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HIND POULTRY

Vol. XX October 2021 No. 4

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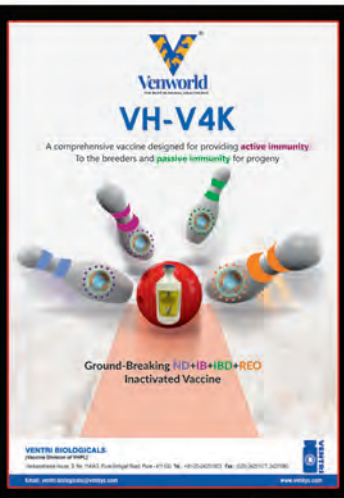
SPACE 2021 at RENNES in France



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CLFMA symposium calls for countering false propaganda and bats for GM crops for Animal Feed Industry

The animal feed industry has appealed to the Union government to allow genetically modified (GM) crops, particularly soyabean, to tide over the recurring problem of feed shortage. At a round-table held at the just concluded National Symposium organised by the Compound Livestock Feed Manufacturers of India (CLFMA of India) on September 25, participants said the introduction of GM crops was important to improve yields and availability of the vital feed required by the industry.

B Soundararajan, Chairman of Suguna Holdings, said that the country should use GM seeds to achieve self sufficiency in the feed sector. "On the maize front too, we might end up in a situation of shortage," he said. Bahadur Ali, Managing Director of IB Group, said the industry needs to talk to the government and convince it to bring in GM crops.

"We need a unified voice to put forth our appeals before the government," he said. BS Yadav, Managing Director of Godrej Agrovet, felt that other countries had succeeded in improving productivity of soyabean by embracing GM varieties. Calling for an image makeover for the poultry industry, he said there was a need to bring together the fragmented intellect of the industry and present the facts before the government for support. Tarun Sridhar, former Secretary of the Department of Animal Husbandry and Dairying, Government of India, said ignorance, misplaced facts and ideological stance of a few people had led to this situation (anti-GM sentiment).

He said the people have been consuming at least a dozen products such as snacks, which have some GM ingredient in one form or the other. He felt that negative campaigns whenever a disease outbreak happened in the country, which targetted the poultry industry result in losses. P Krishnaiah, former Chief Executive of National Fisheries Development Board, said that the fisheries sector didn't get the attention it deserved.

"There is an urgent need for deployment of technology and research to develop the sector as it has immense potential to provide livelihoods in rural areas," he said. Rahul Kumar, Chief Executive Officer of Lactalis India Limited, said the cost of production in the dairy industry was higher than that in the United States and Europe. There is a need to use technologies like cloud data, blockchain and satellite imagery (to map fodder areas) to help the country become an efficient producer of milk, he said.

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Ferry Monné joins Aviagen India as Head of Sales & Marketing

In an ongoing effort to strengthen service to customers and drive the growth of the increasingly popular Ross 308 AP broiler breeder, Aviagen India has appointed Ferry Monné as Head of Sales and Marketing, effective Sept. 1. Ferry will report to Marc Scott, Aviagen India Business Manager. A sales professional, Ferry joins Aviagen with a proven track record and a wealth of senior sales and sales operations experience in the poultry, automotive and IT industries. Prior to joining Aviagen India, he partnered with a poultry equipment distributor in southeast Asia. Before that, he served as Business Development Manager, Asia and Oceania, for HATO Agricultural Lighting, where he successfully built up new markets, improved dealer performance and raised awareness of poultry-specific lighting equipment and technology. Originally from the Netherlands, he has spent the past 17 years working in India and Southeast Asia. Welcoming him to the Aviagen India family, Marc said, "We are delighted to have Ferry on board, leading our drive to enhance the success of our valued customers and grow our business. He joins at a very exciting time for the India poultry industry – a time of rapid advancement, and Ferry and his sales team will be at the forefront. promoting the best breed and best practices to benefit all our customers." "I am passionate about teamwork, serving customers and striving daily to implement continuous improvement for their benefit. I look forward to joining Aviagen India and working with my team to promote the health, welfare and performance of our customers' birds and further improving the bottom line of their businesses," added Ferry.

M. K. Vyas meets Ferry Moone Aviagen's Head for Sales and Marketing

M. K. Vyas Managing Partner Hind Publications accompanied by Mr. Shashank met Mr. Ferry Moone, Head for Sales and Marketing : Aviagen India and Mr. K. Mani at hotel Hyatt place, Hyderabad. Very useful discussions took place on present scenario of Poultry industry in India including the impact of rising Soya prices and relief to Poultry producers through the import of GM Soya. Also discussed about the advantage of breeding and rearing of Poultry in EC Houses and huge potential for growth in both Layer and Broiler sector.

Integrated Mycotoxin Management

Avinash Bhat[1], Dr. Swamy Haladi[2] & Dr. Sabiha Kadari[1]

[1] - Trouw Nutrition India; [2] – Trouw Nutrition Global

Mycotoxins are diverse bio-chemical entities produced by mycotoxigenic fungi. The mycotoxin contamination of various agricultural crops and crop products are major concern, since it has significant implications on feed and food safety, food security and international trade. Mycotoxins alone are responsible for 5-10 % losses of total world crop production. Recent mycotoxin surveys pointed out that more than 80 percent of samples tested were positive for at least one mycotoxin and 45% of samples were contaminated with more than one mycotoxin. The production of each type of toxin is influenced by unique climatic, biological and chemical condition of both fungus and plant host or organic substrate on which the fungus is growing.

Rapid mycotoxin monitoring tool: Mycomaster

The concept of mycotoxin management is not new. A serious thinking and work have been going on in this aspect for the last 3 decades. It all started with major six mycotoxins namely aflatoxin, ochratoxin, deoxynivelenol (DON), T2 toxin, zearalenone and fumonisins and the strategies to manage the associated risks. With more and more research on mycotoxins poured in, now more than 600 mycotoxins have been identified. The effect of many of these mycotoxins is yet to be established. The interactive effect of the mycotoxins has further complicated the biological actions on the human and animal health system. So, mycotoxin management requires a holistic multifactor management approach from field to fork.

A modern approach utilizes a centralized digital platform which integrates each and every step of feed and food production, feed and food safety and security including international trade.

Agricultural Farm management

Farm management is the first important step in the mycotoxin management. The mycotoxin contamination usually starts from the field with fungal contamination of the agricultural plants. The mycotoxigenic and pathogenic fungi invade the plants from the soil. A suitable agroclimatic condition will trigger the production of mycotoxins in the plants and subsequent distribution of the mycotoxins in various parts of the plants including the grains. Non-pathogenic fungi will also invade the plants via wounds and damages caused by invading plant pests.

The farm management involves proper soil treatment, crop rotation practices, usage of fungal and pest resistant crop varieties, and usage of proper fungicides and pesticides. The management also includes usage of various modern biological control measures for fungal and pest management. The digital platform of farm management module should be able to guide the farmer in this regard with integrated weather forecasting system with modelling approach to predict mycotoxin contamination in raw material production.

Post-harvest and Storage Management

Direct monitoring of the mycotoxin contamination after harvest, separation of contaminated grain and other products before storage by automatic spectral imaging technology are key critical requirements for post- harvest and storage management. With regards to this, implementation of effective prevention and remedial measures

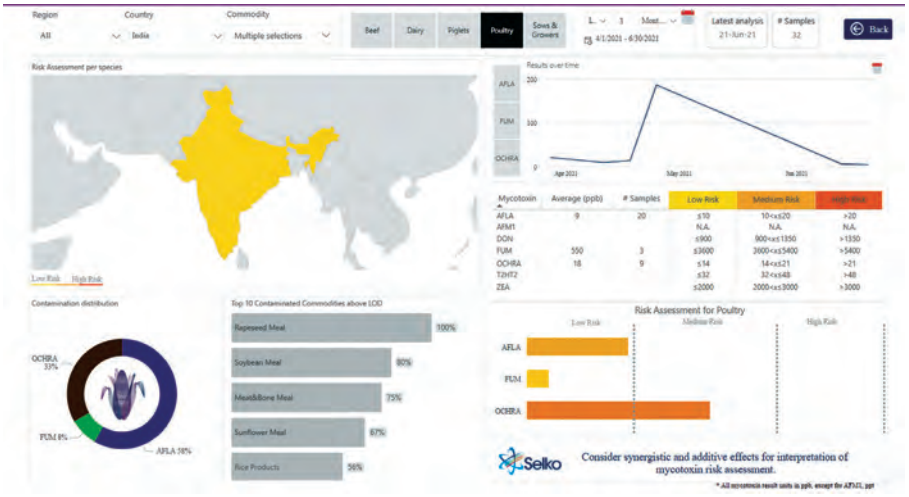


Fig. 2: Mycotoxin Monitor

in terms of real time post-harvest management system for storage of raw materials is essential. The storage support system should include preservation with mould control agents either in liquid (preferable) or powder form, before storing and automatic real-time monitoring of temperature, relative humidity and carbon dioxide levels in silos as risk level monitoring markers.

Innovative pre-milling and milling strategies are equally important whilst targeting management of mycotoxins. De-branning and micro-ionization are the two major strategies in minimizing the mycotoxin contamination. Separation of bran and other byproducts effectively minimize the mycotoxin contamination in the milled

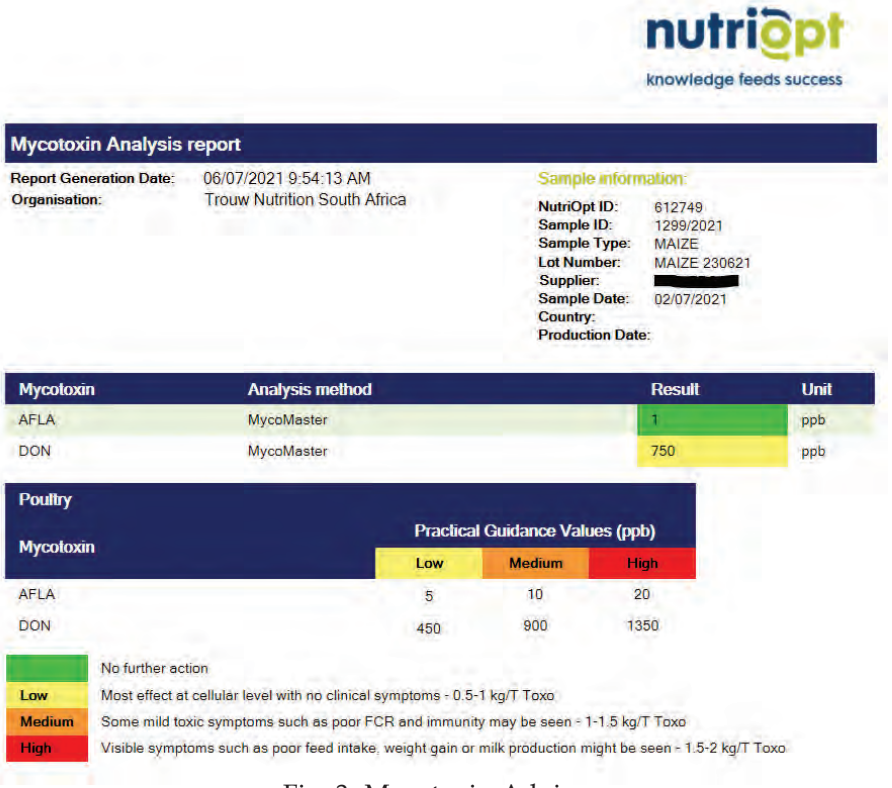


Fig. 3: Mycotoxin Adviser

products for human consumption. The milling byproducts are often used in animal feed creating a greater risk of feed contamination with mycotoxins. A clear mycotoxin monitoring strategy is necessary with stringent quality control measures whenever by-products are intended to be included in feed production.

