Basha, Senior faculty of CPDO&TI executed the job of Admin of conducting Discussion Forum very effectively and proposed vote of thanks for the delegates. The other team members of CPDO&TI worked hard in making this programme successful. Team CPDO&TI thank all the viewers participated through Zoom and Youtube. It is also acknowledged that Print Media extends great support by wide coverage of all online events of CPDO&TI across the country.

Courtesy: NECC

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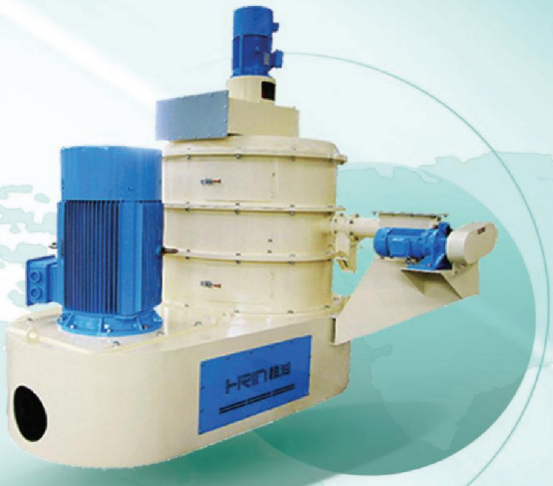

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Environmental Guidelines for Poutry Farms

CONTENT

1. Background

Guidelines for Poultry farms were developed in the year 2015, which was applicable to poultry farms handling above 1.0 lac birds. As per CPCB classification of industrial sectors, 'Poultry, Hatchery and Piggery' are categorized into 'Green'.

In the matter of O.A. No. 681 of 2017, Hon'ble NGT, passed the following order on 16th September, 2020:

'... *'Accordingly we allow this application and direct CPCB to revisit the guidelines for categorizing the poultry farms as Green category and exempting their regulation under Air, Water & EP Act. CPCB may issue fresh appropriate orders within three months and in if no further order is issued, all the State PCBs / PCCs will require enforcement of consent mechanism under the above acts after 01.01.2021 for all Poultry Farms above 5000 birds in the same manner as is being done for farms having more than one lac birds. Till then, even without such consent mechanism, the state PCBs / PCCs may strictly enforce the environmental norms and take appropriate remedial action against the any violation of water, air and soil standards statutorily laid down."*

To comply with the Hon'ble NGT, CPCB has constituted an Expert Committee comprising members from Department of Animal Husbandry. ICAR-Directorate of Poultry Research, Shri N.K. Verma, Ex. AD, CPCB, Haryana State Pollution Control Board, Tamil Nadu State Pollution Control Board & Central Pollution Control Board.

2. Poultry farming

Poultry farms refers to breeding, hatcheries, layer and broiler farms. Poultry farming is the rearing of domesticated birds such as chickens, turkeys, ducks, goose etc. for the purpose of farming meat or eggs for food. Chickens raised for eggs are usually called laying hens or layers while chickens raised for meat are often called broilers. Chicken are most numerous and popular domesticated poultry species, while other species, e.g. duck, goose form a very small proportion of activities in comparison. Poultry farming in India has witnessed a spectacular growth and transformed itself into a vibrant agri - industry. The leading states having poultry farms are Tamil Nadu, Andhra Pradesh, Telangana, West Bengal followed by Maharashtra, Karnataka, Assam, Haryana, Kerala and Odisha.

As per the 20th livestock census carried out by Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry & Dairying, the state-wise number of poultries (birds)v are given below:

Sl.No.	States / UTs	Nos of Poultries (birds) in millions
1	Andhra Pradesh	107.863
2	Arunachal Pradesh	1.599
3	Assam	46.712
4	Bihar State	2.19
5	Chhattisgarh	18.711
6	Goa State	0.349
7	Gujarat	21.773
8	Haryana State	46.24
9	Himachal Pradesh	1.341
10	Jammu & Kashmir	7.366
11	Jharkhand	24.832
12	Karnataka State	59.494
13	Kerala State	29.771
14	Madhya Pradesh	16.659
15	Maharashtra	74.297
16	Manipur	5.897
17	Meghalaya	5.379
18	Mizoram	2.047
19	Nagaland	2.838
20	Odisha	27.439
21	Punjab	17.649
22	Rajasthan	14.622
23	Sikkim State	0.580
24	Tamil Nadu	120.781
25	Telangana State	79.999
26	Tripura	4.168
27	Uttar Pradesh	12.515
28	Uttarakhand	5.018
29	West Bengal	77.322
30	Andaman & Nicobar Islands	1.289
31	Chandigarh	0.048
32	Dadra Nagar Haveli	0.089
33	Daman & Diu	0.018
34	Delhi	0.043
35	Lakshadweep	0.226
36	Pondicherry	0.236

3. Poultry Farming Process

The poultry farming consist of the following unit operations.

- Breeder Farms (Breeding)
- Hatchery Farm (Hatching)
- Layer farm &
- Broilers

3.1 Breeder Farms(Breeding)

Breeder farms specialize in the production of fertilized eggs for either broiler or egg production. Specific ratios of male / female breeders are used to ensure the fertility of hatching eggs. In India both layer and broiler breeders are predominantly housed in cages and the fertile eggs are obtained by artificial insemination. The eggs are collected daily, assessed for quality and stored in plastic / pulp trays in a controlled environment before being transferred to the hatchery for the production of commercial chicks. At the end of their productive phase, breeders are removed and sold for meat processing or byproducts.

3.2 Hatchery farms (Hatching)

The eggs collected from Breeder farms are hatched at special hatcheries. These are centralized facilities and receive fertilized eggs from its own or several other

breeder farms. The eggs are stored for a period of 4 to 10 days before being placed in incubators that control temperature and humidity to stimulate embryonic development. Hatching typically takes 21 days. The chicks are vaccinated, graded for uniform quality and dispatched to destinations for further rearing. The day-old broiler chicks are delivered to broiler farms straight run (un-sexed). Chicks from egg laying stock are gender sorted and the female chicks alone are delivered for egg production while male chicks are killed and disposed-off.

3.3 Layer (Egg production)

In the layer farms, egg laying hens are reared for egg production. Typical egg laying cycle starts around 18 weeks age of the bird and continues upto 72 – 75 weeks of age and thereafter diminished gradually to become uneconomical. Birds less than six months of age are termed as pullets and are raised either on floor or on the cages little away from adult farms located in the same or at different premises. The birds are kept and raised in three different houses based on its age i.e. a) Chick house: 0 to 45 days, b) Grower House: 45 days to 18 weeks and c) Layer House: 18 weeks to 72 to 75 weeks. The birds start laying eggs from 18 weeks onwards.

There are two phases of growing period i.e. brooding and growing phase. The brooding phase extends from day one to three to four weeks depending upon the season of rearing. During this period, the birds are provided extra warmth in an enclosed quarter by means of gas brooders, electric hovers, infra-red bulbs or coal brooders. After this initial period, the birds are moved to growing establishments which are typically open houses. The brooding and growing houses may be deep litter type or cage type. After the completion of the growing phase, the birds are moved to laying cages where they remain there till the end of their laying cycle (72 to 75 weeks of age).

3.4 Broiler (Meat Production)

Broiler birds are raised especially for meat production for 40 to 45 days or up to weight gain of 2.5 to 3.0 Kg. Most of broiler birds gain slaughter weight (2.5 kg to 3.0 kg) within 40 to 45 days. Broilers are most commonly reared in deep litter shed, where feed and water is given by hanging feeder and watering. After cleaning of the deep litter shed, rice husk, saw dust, groundnut hulls, wood shavings, and dried leaves bed of 3" thickness is prepared by scratching. Chicks are moved in the shed freely. Depending on the weight of the bird, the birds are sold for slaughtering from 40 to 45 days.

The rearing of birds is of two types:

3.4.1 Deep Litter System

Birds are kept on litter floor which is covered with different kinds of agro materials like rice husk, saw dust, groundnut hulls, wood shavings and dried leaves etc. depending on their availability. Initially, the depth of the agro material is approx 5 to 6 cm and then topped up by another 5 to 6 cm as the birds grow in size. The birds may remain on this system up to six weeks in case of broilers from where they go for slaughtering. In case of layer, they remain up to 18 weeks of age or may be shifted to cages. The majority of broilers are housed in deep litter sheds. Feed and water are provided manually in small farms and with automatic equipment in large farms.

