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The Impact of AI on Agri-Animal Business

The potential productivity gains from generative Artificial Intelligence (AI), particularly in the agri-animal business arena are yet to be fully understood. The range is wide and hope of what this can accomplish is high. The poultry productivity impact through AI is expected to be profound because of the magnitude of tasks that can be accomplished more quickly with greater precision and efficiency. Early adoption and related experiments and analysis show significant productivity leaps for some roles and activities, including poultry nutritionists and genetics performance and innovations, with better results and production and with great satisfaction.

Some illustrations of the deployment of this brain power are in science and veterinary research and development, leading to faster innovation and earlier and accurate diagnosis of animal diseases and disorders, as well as in the field of education and learning and in many consumer interface services.

The extent of reskilling, remodelling and rejigging of agri-animal business and work process that will happen ahead is not clear today. The breadth, magnitude, and time span of such changes are also unknown and hard to predict. But these changes could be massive and disruptive because of enormous human initiation embodied in generative AI.

The other side of productivity, or the increase in value of output with given levels inputs such as labour and capital over a period, is the impact on employment. The implications are expected to be huge in this realm. Whether the deployment of AI will drag this down and trigger reallocations across segments and working groups is a critical issue. The outstanding difference of this technological innovation is its disproportionate incidence upon jobs requiring higher order skills, especially those oriented to cognitive tasks.

G. N. Ghosh
Managing Editor

Hammer Mill Blade Design on Feed Particle Size and Production Performance of Commercial Broiler Chicken

S. Ramchandar, G. R. Manohar¹, P. Shamsudeen, C. S. Pandian, S.T. Selvan and S. Bakyaraj

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An experiment was conducted to study the hammer mill blade design on feed particle size and production performance of commercial broiler chicken for the period of 5 weeks of age. The study was divided into two experiments. In the experiment 1, feed was prepared using five different hammer mill blade designs as plain (T_1), single stepped (T_2), double stepped (T_3), extended tip (T_4) and tapered tip (T_5) hammer mill blade designs, followed by the feed particle size which was measured using sieve analysis method. In experiment 2, biological trial was conducted with the feed prepared using different blade designs and production performance was recorded. The experiment study has shown that the T_4 had higher geometric mean diameter (GMD) (830.57 μ m), when preparing broiler pre-starter feed with 3mm sieve, but while preparing broiler starter feed with 4.5mm sieve, T_5 had higher GMD (881.99 μ m), whereas, during broiler finisher feed preparation with 6mm sieve, the T_2 treatment group had higher GMD (1019.17 μ m). The experiment 2 was carried out with 180 day-old commercial broiler chicks. Based on body weight, the chicks were randomly divided into five equal treatment groups, each group consists of 36 birds with three replicates and each replicate contains 12 birds. Each treatment groups were fed with feed prepared using different hammer mill blade designs. The experimental birds were reared in standard managemental conditions in deep litter system with open sided house and fed ad-libitum throughout the experimental period. The body weight, weight gain and feed intake showed significant difference; however, the feed conversion ratio and livability did not show any difference. The broiler chicken fed with feed prepared with extended tip hammer mill blade design (T_4) had significantly higher body weight gain (1968.06 g) and better feed conversion ratio. (1.53) at five weeks of age. This study concluded that extended tip hammer mill blade design could be used to prepare broiler chicken feed which had significant effect on production performance of commercial broiler I chicken.

Source : XXXVII Indian Poultry Science Association Conference, November 2022

Effect of Vitamin C, E, Organic Chromium and its Combination Performance of Narmadanidhi Birds in Summer Season

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The present study was conducted to assess the effect of vitamin C, E, organic chromium and its combination on performance of Narmadanidhi birds in summer season. A total of 240, day old coloured dual type Narmadanidhi sexed chicks with equal numbers of male and females were distributed into 12 dietary treatment groups. Each treatment group was randomly allotted 20 chicks in 2 replicates. The chicks were housed in individual pens as per treatment groups and reared on litter system. Prepared starter and finisher ration were allocated in 12 dietary treatment groups. Treatments were given through feed. First group kept as control group (T_0). T_1 and T_2 were supplemented with 150 and 250 mg/kg feed vitamin C. T_3 and T_4 were supplemented with 125 and 200 mg vitamin E per kg of diet. Treatment T_5 and T_6 were supplemented with 1.25 and 2 mg organic chromium (chromium propionate) per kg of diet; T_7 and T_8 group were supplemented with 2.50 mg vitamin C per kg of diet plus additional supplementation of Vitamin E 125 and 200 mg/kg of diet respectively. Treatment T_9 and T_{10} were supplemented with 250 mg vitamin C/kg of diet plus additional supplementation Cr propionate @ 1.25 and 2.00 mg/kg of diet respectively. Treatment T_{11} was supplemented with combination of vitamin C @250 mg/kg, vitamin E 125 mg/kg and Cr propionate[®] mg/kg, of diet. Body weight, feed intake and feed conversion ratio recorded weekly replicate wise and iM treatment wise. It was concluded that T_{11} i.e. combination of Vitamin C, vitamin E and Cr propionate IM better overall performance than their individual effect.