The decontamination of rejected materials can also be effectively carryout using the rejected materials in microbial fermented assisted biofuel generation.

An integrated Mycotoxin Data management and Forecasting

An effective monitoring system with optimal analysis and management of data is critical to map the mycotoxin levels present in different raw materials and finished products. This needs to be carried out from different geo climatic regions for geotagging the sources of these raw materials and finished products. This robust system will enable to develop strong mycotoxin risk assessment and forecasting models. The database should also include update on emerging new mycotoxins, mycotoxin metabolite and denatured product profiling.

A strategy needs to be evolved for careful and effective inclusion of contaminated raw materials in a limited way such that the usage will not detrimentally affect the laws of the region and health of the livestock.

Trouw Nutrition Solutions

Trouw Nutrition in its endeavor of feeding the future has efficient mycotoxin risk management strategies in place that can be implemented at feed mill/ farm level, under technical guidance. Currently the monitoring aspect of mycotoxin management is carried out through collection of mycotoxin prevalence data through the global network of rapid mycotoxin monitoring tool, Mycomaster.

The database is being used as a surveillance tool that gives a real-time information on the current mycotoxin scenario and specie risk assessment through our digital platforms like Mycotoxin Monitor and Mycotoxin Adviser. Mycotoxin Monitor gives an indication of the current mycotoxin situation around the globe with monitoring capability on regional basis Fig. 2.

Mycotoxin Adviser, on the other hand, gives customized advice to the livestock producer on the risk status in species level with possible remedial measures in the form of mycotoxin binders with suitable inclusion levels as per the risk, as depicted in Fig. 3.

Trouw nutrition boasts of a range of mycotoxin binders - Toxo range, that have been validated and proven to be effective in controlling and mitigating the effect of mycotoxin risks in animals.

For detailed information on the Trouw Nutrition's Mycotoxin Risk Management (MRM), kindly get in touch with your local Trouw Representative or contact us at customercareindia@trouwnutrition.com

NOVUS

Potential of Essential Oil Blend in Poultry Production

Dr. Koushik De,
Technical Services Director- SCA Novus International

The efficient conversion of feed into its basic components for optimal nutrient absorption is vital for both broiler and broiler breeder production and welfare. Gut health, an intricate and complex area combining nutrition, microbiology, immunology, and physiology, has a key role to play. When gut health is compromised, digestion and nutrient absorption are affected which, in turn, can have a detrimental effect on feed conversion leading to economic loss and a greater susceptibility to disease.

The industry has made huge efforts in recent years to develop solutions focusing on gut health. This is not only due to a direct link to improved feed efficiency and profitability, animal welfare or food safety, but also due to changes in consumer preferences and regulatory requirements.

When it comes to poultry gut health, coccidiosis and necrotic enteritis are major economic challenges, particularly when present in a subclinical form where symptoms may not be observable. Due to epithelial damage and inflammation, these subclinical infections reduce feed efficiency and result in an opportunity for potential pathogens.

Poultry trials challenged with Eimeria and Clostridium perfringens showed that NEXT ENHANCE® 150 feed additive – an encapsulated, highly concentrated blend of thymol with carvacrol – promotes healthy intestinal microbial flora, as well as supports gut barrier function, inflammation processes and immunity. NEXT ENHANCE® 150 has a positive effect in the reduction of coccidialfaecal oocyst shedding and minimize damage to intestinal epithelium in infected birds . Use of NEXT ENHANCE® 150 for reduction in coccidial oocysts in excreta could lead to the development of new strategy for the prevention of avian coccidiosis.

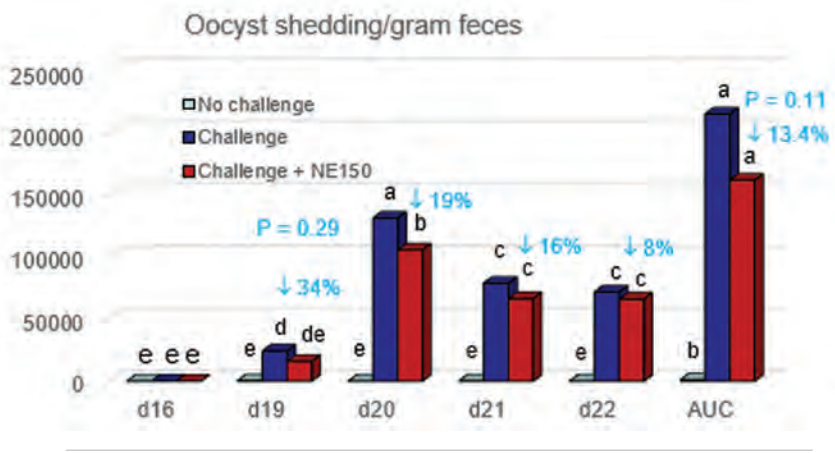
Coated essential oil blend -protected for better performance:

Where essential oils are concerned,thymol and carvacrol are scientifically well-documented compounds. Due to their phenolic structure (having a cyclic ring with a hydroxyl group attached) they are recognized as efficient compounds showing a variety of beneficial effects in the gut. NEXT ENHANCE® 150 (NE150) is a highly concentrated blend containing thymol and carvacrolprotected by a unique coating. This ensures that the active ingredients are stable during pelletingand can ultimately result in a controlled release to the lower parts of the intestinal tract.

Multi-faceted approach:

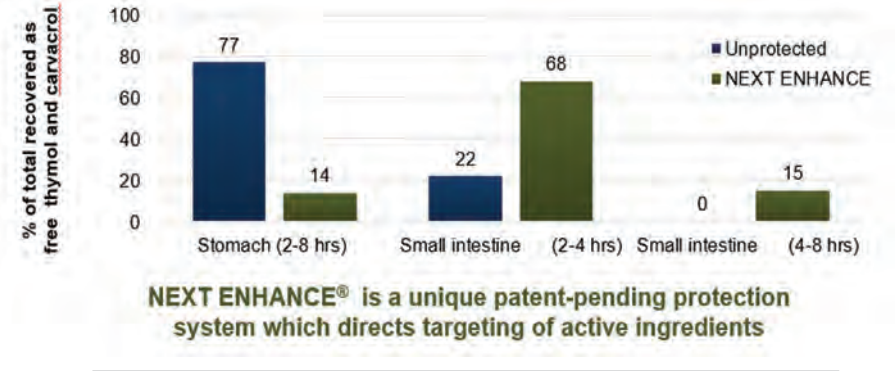
Thymol and carvacrol are highly effective against a wide range of potential pathogens.In a variety of studies, NE150 has demonstrated its potential to establish a healthy microbial composition by promoting higher lactic acid-producing bacteria and reduce pathogenic species. An example of the antimicrobial effects in broilers is shown in Figure 1.

In the study, an Eimeria challenge model was used, which typically increases the levels of C. perfringens. It is well known that C. perfringens is the causative agent for necrotic enteritis but requires



other predisposing factors to become clinical or subclinical. The invasion of intestinal cells by the Eimeria parasite is seen as the major predisposing factor because it creates tissue damage and leakage of plasma proteins used by C. perfringens. Broilers, receiving NE150 showed lower levels of C. perfringens as well as lower levels of Enterobacteriaceae, a large family of pathogens includingE.Coli or Salmonella. As a result, NE150is shown to lower the risk of a bacterial overgrowth, which is key in the development of necrotic enteritis.

Biomarkers can be used to study the effect of protected thymol and carvacrol on intestinal integrity and gut barrier function. The stability of the tight junctions(a unique connection between cells),for example is linked to the amount of occludin, which increases the physical barrier function of the intestine. Under challenge conditions and during inflammation processes, occludin is known to be downregulated. A broiler study with C. perfringens challenge showed lower levels of occludin, which increasedwith the addition of NE150. This lowers the risk of pathogen translocation,or the uncontrolled transfer of different molecules from the lumen into the bloodstream. It has also been shown that broilers receiving NE150 under Eimeria or C. perfringens challengesshowed significantly lower serum endotoxin levels, indicating improved mucosal barrier integrity.Adding NE150 to the ration has also shown increased villus height to crypt depth ratio, another well recognized marker for intestinal health. Macroscopic intestinal lesions are another relevant indicator of gut health. In Eimeria and C. perfringens challenge studies, these lesions were significantly reduced with NE150.Fewer intestinal lesions can result in a lower inflammation processes and candirectly translate to performance improvements.



During a host-pathogenic infection, pro-inflammatory cytokines are released to activate the immune system. However, the inflammation needs to be controlled as a prolonged and persistent activation of pro-inflammatory cytokines can result in mucosal damage as well as impactthe stability of tight junctions. The inflammation also consumes a lot of energy, which impacts performance. NE150is shown to downregulatepro-inflammatory cytokines,which helps to protect intestinal barrier function and save energy. Conclusively, thymol and carvacrol lower the risk of performance depression and intestinal damage caused by inflammation.

Thymol and carvacrol are also known to have anti-oxidative capacities due to their chemical structure.To understand how NE150 could benefit broilers' oxidative status, a study was done measuring various biomarkers, such as super oxide dismutase (SOD) and glutathione peroxidase (GSH-Px). These enzymes are responsible for the conversion of reactive oxygen species (ROS) to harmless substances. ROS are a result of

Figure 1: Reduction in caecal *C. perfringens & Enterobacteriaceae*8 days post-challenge with *Eimeria*