3.4.2 Cage System

This is widely practiced system for housing commercial layers, breeder layers and of late even broiler breeders. The birds are generally housed in cages erected on raised platforms in open sheds. These cages are arranged in rows. Three or four birds are accommodated in each cage with provision of drinking water and feeding. The water is provided through a nipple fitted to a closed pipe running at head height of the bird. Feed is placed in a trough attached to the front of the cage and distributed often manually or by automation. The droppings of birds slip through perforations instantaneously and are collected on the floor.

4. Classification of Poultry Farms

Backyard poultry is typically owned by small and marginal farmer and comprises of few birds, largely for self-consumption and very small quantities get commercially sold. The poultry farming practiced by the rural and tribal farmers under free range or backyard or semi-intensive systems is usually referred to as rural poultry farming.

Based on the number of handling of birds, Poultry farms may be classified into three categories.

- Small (5,000-25,000 bird)
- Medium (above 25,000-1,00,000 birds).
- Large (above 1,00,000 birds)

The poultry farms under small category are in un-organized sector run by economically weaker farmers and are of rural background.

5. Environmental issues & Current practices to address the environmental issues in Poultry Farms

Environmental nuisance arising from poultry farms is due to the generation of NH3 & H2S gases causing odor, dust from feed mill, storage & management of Solid Waste (Manure, Dead Birds and Hatchery Waste) also causing odour & water from cleaning operations. Breeding of flies and rodents etc. are the other issues in poultry farms.

(i) Gaseous emission (NH3 & H2S) and Feed Mill Dust

- The gaseous emission viz Ammonia (NH3) and

Hydrogen Sulphide (H2S) are emanated from the excreta generated from the birds causes odour. The odour is produced due to anaerobic conditions in the litter occurs due to its storage at one place for longer period. The general practice followed by poultry farms to control odour is by maintaining good ventilation and free flow of air.

- Dust is generated from the feed mill operation during mixing and grinding of various ingredients of feed. The feed mill operations are typically located inside the mill buildings. Dust extraction systems are generally used to collect the dust and to improve the shop floor environment.

(ii) Solid Waste

Sources of solid waste are (i) Poultry droppings / Manure / Litter (ii) Dead Birds & (iii) Hatchery Waste.

- In case of cage system, excreta are collected just below the bird cages directly on ground, made of stone slabs or concrete or impermeable compacted clay. Litter is collected and kept dry by maintaining good ventilation and free air flow to undergo aerobic composting. The manure is removed once in four to six months & sold to the farmers. In deep litter system, excreta are collected in bed made up of agro residue (rice husk, saw dust, groundnut hulls, wood shavings, and dried leaves) itself. Once in a day or two days the bed is scratched for mixing of litter. Once the chicken is sold for meat, the bed (rice husk, saw dust, groundnut hulls, wood shavings, and dried leaves) is removed once the cycle of 42 to 45 days gets over along with the excreta and sold as manure. The shed is washed and lime is applied as disinfectant and allows the area for quarantine period.
- Death of the birds in poultry farms is a common phenomenon and their disposal is an issue. Dead birds cause nuisance, odour and aesthetic problems like disease, insect, rodent and predator problems if the birds are not disposed immediately. Dead birds are either burned at relatively high temperatures using different fuels which causing atmospheric pollution and also odour nuisance or buried in the burial pit in the premises.
- During hatching operation, large quantity of solid waste comprising of egg shells, unhatched eggs, dead embryos and chickens and a viscous liquid from eggs etc is generated. This waste is disposed through open burning or through rendering plant.

(iii) Waste water generation from cleaning operation

- Water in poultry farms is used for drinking of birds, sprinkling during the summer and for cleaning sheds and equipment in between batch replacement.
- As such there is no process waste water generation from the poultry farming. However, waste water is generated during cleaning operations. The waste water is collected in holding tank and utilized in gardening in the premises.

(iv) Other issues:

- Breeding of flies and rodents, etc. are the other issues in poultry farms

6. Environmental Guidelines for Poultry Farms farms:

Following are the revised guidelines addressing environmental issues of Poultry Farms.

6.1 Gaseous emission (NH3 & H2S) and Feed Mill Dust

(i) Minimization of odour / gaseous pollution

- Proper ventilation and free flow of air over manure collection points to keep it dry shall be ensured.
- Manure should be protected from Run-off water and from unwanted pests / insects.
- Well-designed storage facilities should be provided to contain manure / litter.
- Carcasses of dead birds shall be promptly collected on regular basis and disposed appropriately without damaging the environment as per the prescribed methods under section 7.2.3 of the guidelines.

(ii) Dust from Feed Mills

- Feed mill and Go-down should be located on a well elevated ground preferably near the entrance of the farm and isolated from other poultry sheds.
- Dust collector system should be installed to control emissions from mixing and grinding section of the feed mill.
- Workers in the feed mill shall be provided with dust masks to protect them from dust.
- Provision for vehicle tyre dip shall be made at the entrance to remove impurities / dust carried by vehicle tyres;
- Floor of the feed mill and Go-down shall be concrete and raised above the ground level by a minimum of 2 feet.

6.2 Management of solid wastes (Solid Wastes contains Manure / litter, Hatchery Debris and Dead Birds)

(i) Manure handling and disposal

- Proper ventilation and free flow of air over manure collection points to keep it dry (by blowing dry air over it or by conveying ventilation air through the manure pit) shall be ensured to prevent obnoxious odour in the area.
- Poultry housing shall be ventilated allowing sufficient supply of fresh air to remove humidity, dissipate

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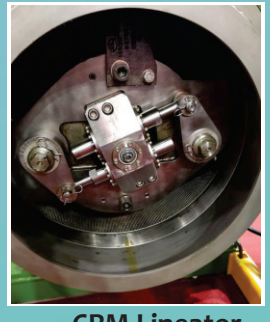

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heat and prevent build-up of gases such as methane, carbon dioxide, ammonia, etc.

- Excreta shall be scratched at least once in two days as needed for mixing of litter and to keep bedding material (rice husk, saw dust, wood shavings etc.) dry in case of deep litter houses the waste material. This waste shall be utilised for composting after completion of the cycle.
- Manure collected under cages on high raised platforms shall be stored for further processing and utilized by using following options:

Sl. No.	Poultry Farms	Methods for Disposal/ Utilization of manure
1	Small Poultry Farms	Composting
2.	Medium & Large Poultry Farms	• Composting or Biogas production for disposal/utilization of manure/litter • Combination of any of the methods for disposal/utilization of manure/litter
3.	Poultry Farms in Cluster	• Common facilities for Biogas production or Composting or their combination

- Land application of manure to the nutritional requirements of soil and crop shall be balanced.
- The litter / manure storage facilities shall be minimum 2 m above the water table and of adequate size based on type and number of birds handled. Its base should be constructed with stone slabs or concrete or impermeable compacted clay.
- Manure shall be protected from run off water and cover it to avoid dust and odours in storage pits. The dry manure dump shall be covered with permanent roof or with plastic / similar material to prevent air emissions and the precipitation falling on it.
- Mortalities on farm by proper animal care and disease prevention program shall be reduced.
- Proper facilities (Burial Pit / Composting / Incineration) shall be provided for Collection, storage, transport and disposal of dead birds
- Domestic hazardous wastes (vaccines, vails, medicines, syringes, etc.) shall be disposed as per provisions of "Solid Waste Management Rules, 2016".

Composting of Manure:

- Proper mixing the waste with a carbon rich material (e.g., paddy straw / husk, wood shavings) should be done in the pits. Carbon to nitrogen ratios of 20 - 25:1 is usually recommended. Pure manure can also be composted following the procedure and monitoring all parameters. The composting facilities may be designed through expert institutions in the field as per the size of poultry farms.
- Periodic stirring of compost material should be done for its proper mixing.
- Moisture levels should be maintained between 35 to 50%.
- Temperature monitoring should be done to determine composting conditions.

(ii) Hatchery Waste

- Efforts shall be made in converting the shells to animal feed to supply as a source of calcium, especially for poultry feeds.
- Extrusion with soya bean meal can be used to make a shell / hatchery meal.
- Un-hatched eggs shall be disposed of by composting or rendering.

(iii) Dead Birds Disposal

The dead birds arising from day to day farm activity shall be separated from other live birds promptly and stored in closed containers and disposed off within 24 hours by following any of the disposal methods.