Source : XXXVII Indian Poultry Science Association Conference, November 2022

Effect of Supplementation of Phytogetic Mixture on the Performance Index of Chicken Broilers in Winter Season

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An experiment was conducted to study the effect of phytogetic mixture supplementation on the performance of broilers in winter season. Two hundred eighty eight day-old commercial chicks were subjected to eight dietary treatments consisting of three replicates of twelve chicks in each replicate were reared for a period of 6 weeks in winter season to find the effect of following treatments, namely; To- Negative control, Ti-control, T1-0.5 % Amla + 0.5 % Ashwagandha + 0.25 % Turmeric powder, T3-0.25 % Amla + 0.5 % Ashwagandha + 0.25 % Turmeric powder, T4-0.125 % Amla + 0.5 % Ashwagandha + 0.25 % Turmeric powder. T5- 0.5 % Amla + 0.25 % Ashwagandha + 0.25 % Turmeric powder, T6-0.5 % Amla + 125 % Ashwagandha + 0.25 % Turmeric powder and T7- 0.5 % Amla + 0.5 % Ashwagandha + 0.125 % Turmeric powder. The production indices and hemato-biochemical parameters were studied. Standard managemental practices were followed during the experimental period. Significant ($P < 0.05$) differences were observed for Performance Index (P.I.) of birds in T_2 , T_3 , T_4 , T_5 , T_6 and T_7 at 5 and 6 weeks of experiment during winter season.

Supplementation of phytogetic mixture consisting of 0.5 % amla and 0.5 % ashwagandha with 0.25% or 0.125 % turmeric powder (T_2 and T_7) gave best results and improved the performance indices. Addition of 0.5 % amla and 0.5 % ashwagandha with 0.25% or 0.125 % turmeric powder can be effectively supplemented as an alternative to antibiotics growth promoter in poultry ration in winter season without any adverse effect on the birds.

Source : XXXVII Indian Poultry Science Association Conference, November 2022

Performance of Broilers Fed Diets Supplemented with Artemisia absinthium with or without Enzyme

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The antibiotic resistance is a global health issue and nowadays consumer demand for antibiotic-free products has risen significantly. The phytogetic feed additives are considered as viable alternatives to antibiotics in poultry. Therefore, the present study was conducted to evaluate the effect of feeding diets supplemented with Artemisia absinthium with or without enzyme on the performance of broilers. Two hundred and fifty two day old commercial broiler chicks were randomly divided into seven treatment groups, having three replicates with twelve birds each. The groups were distributed as; group Ti-control, offered basal diet without any feed additive whereas groups T_2 , T_3 , T_4 were offered basal diet supplemented with Artemisia absinthium @ 1, 1.5 and 2% respectively on dry matter basis whereas groups T_5 , T_6 , T_7 were offered basal diet supplemented with Artemisia absinthium with cocktail enzyme @ 1, 1.5 and 2% respectively on dry matter basis. The group of birds fed diets supplemented with enzyme treated Artemisia absinthium leaves had significantly ($P<0.05$) higher body weight, body weight gain, and improved feed consumption ratio (FCR) when compared to other treatment groups and the control group. The feed consumption was significantly ($P<0.05$) higher in groups fed diets supplemented with enzyme treated Artemisia absinthium leaves as compared to other treatment groups. Among all the treatment groups significantly ($P<0.05$) better results were obtained with the inclusion of 2% Artemisia absinthium with enzyme. Therefore, supplementation of broiler diets with 1.5 % and 2% enzyme treated Artemisia absinthium improves the growth and performance.