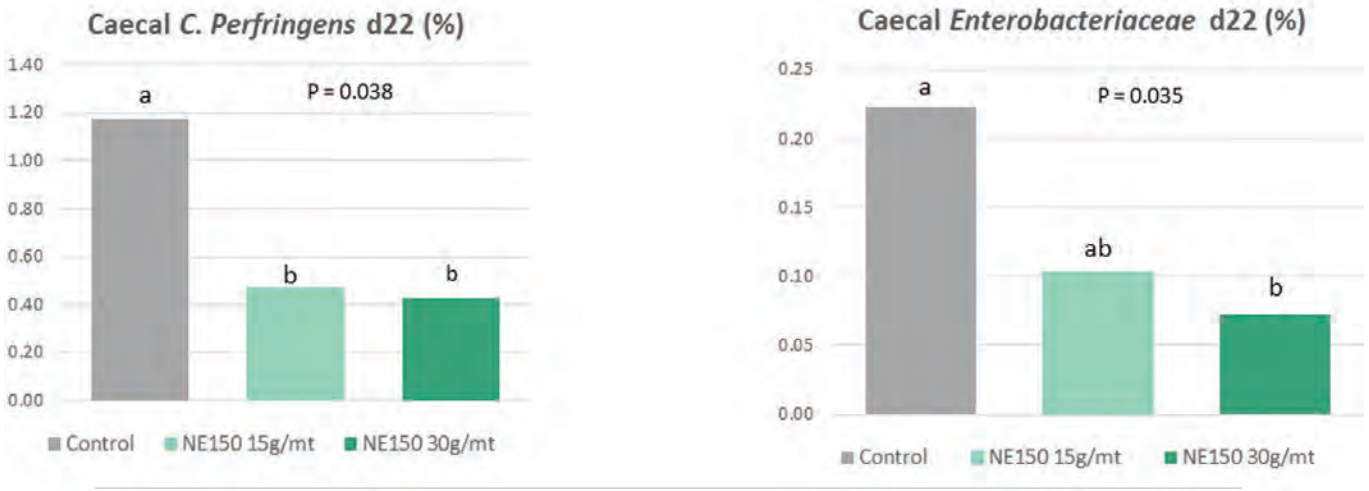
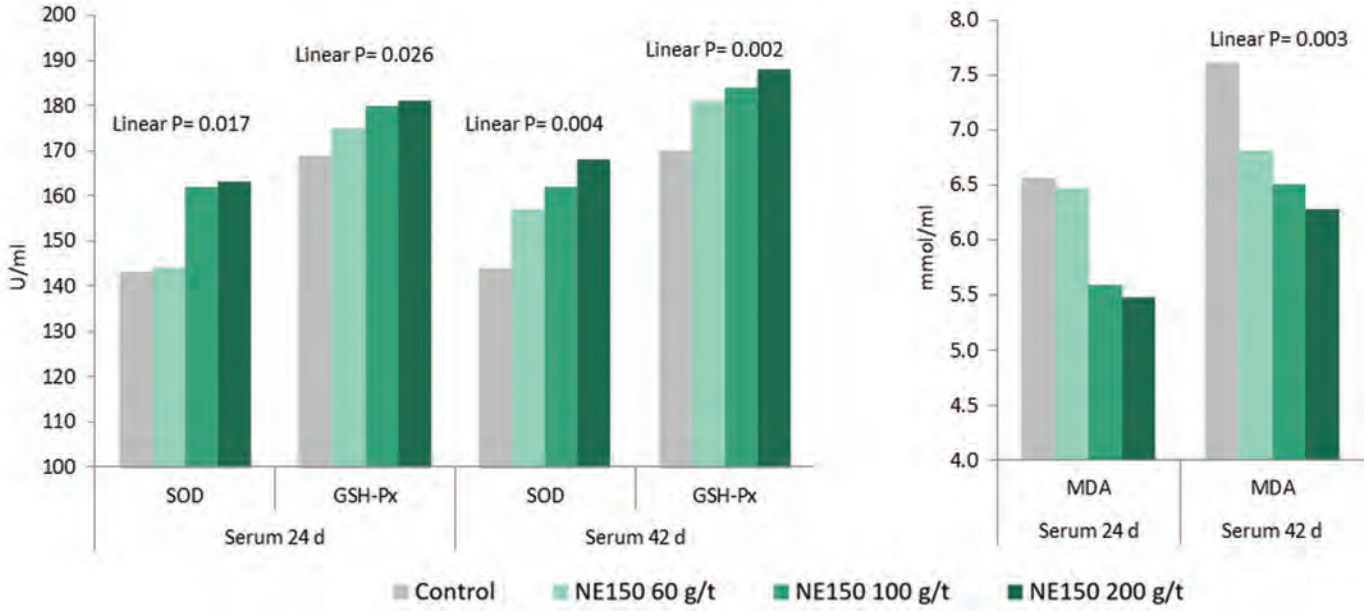


Figure 2: Improved antioxidant status



normal metabolism but are toxic to the organism and increase significantly during an infection or stress. It was shown that both enzymes increased (Figure 2) when NE150was added to the diet. As a result, the malondialdehyde levels, a marker for lipid peroxidation, were significantly reduced in broilers. NE150 can therefore, directly and indirectly, help to maintain a balance between ROS and the defense system, which lowers the risk of tissue and cell damage as well as performance losses.

Consistent performance improvement

With its broad impact on gut health it is not surprising that broilers receiving NE150 show a consistent improvement in feed conversion ratio with an average of 3.7% when used at the recommended dosage rate. In addition, NE150 can be used in feeding programs to support the birds under coccidiosis, necrotic enteritis or gut health challenges to help alleviate negative effects on the animals. This array of trials shows that producers can use NE150 in their strategy to improve feed conversion ratio, thereby reducing production cost efficiently and increasing the profitabilityof commercial broiler productions.

References available upon request

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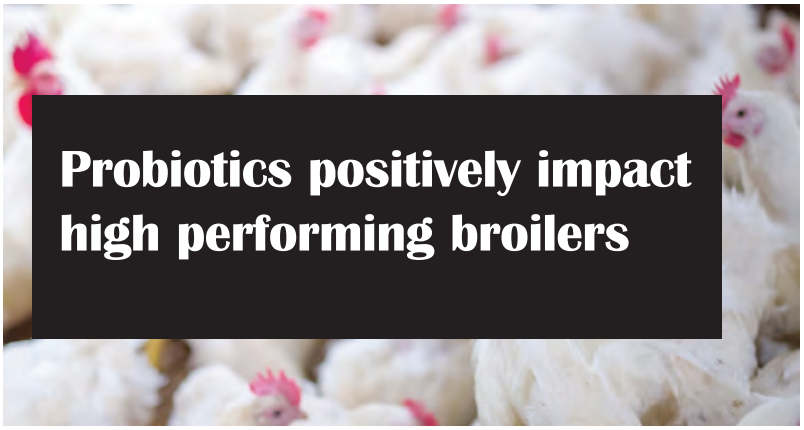
Improving food & health



Probiotics positively impact high performing broilers

Introduction

Poultry professionals are always seeking evidence-based ways to improve performance and reduce production costs of broiler flocks. Recently, a team of researchers from Freie Universität Berlin under the supervision of Dr. Jurgen Zentek conducted a trial to evaluate the impacts of *Bacillus subtilis* (BAS) inclusion in broiler diets with high standard nutrient content and nutrient deficiency (ND) on growth performance (GP) and nutrient digestibility (Farshad G. Boroojeni et al., 2018, Poultry Science2). Insufficient intake of nutrients is one of the most common stressors in poultry production and can lead to disturbance in the gut microecology, gut immunity, and barrier integrity, followed by dysbiosis and poor performance. The objective of this trial was to test whether feed supplementation with GalliPro® (*B. subtilis* DSM17299) to broilers under nutritional stress induced by lowering the energy and protein content of the diets, might be able to relieve the shortage of nutrients by improving their digestion and availability. This study was conducted under high level of production, feed quality and hygiene.

Material and Methods 6 treatments were used in this experiment from day 1 to day 42. Diets were wheat-corn-soybean-based, with other ingredients added (wheat bran and soybean oil). 120 chicks with 15 birds per pen were included in each treatment with 8 replicates per treatment. This allowed a confidence interval of 95% with a power of 80% for a difference of 100g with an estimated standard deviation of 70g.

Table 1. Estimated proximate composition of starter and grower diets per treatment

Starter (1-21days)	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**
Nutrient concentration	100%	100%	98.4%	98.4%	96.8%	96.8%
GalliPro® included	No	Yes	No	Yes	No	Yes
ME MJ/kg	12.03	12.03	11.82	11.82	11.61	11.61
CP (%)	20.86	20.86	20.56	20.56	20.27	20.27
Lys (%)	1.31	1.31	1.28	1.28	1.26	1.26
Grower (21-42 days)						
ME MJ/kg	12.53	12.53	12.32	12.32	12.11	12.11
CP (%)	18.43	18.43	18.14	18.14	17.85	17.85
Lys (%)	1.11	1.11	1.09	1.09	1.07	1.07

The Standard diet was formulated to meet or exceed the recommendations of the Society of Nutritional Physiology (GfE, 1999) while the other treatments were formulated to lower the energy and Crude Protein content and balance the amino acids (Table 1). Each diet was formulated with or without Gallipro at the dose of 1.6 109 CFU in the starter, and 0.8 109 CFU per kg of diet for grower and finisher. Two energy- and protein-/ AA- reduced diets were formulated to have 0.20 and 0.40 MJ/kg less ME, 3 and 6 g/kg less crude protein (CP) compared with the standard diet. 2 exogenous enzymes (xylanase and phytase) and the anticoccidial

drug narasin 60 ppm were added to all 6 treatments. Treatment 1 and 2 are with 100% of the formulation. Treatment 3 and 4 were formulated with a decrease of 0.2 MJ and 0.3 points of crude protein (98,4% of control feed of T1 and T2). Treatment 5 and 6 were formulated with a new decrease of 0.4 MJ and 0,6 points of crude protein (96,4% of the control feed of T1 and T2).

Results

The results are summarized in the graphs both for FCR and Body weight gain which were the 2 key indicators. Mortality was extremely low and thus not valuable input for this study. It can be seen from a FCR perspective an overall improvement of 2% (100% formulation) to 3% (98.4% and 96.8% formulations). It is noticeable that the improvement is higher during the last 3 weeks (2 to 3.5%) compared to the first 3 weeks of age (1 to 2%). Overall, FCR improvements were observed for the GalliPro® supplemented diets at all nutrient concentrations and treatment period (starter and grower). (Graph 1 &2)

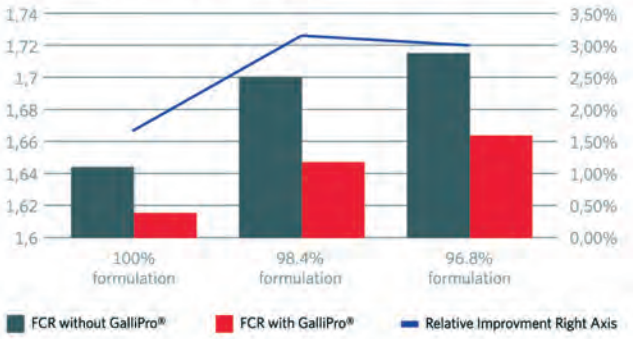
Regarding the weight, it is noticeable also that the improvement occurred in all diets regardless of their nutrient concentration. The effect was even higher when the concentration decreased to reach a 2.25% improvement in weight gain at 42 days. (Graph 3)

Discussion

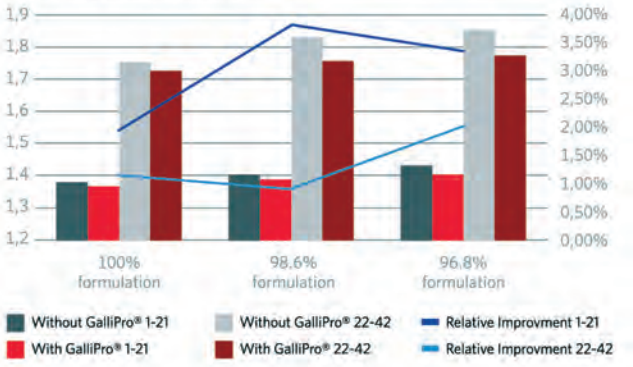
In the conditions of this trial, feed supplementation with GalliPro® resulted in performance improvements at 3 different nutrient concentrations. The interest here is to find that the impact is very consistent during the life of the chicken and this even with very high level of performance in the control group (1.616 of FCR and 3 028 g at 42 days while the genetic potential is 1.67 FCR and 3 023 g). These findings contradict the belief that probiotics may be not as efficient in highly performing birds. Indeed, the effect is important even in these conditions. These findings agree with what was observed in the past by Blanch et Al.1 with a 2.3% improvement average in broilers. Here the improvement was 2 to 3% in FCR. If we look to the model in place, it is interesting to find out what is the main economic value of these different strategies.