Burial Method:

- The dead birds arising from day to day farm activity should be separated from other live birds promptly and should be stored in closed containers \ disposed off within 24 hours
- The dead bird burial pit shall be of minimum 3 to 4 m in depth and 0.8 to 1.2 m diameter and this size may vary as per the capacity of poultry farm and shall be located above minimum 3 m from the ground water table.
- The dead bird burial pit shall be provided with a vermin / fly proof cover made up of wooden / metal / concrete having a central operable lid of proper size for day to day dropping of carcasses.
- Carcasses shall be covered by a thin layer of soil (at least 40 cm deep).along with calcium hydroxide.
- When the pit is full, a compacted soil cover of 0.5 m shall be provided with the top of the covered soil well above the ground level.
- The distance between any two burial pits should not be less than 1 m.

Composting

- The composting facility shall not be located within 300 m from the nearest dwelling and 100 m from any well or water course.

- The capacity of the composting facility shall be sufficient to handle the average mortalities on the farm.
- The roof of the composting facility shall be permanent with concrete bottom.
- The composting facility shall be secured with link mesh all around raised to a height of 1.5 m above the ground level to avoid the predation by straw dogs etc.
- A proper mixture of smaller and larger particle sizes to obtain an optimum air exchange within the mixture and build-up of temperature.
- Moisture content of the composting pile shall be approximately 60%. More than this may result in odour problems and less than this will reduce the efficiency of the composting process.
- Carbon and nitrogen are vital nutrients for the growth and reproduction of bacteria and fungi. The carbon-to-nitrogen ratio shall be in the range of 20:1 and 25:1 for proper composting. This is obtained by carefully balancing the dead bird and carbon sources.
- The optimum temperature for composting is 54 to 66^{O}C which pasteurizes the compost. If temperature falls below 49^{O}C after a week or so, the material should be moved to the secondary stage unit. To facilitate the easy transfer of the first stage material to the secondary stage, the proper designing of the primary stage (first stage) facility is desirable as illustrated in figure 5.5. Failure to do so will result into poor compost. The temperature in the secondary stage unit will begin to raise as beneficial bacterial activity begins and will peak in 5 to 10 days.

6.3 Waste water Management

- The waste water generated from the cleaning operations (after each batch removal) shall be collected in appropriate holding tank and put to use in the green belt. Efforts may be made for dry cleaning of the sheds with use of disinfectant so as to avoid use of water.
- Water use and spills from drinking devices shall be reduced by preventing overflow or leakages and using calibrated, well-maintained self-watering devices;
- Improve drainage, reduce standing water and water ditches to control mosquitoes and flies
- Use of pressure pumps, hot water or steam in cleaning activities instead of cold water and plain water scrubs may be encouraged to improve sanitation and reduce the quantities of wash water.

6.4 Other issues

- Control of Flies: Proper treatment and disposal of manure, ventilation of sheds, control of temperature, good sanitation, swift repairs of leaks, avoidance of feed spills, prompt removal of broken eggs and dead birds shall be ensured for control of flies in the poultry farms. The farm should have provisions of wire nettings, traps, fly-repellents, insecticides etc.
- Control of Rodents: Methods for the control of rodents may include: i) Exclusion ii) Trapping Glue boards iii) Tracking powder iv) rodent proof doors and windows to eliminate rodents / pest infestation.
- As per Bureau of Indian Standards 1374: 2007, on poultry feed specifies that the use of antibiotic growth promoters is not recommended in poultry feed, hence use of antibiotics should not be mixed with feed or administered for non-therapeutic purposes without prescription for diseased birds. Regulation for use of antibiotics shall be regulated as per the advisory / directions issued by Department of Animal Husbandry, Dairying and Fisheries and Ministry of Health and the Drug Controller General of India.

7. Siting Criteria

New Poultry Farms (Set up after issuance of Guidelines) should preferably be established

- 500 m from residential zone in order to avoid nuisance caused due to odour & flies.
- 100 m from major water course like River, Lakes, canals and drinking water source like wells, summer storage tanks, in order to avoid contamination due to leakages / spillages, if any.
- 100 m from national Highway (NH) and 50 m from State Highway (SH) in order to avoid nuisance caused due to odour & flies.
- 10 - 15 m from rural roads / internal roads / village pagdandis.
- The Poultry sheds should not be located within 10 m from farm boundary for cross ventilation and odour dispersion.

8. Regulatory/ Monitoring Mechanism for Poultry Farms

- SPCBs / PCCs shall upload Environmental Guidelines on their website.
- Guidelines shall be applicable to all the category of Poultry Farms.
- Poultry Farms handling birds above 25,000 at single location will have to obtain consent to establish (CTE) and consent for operate (CTO) under the Water Act, 1974 & Air Act 1981 from State Pollution Control Board / Pollution Control Committee.
- The Poultry Farms are categorized under "Green" Category, therefore validity of consent will be 15 years.
- Animal Husbandry Department of the State / Districts to assist the poultry farms for implementation of Guidelines.

Efficacy of Phyto chemicals on the Performance of Broilers

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Highlight Points

- This article discusses about efficacy of various phyto-chemicals / herbal formulations on growth, performance and immunity of broilers. It emphasizes on effect of different traditional herbs on improving the gut health of poultry and also overall well being of birds. Different herbal feed additives and its active components and they were elaborated along with its limitations.

1. Introduction:

India is one of the leading producers of poultry meat in the world. The increase in the average income and the urban population has led to a tremendous increase in the poultry demand and a steady increase in consumption over the years. In 2020, the consumption of poultry meat in India was found to be over 3.9 million metric tons. The increase in population also necessitates that stringent rules must be followed for antimicrobial use and their withdrawal periods

2. Phytochemicals:

Phytochemicals, also referred to as phytobiotics or phytogenics, are non-nutritive plant compounds that have protective and disease preventive properties. These are incorporated into animal feed to enhance productivity. In recent years, phytobiotics have been used as natural growth promoters in the animal farming industry. A diverse variety of herbs, spices like yarrow, garlic, ginger, cumin and essential oils like thymol, sage, lemon are used to improve animal health and performance. The beneficial effects of phytochemicals are ascribed to their antimicrobial and antioxidant properties. Phytochemicals when added in the diets alters and stabilizes the intestinal microbiota, reduces microbial toxic metabolites in the gut, owing to their direct antimicrobial properties on various pathogenic bacteria. It results in relief from intestinal challenge and immune stress, thus improving performance and growth. The beneficial effects of phytochemicals also include its antioxidant property which reduces the oxidative stress in various tissues. Phytochemicals also exert their action through immunomodulatory effects such as modulation of cytokines, increased antibiotic titres, and increased proliferation of immune cells.

3. Modes of Action of Phytochemicals:

Beneficial effects of phytochemicals / herbs or botanicals in farm animals may arise from activation of feed intake and secretion of digestive secretions, immune stimulation, anti-bacterial, coccidiostatic, anthelmintic, antiviral or anti-inflammatory activity and inhibition or particularly – antioxidant properties. Most of these active secondary plant metabolites belong to the classes of isoprene derivatives, flavonoides and glucosinolates, and a large number of these compounds has been suggested to act as antibiotics or as antioxidants in vivo as well as in food. A main activity takes place in the digestive tract. Herbs or the phytochemicals can influence selectively the micro-organisms by an anti-microbial activity or by a favourable stimulation of the eubiosis of the microflora. The consequence can be a better nutrient utilization and absorption or the stimulation of the immune system. Finally, herbs can contribute to the nutrient requirements of the animals and stimulate the endocrine system and intermediate nutrient metabolism. Immune system and a stable, beneficial microflora (eubiosis) must be build up. For that a regular intake of feed and water is of a high priority. Often the desired activity of herbs is not constant. Conflicting results may arise from the natural variability of the composition of plant secondary metabolites. Variety and environmental growth conditions, harvesting time and state of maturity, method and duration of conservation and storing, extraction method of the plants, as well as possible synergistic or antagonistic effects, anti-nutritional factors or microbial contamination are factors which may substantially affect the results of in vivo experiments. The different mode of action of phytochemicals are discussed hereunder.

a) Influence of herbal feed additives on feed intake, digestibility of nutrients and performance:

Due to the wide variety of active components, different herbs and spices affect digestion processes differently. Most of them stimulate the secretion of saliva. Curcuma,