Source : XXXVII Indian Poultry Science Association Conference, November 2022

Effect of Minimum Protein Requirement with Ideal Amino Acid Ratios to Digestible Lysine on Performance of 61-72 Weeks White Leghorn Layers

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A study was conducted to evaluate the minimum protein requirements of white leghorn layers on diets with ideal amino acid ratios to digestible Lysine from 61 to 72 weeks of age. The trial was performed with four treatments and twelve replicates with twelve birds per replicate. All the diets are based on maize, DORB, soya and ground nut cake. At 2600 kcal ME level, the digestible lysine requirement is fixed at 0.69% i.e. an intake of 620 mg dig Lysine (total lysine intake 690 mg/b/d). The protein in the control diet is 16.25% (T_1). In the other 3 experimental diets, crude protein (CP) content is reduced to 15.69% (T_2), 15.13% (T_3) and 14.58% (T_4). The results revealed that significantly ($P<0.05$) higher egg production and egg weight were recorded in control (16.25%) and low protein diet (15.13%) compared to other treatments. Feed intake, Haugh unit, albumin index and egg density were not influenced by different dietary groups. But, yolk index was significantly ($P<0.05$) higher in low protein groups compared to control. Supplementation of all low protein diets obtained higher returns over feed cost than the control. Therefore, a 15.13% CP diet with 0.69% dig lysine is adequate for 61-72 weeks white leghorn layers.

Source : XXXVII Indian Poultry Science Association Conference, November 2022

Performance of Different Improved Varieties Rural Chicken under Intensive System of Management

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Two hundred forty-day old chicks were procured from reputed sources (Sixty each of Vanaraja, Kuroiler, Chabro and Indbro Rainbow Rooster). The chicks were brooded in battery cages for one week. On 8th day, the chicks were randomly selected and distributed into four treatment groups viz T1 (Vanaraja), T_2 (Kuroiler), T_3 (Chabro) and T4 (Indbro Rainbow Rooster) having 60 chicks in each which were further subdivided into four replicates of 15 chicks each. The birds were reared under deep litter system of management and provided uniform commercial feeds for a period up to 8 weeks of age. The mean body weight (g) of the improved varieties of rural chicken at 8th week of age was recorded to be significantly ($P<0.05$) highest in T_2 group (1377.3 ± 29.4) and lowest in T_3 group (1072.0 ± 23.3). The overall mean body weight gain (g) from 1-8 weeks of age was significantly ($P<0.05$) highest in T_2 (1260.5 ± 19.5) and lowest in T_3 (998.0 ± 21.9). The cumulative feed consumption was significantly ($P<0.05$) highest in T_2 (343.1 ± 35.3) followed by T_4 and T_1 and lowest in T_3 group (2650.1 ± 39.3). The cumulative FCR was found to be significantly ($P<0.05$) better in T1 (2.62 ± 0.01) than T_4 (2.81 ± 0.03) group. However, no significant differences were observed among T_1 , T_2 and T_3 groups. From the present study, it could be concluded that Kuroiler bird performed better under intensive system up to 8 weeks.

Source : XXXVII Indian Poultry Science Association Conference, November 2022

Research Abroad

Main Risk Factors for Newcastle Disease in Brazil

Luciano Lagata

Director, The Animal Health, Sao Paulo State, Brazil

A study done by the Brazilian Animal Health Defence Group (GDSA) has revealed several risk factors for the spread of Newcastle disease from backyard farms to commercial producers in Sao Paulo State, Brazil.

The study sought to identify possible sources of infection and the transmission routes of the Newcastle disease virus in 104 backyard farms (2,423 animals) in the immediate vicinity of five large poultry farms in Sao Paulo State. Two of them were large companies focused on genetics and breeding.

The researchers examined animal trachea swabs and manure samples. In addition, they asked backyard farm owners to fill in a questionnaire to be able to classify risk factors related to the introduction or spread of disease among these populations. During the course of a year (October 2017 to October 2018), 81 backyard farms were visited (77.88% of the total) and 1,530 birds were tested. Of this total, 30 were ducks and were not included in the serological analysis. Five farmers would not allow the researchers onto their premises.

In total 533 samples were collected, representing 24% of registered birds. Altogether, 86 birds showed antibodies to the Newcastle virus, however, this did not mean that the disease was in circulation. "We did not see any signs of respiratory or neurological prevalence, or a different mortality rate in the birds tested," Lagatta emphasizes. Following the tests, the questionnaire identified six farms among these 46 backyard farms as those most likely to represent a risk. The principal conclusion was that the contact with wild birds in 39 of the farms posed the greatest risk. "In this case, the factor to be worked on is preventing birds living in the wild from having contact with the farmed animals," Lagatta explains.