The reduction in energy and protein content of the diets in the present study was effective enough to negatively affect growth performance and can be

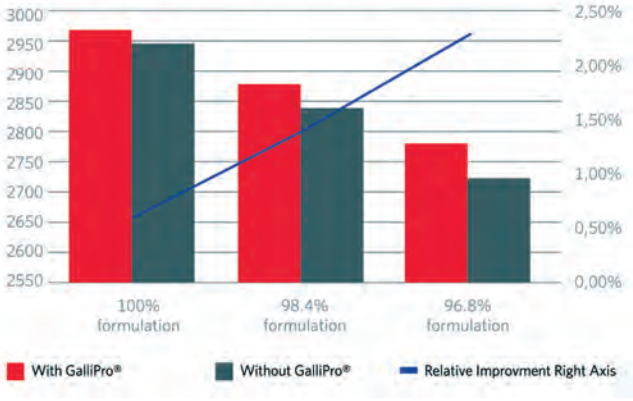
Graph 1. FCR by treatment Groups 1-42 days



Graph 2. FCR by treatment by period



Graph 3. Weight Gain by treatment Group 0-42 days



considered as nutritional stress. Adding GalliProR to the experimental (standard and deficient) diets led to better BWG and FCR in broilers (P. 0.05), It seems to be due to its positive impact on Apparent Ileal Digestibility of crude protein, starch, and GE (P. 0.05). Thus, it can be speculated that broilers received nutrient-deficient diets, as an adaptive response decreased FI and increased feed retention time, which as a result led to better digestibility of Crude Protein and Gross Energy. For producer producing 1 000 000 birds/year, the cost savings are between 28 000 . - 50 000 ./year. At the same time, if the metric is the cost of feed, we can calculate that the feed cost saving is between 5.46 to 9.82 ./ton of feed while producing the same quantity of chickens.

Table 2. Feed Savings by using GalliPro in the different nutritional strategies

	T2 vs T1 (100% of Feed concentration)	T4 vs T3 (98,4% of Feed concentration)	T6 vs T5 (96,8% of Feed concentration)	
Feed Saving per 3kg bird	0,028	0,050	0,048	€/3 kg chicken
Feed Saving per ton of feed	5,46	9,82	9,48	€/ton of Feed
Feed Saving per ton of broiler	32,19	65,24	66,20	€/ton Live Weight

Table 3. Feed Savings by using GalliPro in the different nutritional strategies

	T1	T2	T3	T4	T5	T6
Margin over Feed (MoF)/ 3kg broiler (€)	1,43	1,46	1,32	1,39	1,31	1,38

Based on this research, the poultry industry could decrease live bird costs from 32 to 66 . per ton. We therefore can confirm the economic value of GalliPro based on this research to be interesting for a commercial use. It looks like the economic value is interesting in all cases, in diets formulated at 100% of recommended ME and CP values, as well as in diets with lower levels of nutrients. The higher savings in nutrient deficient diets can be due to a higher quantity of undigestible substrate in the lumen of the gut. However, from all the hypothesis, the treatment T2 was the most profitable of all. (Assumption of no influence of mortality). However, based on this experiment, it is preferable for a fully integrated 3kg broiler producer to include GalliPro on top of the feed formulation to match the best economic value. (Table 3). This should be considered depending on the local economy or market demand in broiler weight and performance objectives.

Conclusion

In conclusion, supplementation of broiler diets with GalliPro® (B. subtilis DSM 17299) probiotic feed additive can positively affect growth performance and nutrient digestibility and this positive impact may even be more pronounced in nutrient-deficient diets.

Foot note

Economical assumptions are : Live weight market price of 1 •/kg – Control Feed costs: T1 and T2: 0,32 •/kg – T3 and T4 : 0,315; T5 and T6: 0,31 – No impact of mortality MoF: Margin over Feed

Reference

[1] Blanch A. et Al, Efficacy of a bacillary probiotic supplementation (Bacillus subtilis DSM 17299) in broilers: combined analysis of fourteen different studies, 2016

[2] Goodarzi Boroojeni F. et Al., Bacillus subtilis in broiler diets with different levels of energy and protein, 2018

Suguna Feeds Launches Cattle Feed at Affordable Price

Suguna Feeds launched their cattle feed variants- MilkyBest+ and NutriBest at their feed mill in Ganapathipalayam, Udumalpet.

With an aim to address the challenges faced by farmers like unavailability of the consistent quality pellet feed, adulterated raw materials and so on, the pioneers in the poultry business, Suguna Feeds, launched the new variants.

Suguna Foods said, "As there is a clear image of the vast potential market opportunity for compound pellet feed in the cattle feed sector that has yet to be explored, we are happy to expand in all prospects and provide a unique and high-quality selection of cattle feed at economical price to meet numerous challenges faced by farmers taking in consideration their challenges."

The total cattle population in India is 19.35 Crores with 5.13 crores of Crossbred cattle. The Milch cattle population in Tamil Nadu is 77.25 lakhs, contributing 29.6% of the total milch population. This shows the fact of the enormous untapped market potential for compound pellet feed in the cattle feed business. Given the continuous growth of the cattle feed market, the main aspects for introducing Suguna Cattle Feeds are socio-economic factors and spreading awareness among the farmers.

SPACE 2021 at RENNES in France Shows Global Event and Exhibition Organizers to Resume their Activities with Confidence

The 35th edition of SPACE, inaugurating its new format, was held from 14 to 16 September, in person, at the Parc-Expo in Rennes, and continued on 17 September in a digital version. After two years without a physical edition due to the health crisis, this edition was a great success: 1,118 exhibitors, including 323 international exhibitors, welcomed 74,772 visitors, including 4,629 international ones. SPACE is pleased and proud to have given rise to these exchanges, which took place in a very positive atmosphere. All of the livestock farming family were finally able to see each other again at their show and there were many smiles. This return of SPACE also symbolises the resumption of activity in the events sector, which has been severely impacted by the health crisis. SPACE 2021 was the first and only worldwide trade show this year for all animal sectors. It is a strong sign of encouragement for all event organisers who have to resume their activities in difficult conditions due, in particular, to difficulties in recruiting staff.

We must therefore commend the collective efforts of all the teams who overcame all the obstacles and who remained confident in organising this show. More than ever, SPACE has fulfilled its mission to farmers and exhibitors. Its fundamentals, which describe it as a professional, international and friendly trade show, have been confirmed or even strengthened this year. The multitude of exchanges, the modernity of the presentations and the booths and the many innovations presented illustrated the dynamism and the ability to adapt and listen that guide the development of our livestock farming sectors.

The visit of the Minister of Agriculture, Julien Denormandie, for the inauguration of SPACE, allowed professionals and sector managers to discuss the crucial issues that are relevant. These exchanges were like those that took place between exhibitors and visitors: high-quality, in-depth, and committed to the future of our agriculture in its diversity.

SPACE has been, once again, an exceptional platform for presenting innovations with 35 Innov'SPACE winners, including 5 special mentions. These products, services and equipment have illustrated how these companies are constantly looking for new solutions to offer working tools to farmers that improve their working conditions while ensuring animal welfare.

By placing the theme of Espace for the Future under the sign of welfare shared between farmers and their animals, this 35th edition has allowed professionals to express themselves on this subject, thus bringing more rationality to the discussions. Thanks to this space for demonstrations, testimonials and round tables by sector, the question of welfare has been at the heart of exchanges and discussions. This Espace for the Future, implemented with the expertise of the chambers of agriculture, has made it possible to highlight the constant and daily concern of farmers for the welfare of their animals. It also highlighted the need to always make it known, explain it and share it with citizens, while highlighting the economic aspect of these issues for farmers. Despite the constraints linked to the health context, the difficulties of travelling and obtaining visas, international visitors were present at this 2021 edition. Several international delegations, in particular from several West African countries, made the trip. The Livestock Farming Ministers from Mali and Senegal, at the head of their delegations, were thus able to explain their needs in terms of training, equipment and genetics, to meet the food needs of their countries and to find suitable solutions for the work of their farmers. This participation, which was unexpected at the time of preparing the show a few months ago, is proof of the importance and role of SPACE as a facilitator of links, but also as a provider of solutions to answer fundamental questions concerning food sovereignty at local, regional, national and global level.

The animal presentations and competitions were very busy over these three days. The Normande breed and the Rouge des Prés had pride of place this year. The Genomic Elite sale, unique in the world, also enjoyed great success in an unprecedented format both in the SPACE ring and remotely, thanks to digital. These SPACE highlights illustrate the high level of technicality of our genetic know-how for farmers.

Throughout these three days, the friendliness of the exchanges and the happiness of being part of the large farming family have also shown that farmers and SPACE are kind-hearted. An unprecedented action symbolises it, since the proceeds of the milk collection day on Wednesday 15 will be donated to the Food Bank. This action was carried out thanks to the joint action of Solaal, Food Banks, and Agriculteursont du Cœur [Farmers have Hearts].

SPACE will now be held again at Parc-Expo in Rennes and will see you again in 2022, from 13 to 15 September, in person, and on 16 September, digitally.

Between now and this new get-together, to extend discussions and keep in touch, find the content and relive the highlights of the show on uk.space.fr, on digital.space.fr and our mobile app: app.space.fr. Also visit SPACE's "Podcast Area" on the website and on the app. You will find all the show's live broadcasts on innovation, food sovereignty, generational renewal, etc. On SPACE's digital tools, you can also find some replays taken from the programme of the hundred or so conferences that took place during this 2021 edition.

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2	HOUSE TYPE-2	45'x270'	17,654	490/-	86,50,460	2	12	6	25,42,176	3.5 yrs
3	HOUSE TYPE-3	45'x220'	14,192	535/-	75,92,720	2	12	6	20,43,648	3.7 yrs

* Prices are valid until 31st of December, 2021 and exclusive of taxes, erection, installation, transportaion charges, subject to any revision from the company.

** ABW- (Average Body Weight) as per industry average norms .

*** GC- (Growing Charges) will be revised post completion of every 8 batch based on the electricity charges and labour charges.

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"Commodities prices are rising around the world, and many producers are trying to manage by using alternative crops or cutting quality standards. But does it put animals—and, ultimately, operations—at risk? Here is what you need to know"

by Augusto Heck

Managing the Rising Price of Agricultural Commodities

In Brief

When the prices of agricultural commodities rise, some producers lower quality standards to save costs or buy alternative ingredients.

Lower quality and alternative grains can have consequences in animals. The costs of managing those consequences could negate the savings achieved by buying cheaper grain.

Understanding and mitigating risks, including likelihood of mycotoxin contamination, is key to profitability.

The price of corn and soybeans, two of the main commodities used in feed formulas, has been skyrocketing. Repercussions have been felt worldwide, with increases in production costs resulting in the narrowing of profit margins or, sometimes, producers operating at a loss.

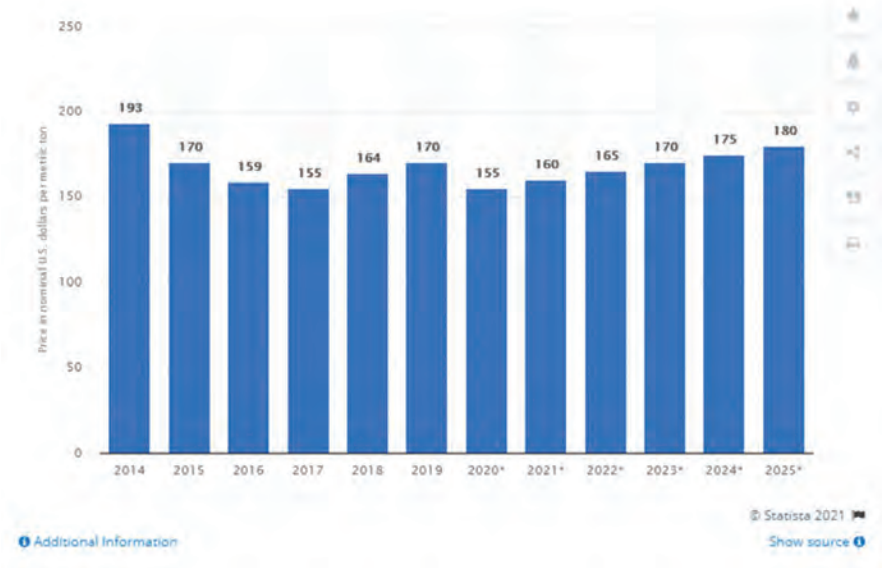
Corn, for example, is a basic ingredient in diets. The average international price is around USD 160 per ton, and projected to rise in USD 5 increments to an incredible USD 180 per ton in 2025.