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cayenne pepper, ginger, anis, mint, onions, fenugreek, and cumin enhance the synthesis of bile acids in the liver and their excretion in bile, what beneficially effects the digestion and absorption of lipids. Most of the spices stimulate the function of pancreatic enzymes (lipases, amylases and proteases); some also increase the activity of digestive enzymes of gastric mucosa. Besides the effect on bile synthesis and enzyme activity, extracts from herbs and spices accelerate the digestion and shorten the time of feed / food passage through the digestive tract. Plant herbs such as garlic (Allium sativum), lemon grass (Cymbopogon citrates) and pepper mint (Mentha piperita) are widely used as antibacterial agents and extensively used to maintain the microbial ecosystem of the gastrointestinal tract especially in tropical regions. Garlic as an alternative growth promoter in livestock production reported improved growth rate, digestibility and carcass traits.

b) Herbal feed additives as antimicrobial supplements:

Several studies showed strong antimicrobial activity of certain plant extracts against gram positive and gram negative bacteria. Plants just like any other creature, readily synthesize substances for their defence against microorganisms and insects. Moreover, they may produce secondary antimicrobial metabolites as a part of their normal growth and development or in response to stress. Several researches have studied the antimicrobial effect of oriental herbs including Allium sativum, Angelica dahurica, Anguisorba officinalis, Artemisia argyi, Coptis chinensis, Dictamnus dasycarpus,Fraxinus rhynchophylla, Geranium thunbergii, Hydrastis canadensis, Phellodenronamurense, Polygonum cuspidatum, Scutellriabaicalensis and Sophora flavesens. These herbs contain major flavonoid components, baicalin, baicalein, limonene, cinnamaldehyde, carvacrol or eugenol which exerts antimicrobial effect along with other supportive herbs.

These herbs have antibacterial effect against Salmonella spp or E. coli and gram-positive bacteria Staphylococcus spp. and Streptococcus spp. Active principles in herbal feed additives changes fatty acid composition which can affect surviving ability of microorganisms by increasing hydrophobicity. This confirms the fact that herbs and spices act as antimicrobial agents by changing the characteristics of cell membranes, and causing ion leakage, thus making microbes less virulent. Plant extracts, known as phytobiotics, have been exploited for their antimicrobial, anti-inflammatory, anti-oxidative, and anti-parasitic activities. There is a lot of variations in the composition of phytobiotics due to the biological factors (plant species, growing location, and harvest conditions), manufacturing (extraction / distillation and stabilization) and the storage conditions (light, temperature, oxygen tension, and time).

c) Herbal feed additives as anti-inflammatory:

Extracts of curcuma, red pepper, black pepper, cumin, cloves, nutmeg, cinnamon, mint and ginger showed anti-inflammatory effect. The major active molecules with anti-inflammatory action are phenols, terpenoids and flavonoids. These molecules suppress the metabolism of inflammatory prostaglandins. Phenolic compounds of plants are hydroxylated derivatives of benzoic acid and cinnamic acids and have been reported to possess anti-inflammatory effects. Flavonoids have long been recognized to possess anti-inflammatory, anti-allergic, antiviral and antiproliferative activities. The most known herbs and spices with anti-inflammatory potential arechamomile, marigold, liquorice and anis. Plants of the Labiatae families (like mint) have attracted a great interest. Their antioxidative activities are due to phenolic terpenes. Thyme and oregano contain large amounts of monoterpenes, thymol and carvacrol. Plants rich with flavonoids such as green tea and other Chinese herbs have been described as natural antioxidant. Black pepper (Piper nigrum), red pepper (Capsicum annuum L) and chilli (Capsicum fretuscene) contain also several antioxidative compounds. But in many of these plants, the parts containing the active substances are of a very fragrant and / or spicy taste leading to restrictions of their use in animal feed. Recently anti-bacterial, antiviral, anti-fungal, antitumor, anti-inflammatory, immune modulatory, wound-healing, antioxidant, and anti-diabetic effects properties of Aloevera have been reviewed for poultry.

d) Herbal feed additives as antioxidants:

Antioxidants are compounds that help delay and inhibit lipid oxidation and when added to foods tend to minimize rancidity, retard the formation of toxic oxidation products and help maintain the nutritional quality. The health promoting effect of antioxidants from plants is thought to arise from their protective effects by counteracting reactive oxygen species. Several studies suggested that plants rich in antioxidants play a protective role in health and against diseases and their consumption lowered risk of cancer, heart disease, hypertension and stroke. The antioxidant potential of medicinal plants may be related to the concentration phenolic substances (flavonoids, hydrolysable tannins, proanthocianidins, phenolic acids, phenolic terpenes) and some vitamins (E, C and A). Garlic and onion biological action products are ascribed to its sulfur-containing active principle which has been reported to their lipid lowering effects and inhibit oxidation of low-density lipoproteins. Often used herbs rich in phenolics are: rosemary, thyme, oregano, sage, green tea, chamomile, ginko, dandelion and marigold.

Herbs and spices can protect the feed against oxidative deterioration during storage.

e) Herbal feed additives as immune stimulant:

The immune system generally benefits from the herbs and spices rich in flavonoids, vitamin C and carotenoids. The plants containing molecules which possess immune stimulatory properties are echinacea, liquorice, garlic and cat's claw. These plants can improve the activity of lymphocytes, macrophages and NK cells; they increase phagocytosis or stimulate the interpheron synthesis. Essential oils extracted from medicinal plants improve the immune response and also are able to cause changes of the duodenal mucosa with beneficial effects for the animal. Recently effect of ß-glucan and cow urine distillate has been highlighted as immunomodulator in broiler chicken.

f) Herbal feed additives as coccidiostat as Coccidia poses a huge threat to the Poultry industry:

Some plants like Tulbaghiaviolacea, Sugar beet, Curcuma longa have demonstrated an activity against chicken pathogens, especially coccidian. Betaine is a by-product of the sugar beet industry and it has recently been seems to have a positive impact in fighting coccidiosis. It protects against osmotic stress associated with dehydration and permits normal metabolic activity of cells. However, the protective effects of betaine on the intestinal cells are also exerted on parasitic cells. The active component is curcumin; a phenolic compound coming from the rhizome of Curcuma longa exerts its anticoccidial effect through its antioxidant action on the immune system. Gallarhois and Nectaroscordum tripedale extracts have shown promising result against coccidial infection.

Name of the Plant	Used Parts	Active Component	Function
Nutmeg (Myristica fragrans)	Seed	Sabinene	Digestion stimulant and Antidiarrhoeic
Cinnamon (Cinnamomum zeylanicum)	Bark	Cimetaldehyde	Appetite and digestion stimulant and antiseptic
Cloves (Syzygium aromaticum)	Cloves	Eugenol	Appetite and digestion stimulant and antiseptic
Cardmom (Amomum subulatum)	Seed	Cineol	Appetite and digestion stimulant
Coriander (Coriandrum sativum)	Leaves and Seed	Linalol	Digestion stimulant
Cumin (Cuminum cyminum)	Seed	Cuminaldehyde	Digestion stimulant and Galactogogue
Anise (Pimpinella anisum)	Fruit	Anethol	Digestion stimulant and Galactogogue
Celery (Apium graveolens)	Fruit, Leaves	Phtalides	Appetite and digestion stimulant
Parsley	Leaves	Apiol	Appetite and digestion stimulant, antiseptic
Fenugreek (Trigonella foenum graecum)	Seed	Trigonelline	Appetite stimulant
Capscicum (Capsicum annuum)	Fruit	Capsaicin	Digestion stimulant
Pepper (Piper nigrum)	Fruit	Piperine	Digestion stimulant

Horse radish (Armoracia rusticana)	Root	Allyl izotiocianat	Appetite stimulant
Mustard (Brassica Nigra)	Seed	Allyl izotiocianat	Digestion stimulant
Ginger (Zingiber officinale)	Rizom	Zingerone	Gastric stimulant
Garlic (Allium sativum)	Bulb	Alkin	Digestion stimulant and Antiseptic
Rosemary Rosmarinus Officinalis	Leaves	Cineol	Digestion stimulant, Antiseptic
Thyme (Thymus vulgaris)	Whole plant	Thymol	Digestion, stimulant and antiseptic, antioxidant
Mint (Mentha piperita)	Leaves	Menthol	Appetite and digestion stimulant, antiseptic
Shatavari (Asparagus racemosus)	Root	Sapogenins, flavonoids and saponin	Prevention and treatment of gastric ulcers, dyspepsia and as a galactogogue.