A second insight was that the biosecurity on the farms is 'precarious'. Also noteworthy was the lack of veterinary care which would help with the preventive and curative aspects of infection. Another factor was that 74.4% of these producers have other growers as neighbours, in addition to the informal origin of their birds. Finally, there was the issue of the improper disposal of dead birds, often in household waste.

The six farms pinpointed as the main risk hubs need more attention from their owners and, clearly, from the professional poultry companies surrounding them. "The prevention of disease in backyard farms should be a shared responsibility among poultry companies and, obviously, of the State veterinary service. We must invest in monitoring, communication and education campaigns to address these kinds of harmful health issues," concludes Lagatta.



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Moisture Management Programs with enhanced Feed Mill Efficiency in Animal Feed

Dr. Stuti Baruah

Program Manager – Feed Safety
Trouw Nutrition South Asia

Moisture management is often not valued but plays a vital role in defining feed producers' profitability. Even distribution and absorption of moisture can prevent uncontrolled microbial load growth, supporting pellet quality and feed utilisation while reducing production process loss and shrink. Moisture is a significant factor in determining high-quality pellets in animal feed.

Moisture-Related Challenges in the Feed Milling Process

The moisture content of feed is variable and, in most cases, altered during the feed milling process. Moisture loss is problematic for producers and end users, significantly impacting nutrient distribution, inventory loss, feed costs, yield, and profitability.

Addressing moisture loss is not as simple as adding moisture back into the feed mixing process. Water has high surface tension, often resulting in poor absorption by feed if added directly, allowing water to flash off in the press and cooler or remain free.

Uneven or incomplete water absorption in feed causes issues such as low pellet quality, nutrient segregation, and spoilage. High and low moisture content in feed is problematic. High moisture reduces throughput, increases the energy required by the pellet making process, leads to feed spoilage and creates dense, brittle pellets. However, low moisture reduces yields, increases fines, nutrient over formulation and easily broken pellets.

Proper moisture management helps in good quality pellet and feed utilization, reduces process loss, prevents feed spoilage, and improves batch yield through reduced shrink. Effective moisture optimization and management in feed requires the producer to examine the factors impacting moisture level throughout the feed mixing and pellet-making process.

Moisture Assists the Pellet-Making Process

Moisture is vital to diets and is critical in the pellet-making process. Adequate moisture supports the binding of feed particles, gelatinization, pellet quality, mill energy consumption and profitability. High moisture can cause choked and reduced throughput within the mill, leading to heightened energy consumption and excessive microbial growth. In contrast, low feed moisture results in brittle pellets that lead to increased fines and poor feed utilization on the farm. In poultry feed, evidence supports that improved physical feed quality maximizes FCR, reduces mortality, improves animal yields, and helps manage excess feed costs.

Fylax Forte-HC liquid is a liquid mould inhibitor with a synergistic blend of organic acids, as well as surfactants. This can significantly reduce press resistance and energy consumption, decreasing the risk of feed blockages at the pelletizer without increasing the risk of microbial growth during feed storage. Trouw Nutrition's liquid mould inhibitor Fylax Forte HC Liquid contains a patent pending technology, called ActiProp; a blend of buffered and non-buffered organic acids combined with surfactants and emulsifiers to guarantee reduction, milling efficiency increase, nutrient value preservation and feed shelf-life prolongation. This solution has been proven in multiple commercial situations.

- The activated propionates technology increases the porosity of moulds' outer layers effectively eliminating moulds
- The surfactants ingredient in Fylax Forte lowers the surface tension of water ensuring an optimal distribution of the hydrating solution throughout the complete batch of mixed ingredients

Benefits of Fylax Forte HC Liquid

- Activated propionates for effective mould control in feed
- Prolongs shelf life of raw materials, compound feed
- Protects nutritional value

- Helps retain moisture content and improving production capacity
- Stable propionic acid recovery of >95% after extrusion
- Reduces fines percentage

Trial reports of Fylax Forte HC liquid has shown improved feed mill efficiency by reducing energy consumption in the pellet mill by 19%, increasing throughput by 20% in comparison to Product MC. Fylax Forte HC liquid outperformed in feed quality parameters, such as: PDI 6% better, 53% less fines collected at the bagging, increased shelf-life of 44% and reduced moisture loss by 62% after 2 weeks of storage.