To mitigate this economic impact, many production systems have adopted risky strategies, namely relaxing their quality standards for the purchase of corn, compromising on standards such as moisture levels, percentage of damaged grains, oil content and mycotoxin contamination. When purchasing soy, the protein, moisture and crude fiber content--as well as the urea activity and presence and levels of mycotoxins-have been made more "flexible".

Consequences of using lower quality commodities

The consequences resulting from this "flexibility" of quality standards include:

- the need for nutritional correction with aggregation of extra costs sometimes equal to or greater than the



Average Worldwide Price for Maize Source: Statista

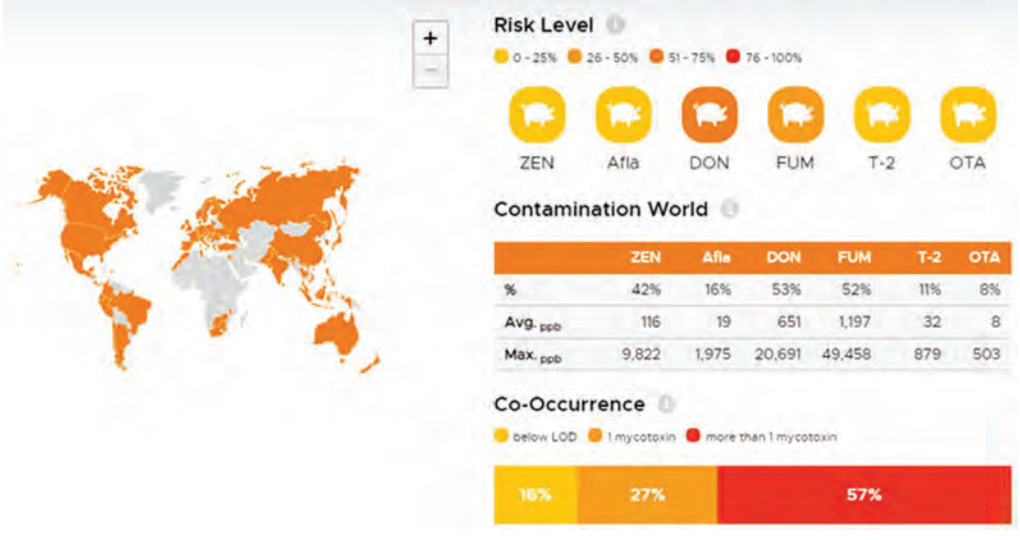
resource savings generated in the purchase of lower quality the grain;

- higher presence of anti-nutritional factors that negatively impact zootechnical indicators;
- greater prevalence and levels of mycotoxins and with a strong possibility of co-contamination, generating the need to invest in products to mitigate the impact or, if they are not adopted, face mycotoxicosis in animals. Because of the compounding effects of co-contamination with multiple mycotoxins, the impact of mycotoxicosis could be orders of magnitude greater than the initial contamination levels.

The moisture content of corn, when high and occurring along with hot temperatures, creates ideal conditions for the proliferation of fungi and, potentially, the production of mycotoxins. Damaged grains are more vulnerable to these fungi because they have lost their protective structures. The oil content, associated with the energy level that the corn must contain, may be significantly reduced in poor quality grains, generating the need for nutritional corrections. And when mycotoxins are present at certain levels, their effects range from silent and delayed damage to the health and performance of your animals to large losses resulting from severe disease called mycotoxicosis.

Soy primarily contributes to the protein fraction in diets. When we have low quality soy, the protein content tends to be lower, requiring nutritional corrections. The high moisture content, together with high temperatures, can also encourage fungal growth and the production of mycotoxins. If the urea activity is high, it means that the thermal processes of inactivation of anti-nutritional factors present in the soybeans were not well executed and could have a negative impact on performance. As with corn, soy can be a source of mycotoxins and so must be tested. When mycotoxins are present at certain levels, their effects range from silent and delayed damage to the health and performance of your animals to large losses from mycotoxicosis.

The proportion of systems that have incurred these risks is quite high, given the scarcity of supply and the steady, if not increased, demand, as well as increased opportunities for international trade arising from the sanitary crises in Asia and Europe, which had a negative impact on local production. The increase in production for export ends up aggravating the mismatch between supply and demand for commodities.



Source: BIOMIN Mycotoxin Survey, January-June 2021

In addition, reducing minimum quality standards, some producers look for alternative ingredients to partially replace corn and soybeans. The ingredients vary depending on the place and times season. While there is information available on how to properly formulate feed from a nutritional point of view, there is a lack of information about the types of levels of mycotoxins they contain because they are not routinely monitored. The great vulnerability is the poverty of information regarding the types and levels of mycotoxins present in them, but now they need to be included in mycotoxin risk management programs.

In the BIOMIN Mycotoxin Survey, the longest running and most comprehensive data set on mycotoxin occurrence, samples from nearly all continents contained mycotoxins produced by fungi of the fusarium genus in quantities indicating a 'high risk' status. This apparent higher risk of mycotoxins may be partially justified by this pressure exerted by their price, but also by a growing concern with monitoring the quality of raw materials, generating more diagnostic information for decision-making. In this contextfumonisin (FUM), deoxynivalenol (DON) and zearalenone (ZEN) are the mycotoxins most present in positivity and levels founded in most situations, comparing the same period with the previous year, we had an increase in risk levels.

Various Mycotoxins and their Effects

Fumonisins can cause pulmonary edema, nephrotoxicity and hepatotoxicity. What's more deleterious, and often the cause-and-effect relationship is not perceived, is its impact on the exacerbation of bacterial respiratory and enteric diseases, as well as immunization failures due to its immunosuppressive effect. These situations occur in the presence of low but constant levels of fumonisins. This is precisely what we are currently facing.

Trichothecenes, which is a group of mycotoxins that includes deoxynivalenol or vomitoxin, are characterized by causing digestive disorders, reduced weight gain, hemorrhages (e.g., stomach, heart, intestine, lung, bladder, kidney), edema, oral injuries, dermatitis, blood diseases, infertility, bone marrow degeneration, slow growth, immune suppression. Trichothecenes disrupt the barrier function of the intestine, allowing substances and disease agents to enter the animal's body, causing disease and loss of performance. Bacteria that causes enteric conditions have their pathogenicity increased in the presence of trichothecenes. Zearalenone is a mycotoxin that has its chemical structure very similar to estrogen, which is the female sex hormone. This is the mycotoxin that worries all production systems that have breeding stock due to the negative impact that it can cause even in short-term situations.

The BIOMIN Mycotoxin Survey found that 65% of samples have co-contamination, that is, the presence of two or more mycotoxins. This is particularly critical in the following combinations: FUM + DON and DON + ZEN. These combinations are said to be synergistic, that is, one mycotoxin amplifies the impact of the other. The presence of DON increases the absorption of FUM and ZEN, that is, the levels considered safe for all of them is lowered when there is co-occurrence.

Starting from the premise that the possibility of the occurrence of mycotoxins and the levels found in the feed ingredients are high and the poultry is the species most susceptible to damage from them, it is essential to test for mycotoxins, perform a cost-benefit analysis of mycotoxin risk management and establish or reinforce mitigating actions.

Due to the biochemical nature of these three mycotoxins that we highlight as the most relevant, biotransformation is the mechanism of choice for a product to counteract mycotoxins. Other mechanisms are less effective, and efficacy is imperative at a time of high challenge.

BIOMIN Solutions

" The Mycofix® range products the appropriate components to convert FUM, DON and ZEN into harmless metabolites in a selective and irreversible way. The enzyme FUMzyme® hydrolyzes fumonisins. The bacteria Biomin® BBSH® 797 produces an epoxidase enzyme that inactivates trichothecenes, the group of mycotoxins that includes DON, and last but not least, the recently launched enzyme ZENzyme® acts on zearalenone protecting the breeding stock.

" These components are the only ones approved for the reduction of food contamination with mycotoxins in the European economic community. Within the EU, only registered components can make statements about the deactivation of mycotoxins, and the EU seal indicates the effectiveness of these tools.

Srinivasa Farms marked the celebrations of the 25th Anniversary of World Egg Day with various activities in the public domain & multiple campaigns running across the social media platforms to create awareness about the goodness of eggs. The celebrities, health and fitness experts egg endorsement videos have garnered an incredible amount of engagement with likes and shares by the audience on social media platforms. The proteins contained within eggs are highly important in the development of the muscles the fitness enthusiasts at the gyms have endorsed the importance of adding egg to their daily diet after their heavy workouts. A 30km Cycle rally in Hyderabad city has created widespread awareness about the egg being a super-food for all ages, the rally received an overwhelming response with great participation by enthusiastic cyclists peddling for the humble egg.

TV shows & Interviews saw Mr. Suresh highlighting howeggs have been recognised as a protein powerhouse for many years as they contain the highest quality protein naturally available. Eggs are playing a significant role in the eradication of malnutrition around the world, thanks to their affordability combined with their nutrient density, helping to dramatically improve the health outcomes of children in nutritionally vulnerable

World Egg Day 25th Anniversary Celebrations

Eggs for all
A nutrient Goldmine!

areas. The egg offers a host of unique benefits in our diets and plays a valuable role in supporting the growing global population. The local Radio promotions made a buzz about eggs offering a healthy and sustainable source of essential nutrients needed for all stages of life. Containing the majority of vitamins, minerals and antioxidants required by the human body, eggs are often referred to as natures wonder food. Egg are the world's most versatile Ingredient. The World Egg day special cookery shows have highlighted how the eggs are a serious power ingredient in the kitchen. Many famous egg recipes have been shared making the egg the star of every meal. The IEC Chairman, Suresh Chitturi led an insight-ful live webinar connecting with health experts Dr. Lakshmi Lavanya and Dr. Anvesh Reddy, who shared the knowledge and experience with participants across a variety of key and relevant contemporary topics on increasing the awareness and importance of the eggs for all ages from toddler to older adults and how egg being a great saviour by helping boost immunity during the pandemic for the corona patients. The participation was highly engaging and interactive with the audience getting to know many important facts about the egg from the expert panel. Suresh's presentation highlighted the importance of increase in egg consumption, and how egg plays an important role in preventing malnutrition, stunting and other growth issues in children. He also emphasised how egg plays an important role in the diet from toddlers to the older adults. Worldwide Egg production provides jobs to millions of people and helps in generating income thereby reducing poverty. The live webinar also hosted an exciting and funfilled Egg Quiz. The participation was over-whelming from the egg enthusiasts across pan India that tested the knowledge, dispelled some of the top myths, and uncovered the real facts on the nutrition and incredible protein food, the eggs. The top quiz winners were presented with gift vouchers.

Trouw nutrition mark 25th Anniversary of World Egg Day

Trouw Nutrition celebrated 25th worldegg day with their stakeholders on 8th October to raise awareness about eggs and impart the benefits of this nutritious food for an "egg-stra" healthy future. Part of trouw's 2-week long World Food Day

campaign, the wide celebrations that were conducted at 6 different locations throughout India and celebrated with their strategic partners - GoodEggs, Erode District Egg Poultry Farmers Welfare Association and Eruvaka Technologies.