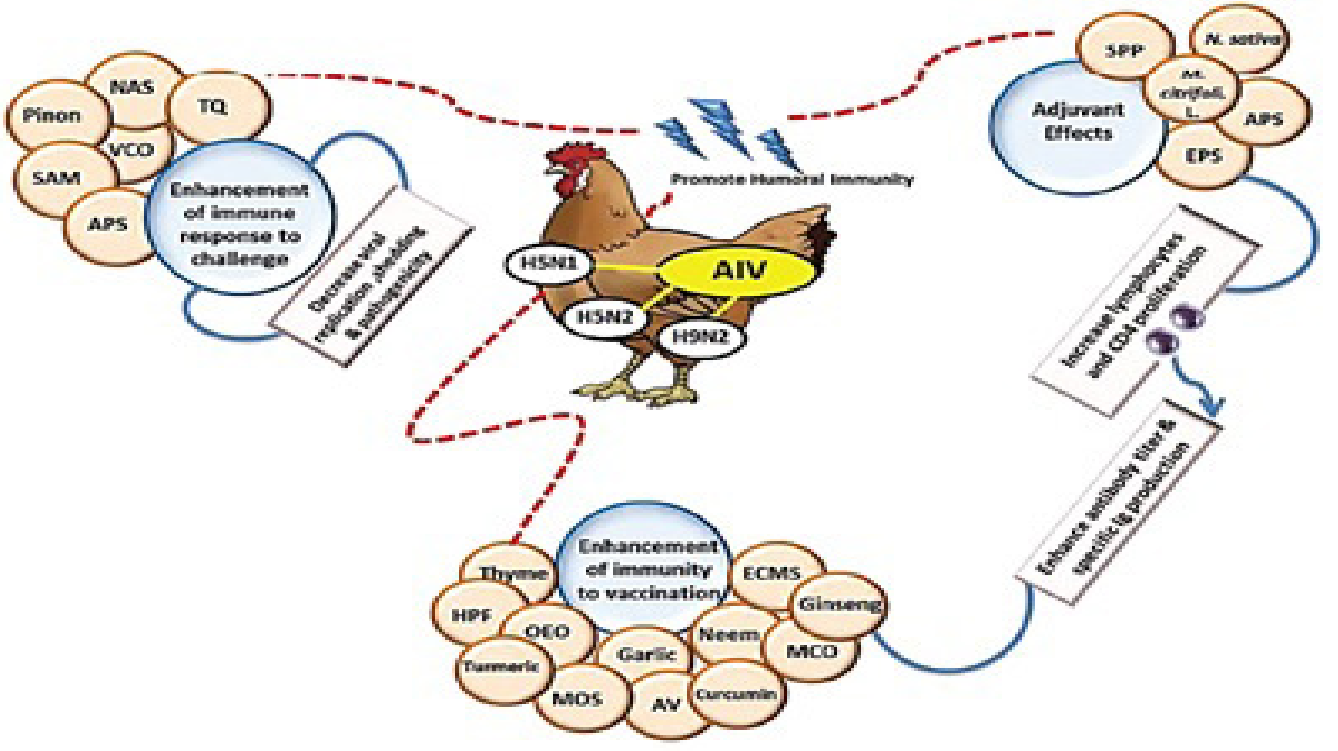

Fig. 1. Different types of herbal plants and their role in improvement of chicken humoral immunity against avian influenza.

PSP: Pinus monophyllashell polysaccharide;)	TQ: Thymoquinone;
VCO: Virgin coconut oil;	SAM:Sambucus nigra;
APS: Astragalus polysaccharides;	NS:Nigella sativa;
SPP: Sargassum pallidum polysaccharides;	MC: MorindacitrifoliaL.;
EPS: Epimedium polysaccharides	Thy: Thyme;
HPF:HypericumperforatumL.;	OEO: Oregano essential oil;
TUR: Turmeric;	MOS: Mannanoligosaccharides;
AV: Aloe vera;	CRM: Curcumin;
MCO: Myrtus communis oil;	GSLS: Ginseng stem-and-leaf saponins;
ECMS: Cochinchinamomordicah	

4. Limitations of Herbal Feed Additives:

- Not easily quantifiable and standardized due to their complex composition.
- The location, soil type, weather conditions, altitude, season during which the plant is grown, harvesting procedure and storage conditions may affect the composition of plants.
- Although majority of herbals are stable, there are various constituents which are photolabile thermo labile thus less stable.
- Variety and environmental growth conditions, harvesting time and state of maturity, method and duration of conservation and storing, extraction method of the plants, as well aspossible synergistic or antagonistic effects, anti-nutritional factors or microbial contaminationare factors which may substantially affect the use of herbal feed additives.

5. Conclusions:

Phtochemicals / herbal feed additives are a natural, eco-friendly alternative to the antibiotics. These phytogenic feed additives can be used as natural non-antibiotic growth promoters, which is found from herbs, spices, essential oils and oleoresins. Phytogenic feed additives have excellent antioxidative, antimicrobial, growth promoting and immune-stimulant effects in poultry production. The antioxidative efficacy of some phytogenic compounds to protect the quality of feed, as well as that of food derived from animals. Phytogenic feed additives have a potential of antimicrobial effects to contribute to a final reduction of intestinal pathogen pressure through inhibition of adherence to the mucosa. It has a great role in enhancements of digestive enzyme activity and absorption capacity. Phytogenic feed additives have beneficial effects on normal gut function, the overall performances of birds (feed intake, body weight gain, feed conversion ratio, nutrient digestibility, carcass characteristics and egg production), meat quality and safety in the storage, and emission reduction in poultry houses. These effects show that phytogenic additives can contribute to the improvement of production performance, and therefore production efficiency as well.

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'To be or not to be' a Standardized Botanical Powder

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The demand for organic and natural foods has grown over the past decade. The desire for better overall health among consumers and the awareness of the harmful effects of synthetic ingredients has fuelled an organic revolution. This is evident from the global market estimations; "the organic food market generated $162,036.7 million in 2019 and is predicted to make revenue of $416,049.7 million by 2027." To be a front player in the future of the organic revolution, consistency in quality and biological results shall be essential. Keeping this in mind, we have designed a series of articles describing the importance of the standardization of botanical powders. Standardization here refers to neutralizing the natural variability to deliver consistency and uniformity in the quality assessment parameters. According to the National Institutes of Health (NIH), **standardization** is a process that manufacturers use to ensure batch-to-batch consistency of their products. Standardization involves identifying specific phytochemicals (also known as markers) that can be used to manufacture a consistent product. In our earlier article, we discussed what and how standardization is done in standardized botanical powders (SBPs).

In the current article, we shall discuss how an SBP comes into being. What are the process and aggressive scrutinization that occurs at each step of its formulation from when it is an idea to its launch into the market? Shakespeare's hamlet phrase "to be or not be" fits in aptly here. The well-known stage-gate process for innovative products can be used as a basis with slight modifications (Figure 1). At each stage a committee would review the process and approve or disapprove the SBP from entering the next stage.

Ideation stage:

In the ideation stage, an idea of a product is proposed to address a pain point or an issue, in the poultry industry. Either to bring in a new supplement or to find a natural and safe alternative to an existing synthetic supplement in the market.

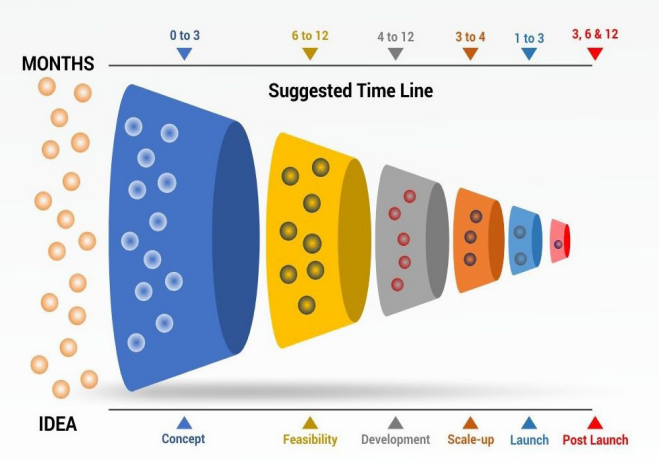


Figure 1: The steps in the stage-gate process

Concept stage:

A clear customer value proposition for the idea is made through a business case. What would the impact of this SBP be in the market? A library of plants is created based on availability, biodiversity, patentability and cost. If the SBP passes this stage, it goes to the feasibility stage.