Trial Summary			
Application	Pelleted broiler finisher feed	Objective	Feed Processing and moisture management
Product	Fylax Forte HC Liq, Product MC	Country & year	India, 2022
Inclusion rate	Fylax Forte HC Liq 0.5 kg/t + 9 kg/t water Product MC 0.6 kg/t + 9 kg/t water	Type of trial	Field trial

Table 1: Trial design in Indian Feed Mill 2022

The trial was done at a feed mill with a production capacity of 110,000-ton poultry feed annually. The effect of Fylax Forte HC liquid was assessed in comparison to Product MC. Product functionality was evaluated in a standard broiler finisher recipe. Both treatments were applied as a hydrating solution (Table 1) via Selko's Moisture Dosing System (MDS) installed at the feed mill. The MDS is a PLC controlled dosing system where water is combined with Fylax Forte HC liquid in a pre-set ratio in an integrated tank to be used as hydrating solution. The precise dosing is ensured by an electromagnetic

flow meter. The hydrating solution was sprayed using flat spray nozzles into the mixer direct to the mash feed. The hydrating solution was added after dry mixing and before adding oil. For each treatment 5 replicates of 2 tons were pelleted. The production parameters (throughput, energy consumption, pellet mill capacity) were measured and the average calculated after stabilization (the first and last readings were ignored). The pellet quality parameters (PDI, % of fines, moisture retention, and shelf life) were also measured from the feed collected at the bagging point (Table 2). For moisture retention the feed was stored in 60 kg bags, closed by stitching for two weeks, with weekly weight check for moisture loss check.

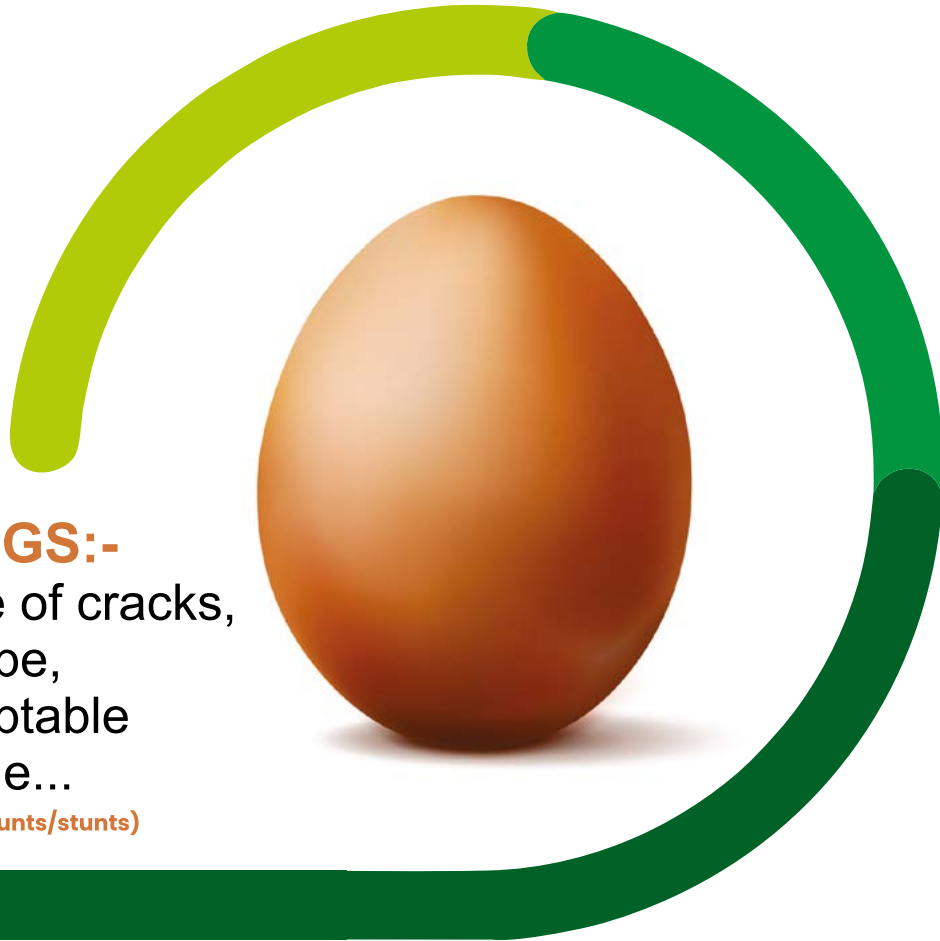
PARAM-ETERS	Final Feed Moisture (%)	Pellet mill throughput (t/h)	Energy consumption (kWh/t)	Pellet mill utilization (%)	Fines (%)	PDI	Accelerated shelf life (stress days)	Weight loss during storage (2 weeks, kg)
Product MC 0.6 kg/t + 9 kg/t water	12.4	7.9	18.3	53	5.27	64	9	0.39
Fylax Forte HC liq 0.5 kg/t + 9 kg/t water	12.5	10.0	14.8	66.5	2.48	68	13	0.15
% Difference (Fylax x MC)	-	+ 21	- 19.2	+ 20.3	- 52.9	+ 5.8	+ 44	- 61.5