SOY FED LABEL

Why it is Important and Why do we need it

Food is the elixir of life and the root of good health. The food on our plates communicates with our DNA and creates the very blueprint of our body's regular functioning. It is therefore extremely critical, that we take cognizance of not only what we eat but how and where the food we consume is sourced from. While every individual requires protein from their daily diet in varying quantities based on a number of factors, every single person procures their day-to-day dietary protein requirement from a multitude of sources. These also include animal-based sources such as poultry, meat, and fish. In fact, while India is largely considered to be a vegetarian country, over 70 percent of the population consumes non-vegetarian food either regularly or occasionally. And while the demand for animal-based protein-rich foods is only slated to rise in the coming years, boosted by a burgeoning middle class, stronger purchasing power and easy accessibility, the need for information and awareness about the origin and content of the food we consume needs to increase proportionally.

This includes knowledge about the feed consumed by animal protein sources because the quality of feed that they consume during their cultivation translates directly into their nutritive value, further impacting the health of people consuming it or its by-products down the food chain. While nutrient requirements vary from species to species by age and life cycle of the animal, digestible amino acids, metabolizable energy and phosphorous are considered to be key nutrients an ideal diet must comprise of. And while there exists a variety of feeds that are commonly used by the animal husbandry, poultry and fish industries, the growing need for a more nutritive, affordable, and sustainable feed has led to greater utilization of soybean-based feeds across industries in recent times. Derived from soybeans post extraction of the oil, this plant protein, which has a less variable chemical composition than other protein sources, has fast become the single most important source of protein for livestock, poultry and even fish. Soybean meal contains between 45-55 percent of crude protein, in

addition to high levels of linoleic acid, essential omega-3 fatty acids, calcium, phosphorous, carbohy drates and unsaturated fats, giving it excellent agronomic and nutritional qualities. Dehulled seeds result in even higher protein content – containing 47-49 percent protein and 3 percent crude fiber. With a profile that boasts of all essential amino acids and superior amino acid digestibility, a soybean meal provides energy through its high sucrose levels, thereby improving the growth, development, and performance outcome of the animals. Moreover, the oil content in a full-fat soybean meal contains important antioxidants that aidsthe overall health of the animal. With soybean meal fast becoming an integral ingredient of animal feed, one would expect high awareness levels about its importance. However, as per a recent Nielsen India Food to Feed study 2021, only 64 percent individuals are aware of soy meal being utilized as feed for animal-based protein sources while only 49 percent are aware that soy feed enhances the protein package of cultivated animals and their by-products. This lack of awareness is a cause for concern, especially in a country like India where malnutrition is rife and cognizance about meeting daily nutritional requirements is obscure. Today, the urgency to educate both, consumers, and the industry, about the importance of nutritive animal feed – about soy feed – to provide adequate quality nutrition for cultivated livestock, poultry and aquaculture is more pronounced than ever. Even as the animal industry begins to recognize the nutritional, commercial and sustainable benefits of soy feed, it is critical that key stakeholders and industry leaders too, understand the long-term health benefits of soy-fed animal cultivation, which has a domino effect throughout the food chain. Initiatives such as the launch of India's first voluntary 'Soy Fed' label by Right To Protein is a significant step towards driving awareness. The objective of this label is to empower consumers in identifying protein-rich livestock and aquaculture products while highlighting soy feed as a key distinguisher for animal protein sources; thereby allowing consumers to gain protein knowledge beyond just the source and make informed choices about the food they put on their plates. Today, given the many advantages of utilizing soy as animal feed is slowly making its presence felt, the Soy Fed labelintroduced on 30th September 2021, has already been receiving support from various industry leaders and brands, who believe in the power of educating consumers to help them make better nutritional choices. As the first adopter of the Soy Fed label in India, the Sneha Group is championing not just the cause of driving awareness among consumers but further re-iterating soy feed as high-quality feed by incorporating it in their livestock's food regime.The need for good health and robust immunity is stronger than ever today. Even as we attempt to understand our body's nutritional requirements and make a conscious effort in choosing the food that we consume, knowing the nutritional source of animal-based proteins is an important step towards a healthier lifestyle. So read the label and be reassured that if your animal-based protein food has the soy fed label on it, you are definitely adding a bout of good health and nutrition onto your plate.

Some labels are good after all.

ILDEX Vietnam re-scheduled to August 3-5, 2022 at SECC, Ho Chi Minh City, Vietnam

In view of the soaring Covid-19 cases around Vietnam over the past a few weeks and with the deep concern on the health of the exhibitors and stakeholders, the management team of ILDEX have decided to reschedule ILDEX Vietnam from its original date on March 2022 to **August a3-5, 2022** at Saigon Exhibition & Convention Center (SECC) in Ho Chi Minh City.

With a population of 98 million, Vietnam has so far administered 5.3 million vaccine doses by the end of July. According to the statement of Vietnam's Health Ministry, Vietnam plans to vaccinate 50% of the population age 18 and older by the end of 2021 and set a goal of 70% of its population vaccinated by March 2022. By postponing the event to 2nd half of 2022, we anticipate cross-border travel is gradually back in normal and the event is set at an ideal timing to meet the market demand after year-long of downturn. From now until the new date in August 2022, we will create intensive contents and activities in the form of online webinars, digital platforms etc. for our exhibitors to expand business connections and stay connected with the Vietnamese market. After the successful 1st edition in July, 2021, the new edition of "V-Connect Vietnam Edition" will return in 2022 together with the return of the physical exhibition. The digital platform will bring more business matching opportunities and livestock related contents for all industry professionals worldwide. VNU Asia Pacific, together with its global partners, will continue the support to all exhibitors and stakeholders on all issues associated with show preparation. For more information, please visit the official websites: www.ildex-vietnam.com or call +66 2111 6611 (VNU Asia Pacific)

Srinivasa Hy-Line

FEED GRANULOMETRY AND THE IMPORTANCE OF FEED PARTICLE SIZE IN LAYERS

INTRODUCTION

Feed particle size is an often-overlooked aspect of poultry production. Producers should not assume that feed is of a uniform size and homogeneously mixed, or that the feed mill is providing the ideal mix of particles in a ration. Feed particles range in size from very fine to coarse, and different grinding methods will result in different particle size distributions. Differences in particle size within a ration can affect both the digestive system and the performance of the bird, even if the overall nutrient values are similar. Producers, therefore, should frequently evaluate feed particle size distribution and be mindful of the many variables that can affect it.

THE EFFECT OF FEED PARTICLE SIZE ON THE DIGESTIVE SYSTEM

Digestive tract development is influenced by feed particle size. Birds consuming feed with large particles will develop larger and more muscular gizzards and longer intestinal tracts. Larger feed particles require more time in the gizzard to grind feed into smaller particles before they can enter into the small intestine. Larger feed particles have a longer transit time through the intestine. The length of microvilli in the intestine is greater, which increases the absorptive surface area, and thereby positively affects digestibility and nutrient absorption. Some researchers have speculated that the inclusion of larger feed particles in the diet increases localized digestive enzyme secretion in the small intestine, which benefits overall nutrient digestibility.

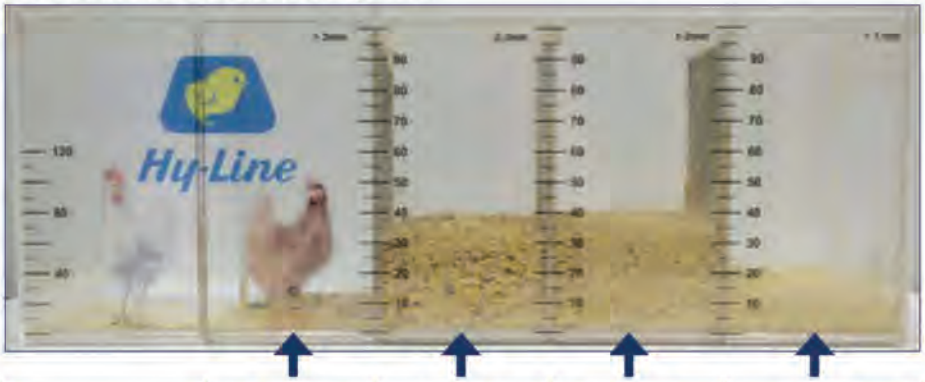
When the diet is composed of predominately fine particles these smaller feed particles quickly pass through the gizzard without grinding and pass into the proventriculus. The result is a small gizzard, enlarged proventriculus and reduced intestine length. Diets containing excessive levels of fine particles should not be fed.

OPTIMAL FEED PARTICLE SIZE

Feed particle size of the diet plays an important role in regulating the feed intake by the bird. Optimal feed particle size increases with age with development of the beak, gizzard and digestive tract. The laying hen has a preference for larger particles, and the preference grows stronger with age.

For the first six weeks, a starter diet is generally given as a crumble, which is made by breaking up pellets consisting of fine particles into a crumble size of 1–3 mm. Crumbled feed is ideal for young chicks because each crumb is a composite of different constituents of the diet. Continued provision of crumbs beyond the starter diet reduces the length of the small intestine and size of the gizzard.

After the starter diet, a well-textured mash (meal) diet is preferred. This ensures proper development of the digestive tract. Well-textured mash (meal) diet has 55–85% of the feed particles between 1 and 3 mm in diameter, with an approximate Geometric Mean Diameter (GMD) of 1200 microns (see Figure 1). Beginning with the pre-lay diet, a well-textured mash diet includes large particles of limestone (2–4 mm diameter). Large particle limestone is needed to maintain good eggshell quality.



	> 3 mm	2–3 mm	1–2 mm	< 1 mm
STARTER	1–3 mm diameter; crumble feed should contain <10% fine feed particles			
GROWER	–	10–25%	45–60%	< 15%
DEVELOPER	5–10%	25–40%	25–35%	< 15%
PRODUCTION	10–15%	30–40%	20–30%	< 15%

Figure 1. Optimal feed particle profile using the Hy-Line Sieve Shaker.

SELECTIVE EATING BY BIRDS

Mash (meal) feed is generally a mixture of coarse and fine particles. Birds preferentially consume larger feed particles. These large particles are frequently coarse-ground corn, which is an important source of gross energy. Fine feed particles usually contain the synthetic amino acids, phosphorus, vitamins and trace minerals. The vitamin/mineral premix is usually fine particle. Birds that overconsume larger feed particles generally have high energy intake and low intake of other important nutrients, such as Vitamin A, vitamin D, riboflavin, sodium, lysine and methionine. Many egg production and shell quality problems are due to inconsistent nutrient intake caused by selective eating.

Birds that are fed too often or in excessive amount are not encouraged to eat the fine feed particles. Fine particle feed can accumulate in the feeders if not properly managed. Encourage the consumption of fine feed particles by leaving a gap of 2–4 hours mid-day. This allows birds to clean the feeders and consume fine particles during this time. Farmers should monitor the feed bins and feeders to assess feed disappearance to determine the appropriate feeding frequency and feed depth that optimizes the daily consumption of both large and small feed particles.

It is important that birds consume both large and fine feed particles on a daily basis to ensure a balanced nutrient intake.

Figure 2. Test sieves. Image courtesy Gilson Company, Inc.
http://www.globalgilson.com/test-sieves

GRANULOMETRY (DETERMINING FEED PARTICLE SIZE)

The standard method for determining particle size is The American Society of Agricultural Engineers (ASAE) procedure S319.1. (*http://animalscience.unl.edu/Research/RumNut/RumNutLab/21-ParticleSizeAnalysis.pdf*). The procedure involves passing feed or ingredients through a series of 14 screens (sieves) of progressively smaller diameter for 10 minutes. The results are reported as Geometric Mean Diameter (GMD) and a measure of particle size uniformity (standard deviation or coefficient of variation [CV]). Properly manufactured feed should have a CV of less than 10%. This procedure is normally only done by large feed mills.