Feasibility stage:

The potential plants that would address the issue are screened. Medicinal plants are screened with bioassays in vitroor in vivo. Traditional and modern scientific literature is curated for botanical constituents that can be used to address and solve the issue. The phytochemistry laboratory develops commercially viable processes for the optimum extraction of medicinal plants, where active constituents, otherwise known as markers, are already known. The phytochemistry lab is where the creation of a SBP starts, with the preparation of different formulations. The SBPs are prepared through scientific evaluation of the phytochemicals required for the formulation and the right selection of the raw materials. The phytochemistry lab also establishes the essential reference marker or the phytochemical that would be necessary to be standardized in each batch of SBPs (Figure 2).

Developmental stage:

Leads generated in the feasibility stage are examined and combined to form formulation prototypes. This is performed with computational models such as orthogonal array composite design (OACD) (Figure 3), which helps look for interactions between the different components of the tentative formulations. These results simulate the interaction between the components and give a scientific

insight regarding the interaction between the constituents. They could either be synergistic, additive or antagonistic.

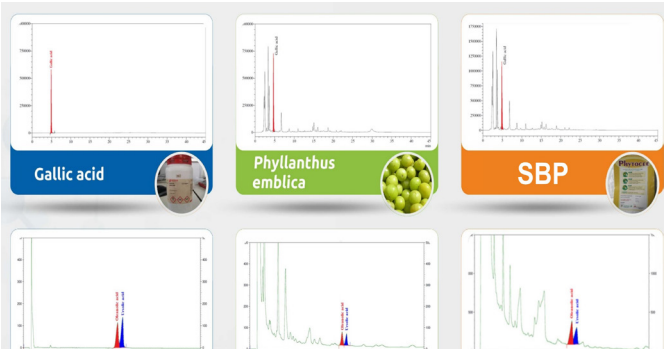


Figure 2: Reference phytochemicals are selected to be standardized in SBPs.

Additivity means that the activity of the ingredients is adding up, synergy means the activity of the components when combined is enhanced, and antagonism means that the ingredients would nullify the effects of each other. Only those combinations that show synergistic predictions in a formulation are prioritized and selected to be taken further.

A series of biological studies are conducted to find the best herb(s) for the desired biological activity. The SBP formulation is then tested in a small group of the target species in a controlled environment. It is assessed for safety in the animals. Only if these studies show promising results they move to the scale-up stage.

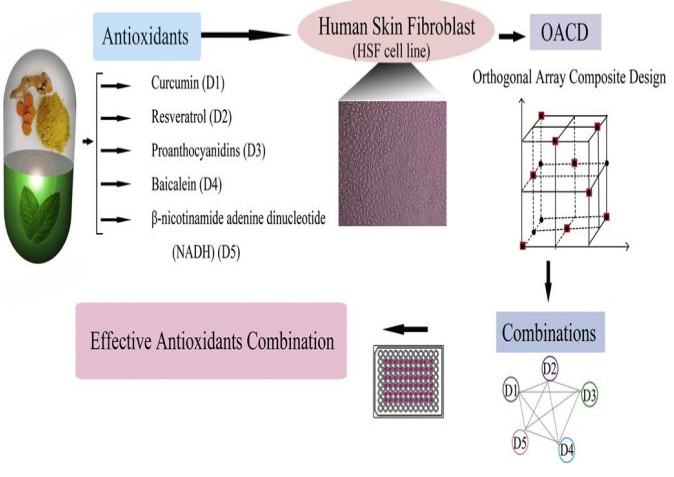


Figure 3: Taguchi Orthogonal Array Method

Scale-up stage:

The challenges during manufacturing are addressed in this stage, where the product is scaled in quantity from kilograms to tons. Then, the beta-testing phase begins, where a larger number of target species is tested. Farm trials in field conditions are conducted in different parts of the country and the world. If the results are encouraging at the scale-up stage, the product is launched to a segment of the market.

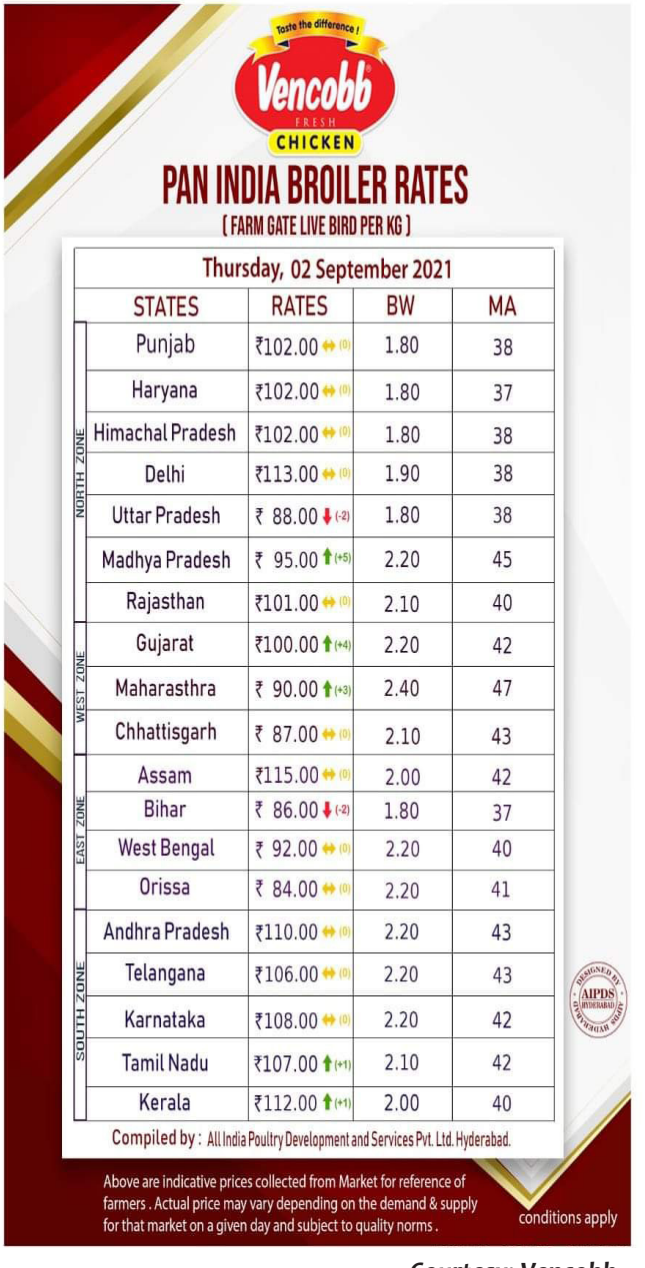
Launch stage:

In the launch stage the SBP is evaluated for its safety, effectiveness and checked if it meets all the end attributes that were desired in the conceptual stage. Later on, it is taken to full-scale marketing.

Post-marketing surveillance:

Test to examine how the SBP fairs. Is the SBP efficient in showing the desired biological effects? Its mechanisms of action at the phenotypic, molecular and genome level are evaluated.

Only when an SBP can pass through each stage with satisfactory performance, the process is furthered to the next stage, if not the journey of the SBP is halted; to iterate its formulations and the journey begins from the start with new constituents. In our next article, we shall elaborate on when the standardization process begins **"Standardization of SBP starts at the grassroots"**.



Courtesy: Vencobb

PHAGE THERAPY AS A NEW HOPE

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Highlight Points

Bacteriophage will be the future of poultry for preventing various issues related to E. coli and Salmonella in the farms. Bacteriophage also strengthens Gut health leading to improved performance parameters in Breeder, broiler and Layers.

Antibiotic resistance in animals is a growing issue that urgently needs to be addressed. Antimicrobial agents are frequently used in animal husbandry as an alternative or supplement to feed additives such as antibiotics and this prophylactic scheme / model / pattern has contributed to the development of antimicrobial resistance. The overuse of antimicrobials can lead to resistant strains developing; for example, when antibiotics are routinely given for minor ailments which would otherwise heal on their own. This post will explore several possible solutions and explain how we can avoid a future where our only option is to rearrange / remodel the established treatment methods for humans, which no longer provide desired effects.