Table 2: Comparison of Fylax Forte HC liquid and Product MC

- In summary, reducing the energy usage of a feed mill producing 110,000 ton/annual by 12%, would result in a saving of Rs 15 lacs approx. annually in energy cost and the increased capacity would give additional 11,000 ton each year. Furthermore, Fylax Forte HC hydrating solution improves feed quality parameters and extends its shelf life.

(Sources: Trouw Nutrition - Internal Field Trials)





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On Site Production of Liquid Feed Enzymes: A Unique Globally Applied Tool

Dr. Lode Nollet
Product Manager- Enzymes
Huvepharma, Belgium

In today's animal feed production, heat treatments like extrusion and pelleting have found their way as a tool to improve animal performance by improved feed technology. However, there are also negative aspects to the use of high temperatures in feed processing such as destruction of heat sensitive additives (like enzymes).

This has led to the development of tools to apply heat sensitive compounds after the heat treatment process, called Post Pelleting Liquid Application (PPLA).

To feed the PPLA system with liquid enzymes, manufacturers need to produce the enzyme as a liquid, stabilise it by adding stabilising agents and conservatives, pack it in 1000 litre Intermediate Bulk Containers (IBCs) and transport it to the feed mill, where it is stored until the IBC is connected to the PPLA system for use. This complete process requires a stable and cool

environment to guarantee the concentration of the enzymes in liquid form.

Working with liquid enzymes packed in IBCs has many downsides as enzymes in liquid form tend to be less stable than dry enzymes. An example of a stability study conducted with commercially available phytases in the market is shown. It can be seen that the activity of liquid phytase (in IBC) is decreasing upto 50% when stored for 12 weeks at 40°C. Therefore, IBCs with liquid enzyme require a lot of temperature controlled storage space and cooled transport. Next to this, the manipulation of the IBCs also poses extra labour costs and often results in leakage or spillage.

WSP Enzymes

The development by Huvepharma of instant water soluble enzyme powders (WSP enzymes) has opened the way to produce liquid enzymes freshly at the feed factory when needed.

With these WSP enzymes, liquid enzymes can be tailor made

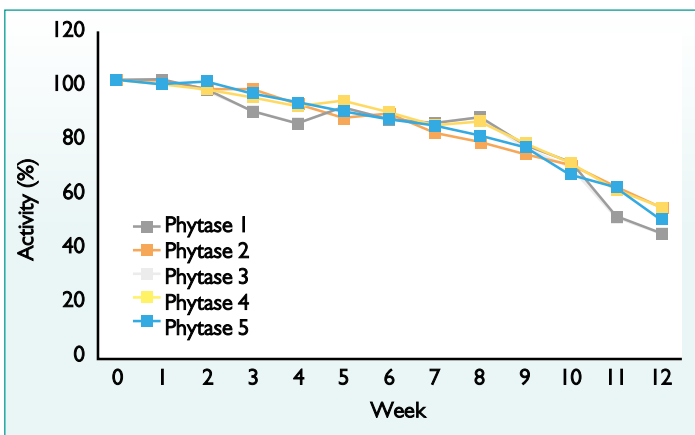


Fig. 1. Different commercial liquid phytases sold in IBCs show poor stability at 40°C indicating the need for cooling.



OptiPhos is an instant water soluble enzyme powder.

at the feed mill in any desired amount and concentration just prior to application with the PPLA.

For dissolving the WSP enzymes, special equipment has been developed: the Huvematic which allows the enzymes to be dissolved even in cold and hard water.