For evaluation of feed particle size on the farm Hy-Line has its own hand-held sieve shaker that can determine particle distribution of mash feeds (Figure 1). This is a useful tool for farmers to check feed deliveries from the feed mill and check particle size in the birds' feeder.

THE EFFECT OF MILLING PROCESS ON FEED PARTICLE SIZE

Raw material particles undergo multiple changes through the feed milling process. The biggest factor affecting particle size is how the diet is milled. Raw materials, such as soybean meal, fishmeal and premixes, are usually in a form that do not require further particle size reduction. Cereal components (i.e. corn, wheat and other whole grains) of diets always undergo a grinding process. Different ingredient types will behave differently when ground. For instance, wheat will produce a different particle size than corn run through the same grinder.

Figure 3. Sieves of varying sizes used to separate a mash feed sample by particle size. Image courtesy Gilson Company, Inc.

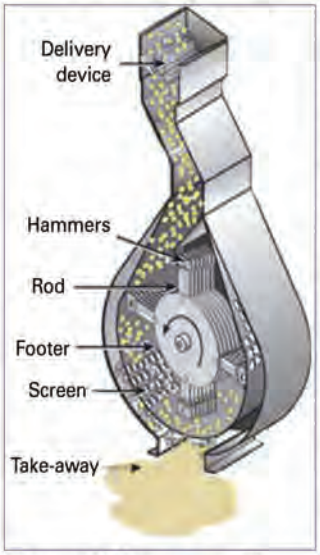


Figure 4. Hammer mill. Image courtesy CPM Roskamp Champion.

Hammer and roller milling are two of the most common methods used to grind raw materials.

Hammer mills (Figure 4) are comprised of rotating sets of hammers that use impact force to break down the grain. The hammers rotate at high velocity and break down the material until it can pass through the surrounding screen. Particle size and uniformity produced by a hammer mill depends on the size, shape, speed and wear of the hammers, as well as the type and diameter of the screen used. Hammer mills are able to produce a wide range of particle sizes. They work well with fiberous materials like wheat by-products.

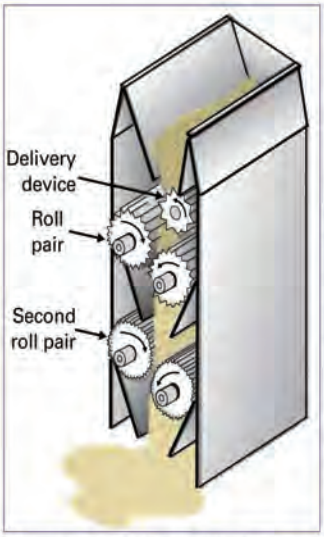


Figure 5. Roller mill. Image courtesy CPM Roskamp Champion.

Roller mills (Figure 5) utilize cylindrical rollers, usually in pairs, to compress and sheer (tear) grains into smaller particles. Feed passes through a series of 2–6 roller pairs which have corrugations or grooves cut into the surface. One roller typically rotates faster and in the opposite direction to create sheering force. Particle size is determined by the number of rollers, distance between rollers, roller diameter, speed and corrugation pattern. Generally, roller mills grind grain into more uniformly sized particles than hammer mills (Figure 6).

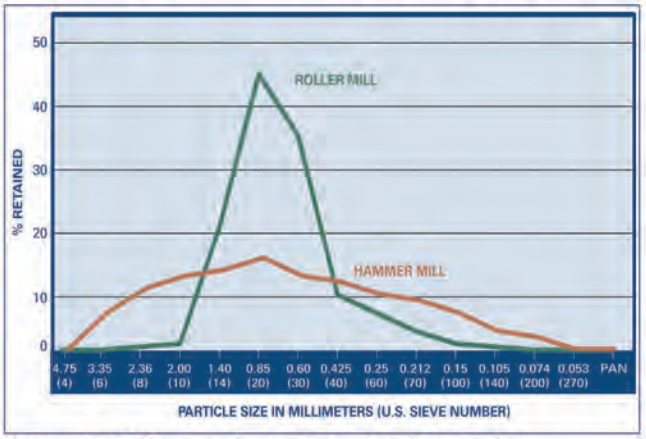


Figure 6. Difference in particle size distribution between a hammer mill and a roller mill. Generally, more uniform particles are produced in a roller mill. Data: M. Heimann, American Soybean Association, 2008.

FEED DELIVERY SYSTEMS

There are three methods of delivering feed in automated feeding systems.

Chain type feeders (Figure 7) - feed is distributed by dragging feed around the feed system with a chain. Chain feeders can cause feed particles to separate by size as it moves feed. The chains can grind the feed particles while being conveyed through the system, although new chain type systems minimize this effect. Slow-moving chain feeders might be problematic as birds at the beginning of a feed line can select out the larger feed particles.

Figure 7. Chain feeder.

Figure 8. Auger feeder. Image courtesy Chore-Time.

Auger type feeders (Figure 8) - an auger is used to distribute the feed. The auger moves feed more rapidly with less feed particle separation and grinding than with chain feeders. Auger feeders typically deliver less feed volume than chain feeders with each feeding.

Hopper type feeders (Figure 9) - a traveling hopper distributes feed by moving down the feed line, dropping feed by gravity. This system causes minimal separation and grinding of feed particles compared to other types of feeders.

Figure 9. Hopper feeders drop feed directly into the feed trough. Image courtesy Alaso.

Management of the feeders is important to minimize the negative effects of feed particle separation and prevent the accumulation of fine feed particles. Frequent feedings of smaller quantities minimizes the accumulation of fine feed. Chain feeders generally deliver a larger volume of feed, making the accumulation of fine particles possible. Allowing the birds to clean the feeders daily will prevent the accumulation of fine particles. Ensuring that there is enough feeder space for all birds to eat at one time will create more uniform nutrient intake in the flock.

Each system has potential feed particle segregation issues that must be monitored by farm managers. Drag chain systems have more side-to-side segregation, where the fine particles are concentrated in the middle of the trough, but the larger particles congregate near the trough walls. In auger systems, there is more top-to-bottom segregation, with fine particles settling at the bottom of the trough and the larger particles remaining near the feed surface. Repeated cycling of the auger can reduce this separation.

TROUBLESHOOTING

Problem	Cause	Result	Remedy
Feed won't auger into the house	Excessive use of bulky feed materials (rice bran, wheat bran); excessive fine feed particles	Feed does not move properly in feed system; poor feed distribution in feeders; reduced feed intake	Avoid excessive levels of bulky materials; match amounts of bulky materials with auger size; avoid grinding materials which are already a small particle size, additional grinding creates excessively fine material in the end product
Sticky feed	Feed is too finely ground	Bridging of feed in bins and feed manifolds; sticky feed puts extra work on feed motors and feeder chains, resulting in electrical overload	Grind cereal grains in mash feed to 1000 to 1200-micron average particle size, increase screen size in hammer mills, or change from a hammer mill to a roller mill (or from a single-stack roller mill to a double-or-more-stack roller mill)
	Too much added fat or poor mixing of fat within the mash	Potential fat oxidation; lower feed palatability	Reduce the quantity of liquid fat added to the diet and/or ensure better distribution of fat within the mix; use good mixing technique when adding fat or liquid ingredients to mixer; excessive fine particles exacerbate the effect of feed sticking and form large aggregates
Selective feeding by birds	Excessive levels of large particles in the feed; drinkers and feeders on same side of cage, resulting in dominant birds occupying feeder space	Dominant birds consume too many coarse feed particles, leading to uneven nutrient intake	Provide optimum feed particle size distribution (see Figure 1); CV of feed particles should be < 10%; uniform feed is less likely to desegregate; place drinkers away from feeders to encourage bird rotation between feeders and drinkers; provide more feeder space per bird
Poor particle size distribution in the feed	Excessive conveying of mash diet resulting in separation of dense and bulky materials; additional grinding of feed in feed trough by some feeder systems; slow feeder speed	Separation of feed particles according to density	Use a minimum of 0.5% liquid oil/ fat in mash diets to incorporate fine particles and improve particle size distribution
Accumulation of fine feed particles in feed trough	Too many feedings; poor feeder management where birds do not "clean up" fine particles daily	Uneven nutrient intake; fine feed increases house dust; dust can lead to poor air quality and increase respiratory disease	Ensure there is adequate time daily for birds to "clean up" feed between feed runs; do not use feed ingredients which are too dusty; do not grind material which does not need to be ground; remove accumulated fine particle feed refused by birds weekly

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Online Discussion Forum (ODF)–On Trends in Poultry Health, Season-2 Organised By CPDO & TI in Association With INFAH

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-2 ORGANISED BY CPDO&TI in association with Indian Federation of Animal Health Companies, on 16TH September , 2021

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 16th September 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 appraise the delegates that speaker have joined from different parts of country & overseas as well. The online discussion forum is streamed on Zoom link & also on YouTube channel of CPDO&TI. The topics of the Online Discussion Forum focused on the Immunity, Data management & Traceability, Food Safety, One Health approach to tackle AMR.

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 software's for data collections in various poultry operations.

Dr. Vijay Makhija, General Secretary, INFAH, made a presentation from Mumbai, Maharashtra digitally about activities of the Organization which is formed in 2012. At present, it has 52 members representing more than 85 percent of Animal Health Markets turnover in India. INFAH is celebrating its 10th anniversary this year & is one of the largest animal health organization across the globe. He mentioned about INFAH's moto being "Healthy Animals, Healthier India". INFAH is invited in all major decision making pertain to Animal health sector and is considered as a voice of Industry. 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 online discussion forum is organized by members of Biologicals & Biosecurity sub-committee of INFAH.

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 assured to extend full cooperation and support to CPDO&TI for conducting many more seasons under Poultry Health series.

Dr. Roel Mulder Secretary General of World Poultry Science Association (WPSA) joined online from Netherlands. He thanked INFAH for inviting him to this online discussion forum. He shared that WPSA is the "The leading global network for poultry science and technology". Its motto is Working together to feed the world. The WPSA is a long established (est. 1912) and unique organization that strives to advance knowledge and understanding of all aspects of poultry science and the poultry industry. Its mission is to facilitate sustainable and socially equittable poultry production worldwide by encouraging and liaising research scientists, educators and those working in the many sectors of the industry. With a large and truly international membership of 8000, the organization's objectives are promoted in various ways. These range from high-profile international congresses and conferences to the many diverse meetings organized by WPSA national branches (of which there are about 80), two federations of branches, in Europe and in the Asia Pacific region and two networks, the African Poultry network and the Mediterranean Poultry network. The World's Poultry Science Journal, the official organ of the WPSA, has developed a highly international reputation for its content, which covers virtually all aspects of production and science in the poultry industry. He shared Co-operation with other associations and organizations & is looking forward to explore collabaration with INFAH

1. Dr. Jayaraman K Poultry Expert joined from Coimbatore spoke on the topic "Immunity Simplified". In his presentation he elaborated in detail about the concept of Immunity development post vaccination. He emphasized the significance of strong gut health. In addition he shared practical experiences with regards to basics of immunity, how to device optimal vaccination schedule ,understanding vaccination failures & tips for better immunization . His key take home messages were , Understand basics to device good schedule and understand failures , Combined approach of correct spacing , combination of live, killed and supported by immune modulator gives good result ,latest technology vaccines are good but world of caution ,use with judicial schedule and health status ,take note of variants and emerging disease , don't plan for best immunity , but plan for optimal immunity . It come with cost. His detailed presentation can be viewed through CPDO&TI YouTube channel: CPDO&TI TRAINING

Dr. Ajay Deshpande, Poultry Entrepreneur presented online from Pune, Maharashtra about the topic Data Management & traceability. In his address he narrated simple practical elements of importance of data management and traceability for efficiency enhancement. His key take home messages were : Poultry industry over the years has evolved into a modern state, the traditional farming systems without proper data keeping, data analysis and traceability doesn't exist now a days, the organization can't grow without having its data system in place, Livestock farmers, feed mills, slaughterhouses, hatcheries and all departments of a poultry company are becoming more and more adept at capturing data, True value is generated from the information that can be obtained from the analysis of these data. When data is in its place, the quality of your decisions improve drastically. By nature, people have different ways of processing information, but a centralized system ensures a framework to plan, organize and delegate, If your organization is looking to stay ahead of the curve, it requires a good data maintenance system in place.