The problem of antibiotic-resistant bacteria:

The moment of introducing antibiotics was a turning point in medicine. Antibiotics revolutionized the industry, displacing other methods of combating microorganisms, and contributed to the development of various medical therapies, e.g., chemotherapy and transplantation. It appeared to be a bold, new world and everyone was on board. People put their trust in this medical marvel. The phenomenon of antibiotic resistance appeared at the beginning of antibiotic discovery, but due to the rate of discovery and introduction of new antibiotics, it did not raise much concern. However, with time, the amount of new and effective antibiotics has drastically decreased and the problem of antibiotic resistance has become more noticeable. Even before commercially available antibiotics were introduced, this had always been a cause of concern as a natural process. While natural compounds functioned as antibacterial in low doses, therapeutic doses accelerated the healing, as well as the resistance rate. Like all living organisms, Bacteria want to survive. They develop mechanisms that adapt them to unfavorable conditions, e.g. make them resistant to therapeutic agents. Unfortunately, antibiotic resistance is significantly influenced by their overuse, not only in the treatment of diseases, but also when used as growth promoting agents in plant cultivation and animal breeding. Regarding the latter, up to 73% of antibiotics are used worldwide. The greatest consumption is in aquaculture, where even tons of antibiotics are released into the waters and therefore consequently accumulate in the environment. This affects not only the development of antibiotic resistance but also the destruction of the ecosystem. Resolving the antibiotic resistance in animals became an issue that must be addressed right away.

How does Bacteria develop resistance?

Bacteria acquire resistance through gene mutations and horizontal gene transfer: conjugation (collection / transfer of genetic material from / to another bacteria), transformation (collection of genetic material from the environment), transduction (with the participation of bacteriophages). Moreover, bacterial cells can achieve transient, genetically uncoded resistance through processes such as growth in biofilms, swarming adaptation, metabolic dormancy and persistence.

Looking for other strategies is desirable:

Due to the declining effectiveness of antibiotics, it is important to slow down the process of acquiring antibiotic resistance by bacteria and to seek and develop other methods of disease prevention and treatment. Introduction of prescription-only antibiotics would help greatly, as in many countries the access is too easy Discouraging the antibiotics' abuse will help slow down the process of

developing resistance.

The use of antibiotics in feed and aquaculture must also be eliminated to the necessary minimum. This problem has been discussed many times in the European Union and it was assumed that in 2022 there will be introduced a law banning the use of antibiotics which are of particular importance in medicine. Even for animals, antibiotics should be available by prescription-only, after dispensation by a veterinarian.

Increasing the availability of rapid diagnostic tests to detect the etiology of the disease is essential. The use of antibiotics to combat viral infections must be strongly discouraged. This includes cases of pharyngitis, the viral case for which doctors often recommend antibiotic treatments.

Additionally, vaccines are an important preventive measure to help develop immunity against various diseases.

Despite all of the above, the most essential way to bypass this problem of resistance is the use of bacteriophages.

Finding new ways to resolve the issue of developing antibiotic resistance for animals in future is important.

Phage therapy as a "rediscovered" path:

Bacteriophages are bacterial viruses that recognize specific species and even strains of bacteria. The name also means "bacterium eater". Phage therapy was introduced a century ago but was discontinued after the introduction of antibiotics. However, research was continued in places such as Russia, Georgia and Poland. Institutions which are well-known for their long-term activity in the field of bacteriophages are Eliava Institute of Bacteriophage, Microbiology and Virology, founded in 1923 in Tbilisi, Georgia and the Ludwik Hirszfeld Institute of Immunology and Experimental Therapy, founded in 1952 in Wroclaw, Poland.

Initially, bacteriophages were used mainly in the treatment of typhoid fever, dysentery, skin and surgical wound infections, peritonitis, septicemia, urinary tract infections and external otitis, but also in pneumonia, meningitis, osteomyelitis and postsurgical infections in cancer patients. The allegations that questioned the effectiveness of the bacteriophages mainly included insufficient methodology design. Bacteriophages have regained the interest through a more detailed understanding of phage biology, genetics, immunology and pharmacology. Many studies suggest that properly developed bacteriophage cocktails give very satisfactory results, both in medicine, agriculture and aquaculture.

Phage therapy has a good chance of success:

The use of bacteriophages is promising because they act very specifically. This means that they will not act negatively on the microflora, unlike antibiotics. The undoubted advantages are in activation after they neutralize all target bacteria and spontaneous reproduction. Therefore, small and single doses are usually sufficient.

Moreover, bacteria striving to develop resistance against phages have a much more difficult task, because phages counteract and through evolution bypass the bacterial defense mechanisms. The tendency of bacteria to develop phage resistance is about ten times slower than in case of antibiotics. Also, phage-resistant bacteria do not possess such qualities in regards to other phages, which still have similar target range. Lastly, phage-resistancy should not be always associated with negative effects. It frequently effects in a decline in bacterial virulence because of the lost ability for colonization and an increase in sensitivity to other phages.

The specificity of bacteriophages mode of action may seem / (appear as) to be a disadvantage for some people and in fact it is a limitation, but mainly in the context of sterilizing, e.g., laboratory equipment and surfaces or limiting the number of microorganisms in food products. However, for the treatment of diseases, specificity is highly desirable. Animals, including humans, are colonized by numerous bacteria that enable the proper functioning of the body and killing them can lead to troublesome and long-term consequences, such as chronic diarrhea and susceptibility to various diseases. Living organisms come into daily contact with pathogenic bacteria, which are eliminated by the immune system. Microbiota also participates in this process, since it competes for a place to live, preventing other bacteria from growing in their vicinity. Moreover, the problem with narrow spectrum of action can be easily circumvented by creating cocktails containing different phages.

Another reason in favor of phage therapy is the high prevalence of viruses, thanks to which they are easily found in the environment. Moreover, there are many naturally occurring virulent bacteriophages in nature which are lethal to bacteria and additionally they constantly evolve parallel to the bacteria. Many antibiotics only inhibit multiplication of bacteria instead of killing them, which increases their ability to adapt.

Currently, large technological advances, including the development of efficient tools and techniques, make it possible to significantly increase the effectiveness of phage therapies. Thanks to novel bioinformatics tools and sequencing technology, it is very easy and quick to determine whether the tested bacteriophage is virulent or only inhibits the growth of bacteria. It is also possible to identify the best conditions for a given bacteriophage in which it is most active. As a result, various stabilizing solutions are created that maintain effectiveness and bioactivity even for months.

Disadvantageous factors which must be paid special attention / that should be highlighted are thermal and pH stability. We must bear in mind that many bacteriophages are most active at neutral pH. The creation of bacteriophage cocktails offers great opportunities to target potentially pathogenic bacteria, while preserving the microflora. Moreover, the constantly expanding knowledge and technical possibilities will contribute to the development of increasingly effective production methods on an industrial scale and to the reduction of production costs, which are already relatively cheap.

In every sense, bacteriophages are the present and the future. The revolution has begun and will be the new marvel that medicine desperately needs.

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*** More References can be provided on request.**

Improve Protein Digestibility for Health and Performance

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Undigested protein is not only costly in terms of wasted resource, it is detrimental to gut health. Including a protease in feed strategies proves successful to tackle this complex issue and deliver positive results.

Dietary protein is one of the most variable nutrients in terms of digestibility. Although the issue is commonly associated with cheaper feed ingredients, even premium soybean meals, which are considered a high-quality protein option, can be affected due to differences in harvest conditions, processing parameters and country of origin. In fact, up to 20% of protein is known to escape digestion and pass through the bird as waste. This not only impacts formulation costs, it also has serious implications for the health and development of the bird and can lead to further increases in production costs.

This is primarily because when high fractions of undigested protein reach the hind gut, it acts as a substrate (food); causing non-beneficial micro organisms to flourish and reducing gut health as a result. In other words, it creates an unfavorable nutribiotic state in the bird; where the Interaction between the three pillars of nutrition, the microbiome, the gut and immune function in the gastrointestinal tract is out of balance. Feed conversion and nutrient absorption are reduced, while susceptibility to disease is increased; meaning both the performance and welfare of the animal are compromised.

Negative effect on microbiome:

Studies have shown that higher levels of undigested crude protein negatively affect microbial communities in the distal part of the gastrointestinal tract. Of particular concern is the fact that an increase in dietary protein will result in a corresponding rise in levels of C. perfringens colonies – causative agents for necrotic enteritis in the distal part of the intestinal tract. The goal for producers, therefore, is to implement an effective feed strategy that boosts protein digestibility – irrespective of the variability of the source – and prevents a sub optimal outcome. So rather than allowing conditions in the gut to develop that are detrimental to the animal's health, this nutritional intervention will actively help to create a favorable nutribiotic state and deliver the related performance benefits. This is the premise behind Danisco's broad spectrum protease. It contains a single-activity enzyme that overvcome the limitations of the animal's endogenous proteases to improve digestion and enhance gut health. Crucially, it is supported by research showing its efficacy and positive role in the context of nutribiosis. So how does it work?