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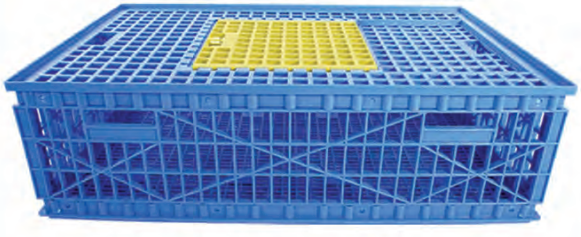
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- Dr. Javeed Mulani , working with OSI Vista Processed Foods Pvt. Ltd. joined online from Coimbatore Tamandu . He addressed on the topic "Food Safety in Chicken Meat Production" & gave overview of Food Safety in Indian Poultry, Food Safety Hazards in Chicken Meat, Transparency Requirement in Poultry Supply Chain, Food Safety Key Considerations at Broiler Farm , Critical to Quality and Safety Points at Poultry Processing Plan & Role of Government Agency. His key take away messages were as follows:
- Innovative Farm Best Practices: follow new innovative best practices to ensure food safety at each stage of Poultry supply chain and make sustainable poultry farming.
- Modern Poultry Processing Plant: Growing demand of safe and good quality chicken meat processed at HACCP base modern poultry processing plant.
- Traceability: It increase transparency in poultry supply chain and increase confidence about safety of chicken meat.
- Guideline for Wet Market: Formalize regulation/guideline to improve GMP practices in wet market which contribute >90% in Indian poultry Industry.
- International std and FSSAI regulation: Follow stringent international standards & FSSAI food safety regulation to lead in world.
- Consumer awareness: Increase awareness about safe and good quality of chicken meat and increase the consumption of chicken meat in country.

Question and Answers with the speakers was 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 regulatory & technical personnel's namely, Dr. D.J. Kalita, Dr N. C . Prakash Reddy and Mr. Ritesh Patel of INFAH Biological & Biosecurity sub-committee. They shared insights on One Health approach to tackle AMR, role of vaccines, Biosecurity & Diagnostic to address AMR & key initiatives of INFAH with regards to addressing the issues of AMR. Elements of National Action Plan on AMR were discussed in brief. INFAH promotes judicious & prudent use of antimicrobials & impart continuous education on following the withdrawal periods.

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.

मान. केंद्रीय पशुपालन राज्यमंत्री डॉ संजीव बालियान ने पोल्ट्री इंडस्ट्री को L.P.A.I. (H9N2) वैक्सीन देने का बड़ा निर्णय लिया!

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भारतीय पोल्ट्री इंडस्ट्री की ओर से ऑल इंडिया पोल्ट्री ब्रीडर्स एसोसिएशन (एआईपीबीए) के चेयरमैन श्री बहादुर अली जी ने मान. केंद्रीय पशुपालन राज्यमंत्री डॉ संजीव बालियान जी के साथ L.P.A.I. (H9N2) वैक्सीन को लेकर बुलाई गयी मीटिंग में नेतृत्व किया| चर्चा में वैक्सीन इंडस्ट्री के निर्माता, पोल्ट्री इंडस्ट्री के कई साथी, कई पोल्ट्री विशेषज्ञ एवं सरकारी अधिकारी भी उपस्थित थे|

इस बैठक में बहादुर अली ने मान. मंत्री जी को L.P.A.I. (H9N2) वैक्सीन ना होने के कारण पोल्ट्री में होने वाली बीमारियों को फॉर्मल प्रेजेंटेशन की सहायता से बताया कि कैसे वैक्सीन की कमी से पोल्ट्री में बीमारियां होती है और पोल्ट्री किसानों को भारी नुक़सान उठाना पड़ता है|

चर्चा में उपस्थित एनिमल हेल्थ के विशेषज्ञ और सरकारी अधिकारियों ने भी यह स्वीकारा कि L.P.A.I. (H9N2) वैक्सीन का ना होना पोल्ट्री इंडस्ट्री की बहुत बड़ी समस्या है| सरकार द्वारा पोल्ट्री को L.P.A.I. (H9N2) वैक्सीन के इस्तेमाल की शीघ्र अनुमति देनी चाहिए ताकि पोल्ट्री इंडस्ट्री को बीमारियों से बचाया जा सके| विशेषज्ञों ने यह भी बताया कि L.P.A.I. (H9N2) वैक्सीन OIE द्वारा यह बीमारी रिपोर्टेबल डिज़ीज़ नहीं है| इसके इस्तेमाल से एक्सपोर्ट्स में कोई बाधा नहीं आयेगी, ना बर्ड्स में किसी भी तरह के हेल्थ इश्यूज आयेंगे| चर्चा में पोल्ट्री इंडस्ट्री की सभी समस्याओं एवं पक्षों को सुनते हुए श्री बालियान जी ने पोल्ट्री के हित में वैक्सीन निर्माण की अनुमति का फैसला लेते हुए कहा कि भारतीय पोल्ट्री इंडस्ट्री को वैक्सीन निर्माण में भी आत्मनिर्भर होना चाहिए| श्री बालियान जी ने इस निर्णय से जुड़ी औपचारिक कार्यवाही को 10-15 दिन के अंदर पूर्ण करने का आदेश दिया ताकि देश की पोल्ट्री के लिए स्वयं की वैक्सीन उपलब्ध हो सके और भारतीय पोल्ट्री इंडस्ट्री को राहत मिले|

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सभी ने मान. मंत्री **डॉ. संजीव बालियान जी** द्वारा लिए गए इस निर्णय के लिए उनकी सराहना की क्योंकि L.P.A.I. (H9N2) वैक्सीन भारतीय पोल्ट्री इंडस्ट्री और पोल्ट्री किसानों की ज़रूरत है जिसके इस्तेमाल के लिए सरकार द्वारा शीघ्र अनुमति मिलनी चाहिए|

How Poultry Farming is Profitable to Farmers

Agriculture has always been a primary and one of the most significant activities in India. Presently, agri-business is doing extremely well with poultry farming gradually becoming the fastest growing and most profitable practice in the country. During the past four decades, the Indian poultry industry has transformed at a dramatic rate from age-old backyard farming into a dynamic agri-business. As per the industry estimates, India produces 2.75 million tons of chicken meat and 65.48 million (2.86 million tons) of hen eggs/year. Furthermore, it employs 3 million people and contributes over Rs.45,416 crores to the Gross National Product./

Given the global scenario, the world poultry meat production is around 104.0 million tons out of which, chicken meat contributes about 87.4 percent while other species include turkey (6.6percent), duck (4.2percent), and geese (2.7percent). On the global front, China occupies the largest stake with 37.6 percent production of hen eggs followed by the USA with 8.5 percent and India with 5.0 percent. Globally, the demand for organic poultry produce is increasing at an extensive rate and consumers pay a premium price for such eggs and meat. This presents an opportunity to rural farmers to undertake backyard poultry which has immense potential for organic poultry production. Further, due to the high demand for protein-rich food, the farmers can acquire a huge base of health-conscious people across the globe and create a sustainable flow of income.

The productivity of raw feed

The present per-capita availability of eggs is 54, whole chicken meat consumption is 2.2 kg whereas the ICMR recommends the consumption of 180 eggs and 10.8 kg poultry meat per person per annum. This showcases a huge gap between the availability and requirement for which the layer and broiler industry has to be upscaled by 5 and 10 folds, respectively. Considering the projected growth of the industry, it correspondingly depends on the availability of feed ingredients to meet the requirement. The estimated compound feed demand for the broiler and layer sectors in 2050 will be around 77 million tons, as per the market report. Thus, to meet this burgeoning demand, it becomes necessary to evolve strategies for increasing the productivity of raw feed ingredients, search for newer feed resources, and effective regulation of supplies for sustainable growth of the sector.

Bio-security

Another operation that needs attention to sustain the growth of the poultry industry is bio-security. It is one of the key factors that contribute to better chicken health while protecting them from biological agents. This is one of the most effective disease management practices that excludes or reduces transmission of disease-causing agents like bacteria, parasites, and viruses, etc. Liberal importation of genetically improved stocks, clustering of commercial farms, and importation of vaccines, inadequate quarantine facilities, etc. offset the balance of biosecurity and threaten the progress of the poultry industry. Taking adequate counter measures can help farmers in making poultry production profitable.

Stringent supervision and monitoring

Acceptance of processed chicken is on the rise, particularly in the urban markets. With the rise in consumer awareness and the requirement for hygienic and safe food, processing will have a bright future in the poultry industry in the years to come. A few plants for processing eggs have been installed using state of art machinery in some states with an average daily turnover capacity of 0.7 to 0.8 million eggs. Whole egg powder, yolk powder, egg white powder, lysozyme, etc. are being produced under high standards of operation. The raw material production for these plants needs to be managed under strict supervision and monitoring for ensuring acceptability of the final product under international food safety regulations./

Development of backyard poultry

Commercial farms are mostly concentrated in and around the urban and peri-urban areas. Currently, native chickens in rural and tribal areas constitute about 38 percent of the country's chicken population. However, due to their low productivity (50-60 eggs/year), they contribute only 21 percent to the total egg production. The eggs and meat are sold at a higher price in rural areas than urban areas. Therefore, there is an absolute necessity and adequate scope for the development of backyard poultry in rural and tribal areas, which in turn can contribute substantially to raise the overall per capita availability of eggs and meat.

Small poultry keepers are capable of more significant contributions to alleviating malnutrition, poverty, and unemployment. Spectacular progress has been made from subsistence to sustainable production systems. In the last 30 years, the Indian backyard population has increased by 16 percent from 60 to 70 million. Additionally, it is a fact that China's 76 percent of total eggs come from rural backyard production. Hence, mass production, as well as production by masses, is the key opportunity for rural farmers to capitalize on and create a sustainable income.

Adoption of technology

Technology adoption plays a major role in making the entire farming process automated and efficient. The adoption of cutting-edge technologies assists conventional practices followed for genetic improvement of birds. Many agri-tech companies are also coming forward to aid farmers in implementing advanced technologies to their practice and obtain faster growth of genetic potential. This results in better and healthy produce, thereby creating a strong income avenue.

Indian poultry farmers face severe competition in the International market enforcing the farmers to lose 15-20percent on exported poultry products due to trade subsidy. Thus, several government schemes in the livestock sector, poultry rearing in villages have topped the importance of farmers' support. Furthermore, the farmers can focus on entering the quail, duck, and turkey markets as they are getting significant traction in the southern part of the country. Exploring new markets for export potential could result in a significant increase in the poultry farmers' income.

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