Highlight Points

The goal for producers is to implement an effective feed strategy that boosts protein digestibility – irrespective of the variability of the source – and prevents a sub optimal outcome. So rather than allowing conditions in the gut to develop that are detrimental to the animal's health, this nutritional intervention will actively help to create a favorable nutribiotic state and deliver the related performance benefits. This is the premise behind Danisco's broad spectrum protease. With the ability to cleave a peptide chain at almost any position, Axtra Pro ensures valuable amino acids are made available for muscle deposition and growth. Trials have shown it can improve the amino acid digestibility of feed ingredients by 12% in birds aged up to 21 days fed a corn / soybean meal diet, and by an average of 2.8% in broilers aged 25 - 34 days fed a corn / meat and bone meal diet.

Figure1-Axtra Pro reduces the level of non-beneficial microorganisms.

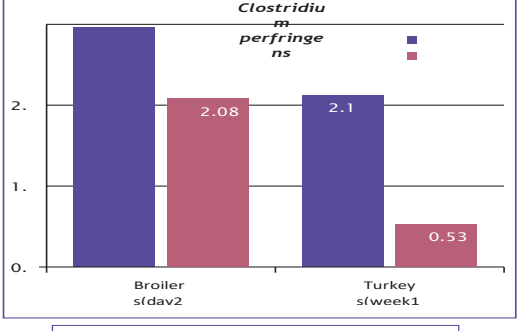
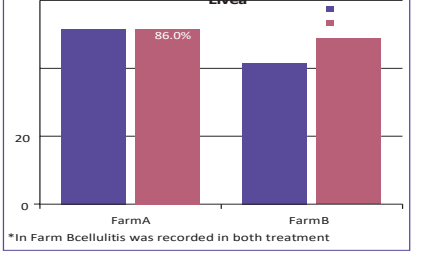


Figure 2 - Axtra Pro is able to maintain the production standards even under challenged conditions in turkeys.



*In Farm Bcellulitis was recorded in both treatment

Protease in action:

With the ability to cleave a peptide chain at almost any position, Axtra Pro ensures valuable amino acids are made available for muscle deposition and growth. Trials have shown it can improve the amino acid digestibility of feed ingredients by 12% in birds aged up to 21 days fed a corn / soybean meal diet, and by an average of 2.8% in broilers aged 25 - 34 days fed a corn / meat and bone meal diet. Significant digestibility improvements are recorded for all or most amino acids, even in the upper age range. This action reduces the level of undigested protein reaching the hind gut, which in turn means that less substrate is available for potentially non-beneficial bacteria. In this way, this protease indirectly inhibits the growth of non-beneficial micro organisms, as demonstrated by its application in a number of different commercial settings. In terms of C.perfringens, the addition of this consistent product to feed formulations results in a reduction in colony growth of 87% in broilers and 97% in turkeys. (Figure1). While Avian Pathogenic E.Coli (APEC) populations have also been shown to be inhibited following supplementation with Danisco's protease– recording a corresponding reduction of 93% and 96%, respectively.

Protease for a healthier gut:

With healthier conditions in the gut, lessen energy needs to be spent on fighting health challenges and it can instead be re-directed to support the performance of the bird. A positive outcome which delivers measurable performance benefits. One clear advantage is that production standards are maintained, even under challenged conditions. This was demonstrated by a study carried out across two turkey farms, in which the broad spectrum protease was used in the feed formulation for 12 weeks. During this period, one operation (Farm B) recorded an outbreak of cellulites; a highly infectious, potentially fatal condition, that is most commonly caused by clostridial bacteria. In this challenged environment, those birds receiving feed supplemented with the product recorded a 12% improvement in live ability parameters. (Figure 2). So, although the use of protease cannot be said to directly affect live ability under normal circumstances as demonstrated by the other (unchallenged) treatment group in the study –it is proven to be a valuable asset during unpredictable times of challenge. In addition, thanks to its ability to improve energetic efficiency, Axtra Pro supplementation has an equally positive impact on wider performance parameters; boosting both FCR and body weight gain.

Wider benefits:

Beyond the immediate concerns relating to gut health and performance, it is also worth noting that improving protein digestibility through protease supplementation helps to address the economic and environmental issues relating to the use of dietary protein in feed formulations. As protein is one of the most expensive nutrients in poultry diets, reducing the amount of crude protein in the formulation will automatically benefit the bottom line. Which means that by decreasing un-digested protein fractions, producers are able to achieve amino acid requirements with lower levels of crude protein, without compromising performance parameters? It also allows much greater flexibility in formulations by providing an effective tool to deal with variability in raw materials. This allows the use of alternative, lower cost protein sources and reduces reliance on high cost soybean meals. Benefits which not only support commercial efficiency, but also help to ease increasing demand on natural resources.

EGIYOK

Date : 03-Sep-2021

TIME : 12:35 PM

ALL INDIA EGG RATE

State/Stations	Today Rate		Yesterday Rate	State/Stations	Today Rate		Yesterday Rate
ANDHRA PRADESH	Rate / 100 Egg		Rate / 100 Egg	*MADHYA PRADESH*	Rate / 100 Egg		Rate / 100 Egg
E.GODAVARI*	416	0	416	Bhopal*	420	0	420
Chittoor*	423	0	423	Gwalior**	450	0	450
Vijayawada*	416	0	416	Indore**	420	0	420
Vizag*	416	0	416	Jabalpur*	421	19	402
W.Godavari* (Tanuku)	416	0	416	Ratlam**	452	2	450
BIHAR	Rate / 100 Egg		Rate / 100 Egg	*CHHATTISGARH*	Rate / 100 Egg		Rate / 100 Egg
Muzaffarpur*	477	0	477	Chhattisgarh (C S P F A)	417	6	411
Patna*	471	0	471	Raipur**	417	6	411
DELHI	Rate / 100 Egg		Rate / 100 Egg	*PUNJAB*	Rate / 100 Egg		Rate / 100 Egg
Delhi*	452	5	447	Punjab (Zone Rate)	431	0	431
Delhi (Delhi Egg Trader Ass) 2 Sept Subsidy - 01	451	0	451	Ludhiana*	-	-	427
HARYANA	Rate / 100 Egg		Rate / 100 Egg	*KARNATAKA*	Rate / 100 Egg		Rate / 100 Egg
Barwala (BFTA)	430	2	428	Bangalore*	420	0	420
Faridabad	451	0	451	Hospet*	380	0	380
Gurgaon	451	0	451	Mysore*	421	0	421
JHARKHAND	Rate / 100 Egg		Rate / 100 Egg	*ODISHA*	Rate / 100 Egg		Rate / 100 Egg
Ranchi*	481	4	477	Brahmapur*	433	0	433
TAMIL NADU	Rate / 100 Egg		Rate / 100 Egg	*WEST BENGAL*	Rate / 100 Egg		Rate / 100 Egg
Chennai*	430	0	430	Kolkata (V16 - R4)	466	0	466
Namakkal*	420	0	420	Silliguri**	-	-	481
RAJASTHAN	Rate / 100 Egg		Rate / 100 Egg	*TELANGANA*	Rate / 100 Egg		Rate / 100 Egg
Rajasthan (RPFF)	437	2	435	Hyderabad*	400	5	395
Ajmer (SRG)	431	1	430	Warangal*	402	5	397
Ajmer*	427	2	425	Siddipet	400	5	395
MAHARASTRA	Rate / 100 Egg		Rate / 100 Egg	*UTTAR PRADESH*	Rate / 100 Egg		Rate / 100 Egg
Akola**	400	10	390	Agra**	450	0	450
Miraj**	390	15	375	Allahabad*	448	15	433
Mumbai*	445	5	440	Faizabad**	-	-	455
Nagpur**	385	5	380	Gorakhpur**	-	-	470
Navapur*	420	30	390	Jhansi (BOX)	950	0	950
Pune*	428	6	422	Kanpur**	467	0	467
GUJARAT	Rate / 100 Egg		Rate / 100 Egg	Lucknow**	471	5	466
Ahmedabad*	435	5	430	Prayagraj**	447	14	433
Anand**	405	10	395	Purvanchal**	470	0	470
Surat*	445	5	440	Varanasi*	466	9	457
Mahuva**	405	15	390	SEND WHATSAPP MESSAGE FOR EGG RATE ON THIS NUMBER 7717307704			

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