The Huvematic weighs, very accurately, the desired quantity of WSP enzymes and the needed quantity of water, mixes them together so the liquid enzyme is produced at the right concentration. The Huvematic can run to produce two enzymes at the same time (for example a phytase and a NSP'ase) and has enough production capacity to serve multiple PPLA lines in the same feed mill. The dry WSP enzymes are commercially available under the brand names OptiPhos, Hostazym P and Hostazym X and are packed in boxes containing two aluminium sealed bags of 10kg each.

One box containing 2x10 kg of WSP enzymes, can replace 2-3 1000 litre IBCs filled with liquid enzymes. This recent innovation by Huvepharma is new in most areas of the world. However, it is already common practice for more than three years in the US where it was intensively tested.

Large broiler integrators in the US have embraced this technology to avoid inconveniences related to liquid enzymes in IBC (as described above), and can be considered as the pioneers. The initial concept in the US was initiated for the use of a liquefied phytase (OptiPhos) and led to the installation of this concept in multiple feed mills.

Due to this success, Huvepharma also extended this concept for the production and application of liquefied NSP'ase (Hostazym X) using the same formulation technology

developed in their R & D laboratories.

This success encouraged Huvepharma to launch the concept of the WSP enzymes globally. In the last year, local (country) registrations of the WSP enzymes have been taken care of, as also the collaboration with multiple construction companies to support Huvepharma with the installation and maintenance of the Huvematic.

Europe was the first continent to follow the US experience with multiple operational units, while others are in the process of construction and implementation.

In hot and humid areas, this concept has been welcomed with high enthusiasm. The challenging conditions like high temperatures and high humidity allow a roll-out of the concept in South-Asia, Pacific region and South America, solving the current difficulties with the IBCs, regarding stability, activity and extra labour.

At the same time, partners were found to support Huvepharma with equipment and related technical support allowing the implementation of the Huvematic concept in

the large poultry integrations of that area.

Conclusion

Instant water soluble enzyme powders (WSP enzymes) are a unique tool for the production of liquid enzymes on site, offering the nutritionist flexibility and security in formulation.

Avoiding the need for IBCs, reducing waste, spoilage and labour cost has been a surplus offered to the feed mill manager.

Despite some scepticism this concept has been implemented with satisfaction in the last year worldwide and provided a solid base of experience for future new cases.



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Feeding Innovation: Acidifiers as Key Players in Poultry Performance

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Introduction

The modern poultry industry, with its emphasis on high production levels and efficient feed conversion, relies on specific feed additives to meet its demands. Antibiotic feed additives, traditionally used as growth promoters in poultry feed, have played a crucial role in stabilising intestinal microbial flora, enhancing overall performance, and preventing specific intestinal pathologies (Hassan et al. 2010). However, the emergence of antibiotic-resistant microbes has prompted regulatory action, leading the European Commission (EC) to phase out and ultimately ban the use of antibiotics as growth promoters in feed starting from January 1, 2006 (EC Regulation No.1831/2003). This shift away from antibiotics has resulted in challenges for poultry performance, increased feed conversion rates, and a rise in the incidence of certain animal diseases, including subclinical necrotic enteritis (Dibner & Richards 2005). In response to this situation, researchers are actively exploring alternative, non-therapeutic additives to address the performance and health issues observed after the removal of antibiotics. These alternatives include organic acids, enzymes, probiotics, prebiotics, herbs, essential oils, and immunostimulants, all of which offer potential benefits as feed additives in poultry production (Khan & Iqbal 2015).

Organic acids, inherent in various feeds, play a vital role in feed acidification and

are naturally produced during animal metabolism. Their utilization in feed has become a proactive measure to prevent diseases in the feed industry, attributed to their inherent antibacterial, antifungal, and antimicrobial properties (Frank K et al.2020). Organic acid treatments, comprising individual acids or blends of several acids, have demonstrated antimicrobial efficacy comparable to antibiotics (Wang et al.2009). Due to their recognized safety profile, organic acids and their salts have received approval for use in poultry production by regulatory authorities such as the European Union (Adil et al.2010).

Chemistry of Acidifiers

The acidic specificities of acidifiers as feed additives are attributed to the carboxyl functional group (-COOH) of organic acids, including fatty and amino acids. These encompass simple mono-carboxylic acids (formic, acetic, propionic, and butyric acids), carboxylic acids with hydroxyl groups (lactic, malic, tartaric, citric and benzoic acids) and short-chain carboxylic acids containing double bonds (fumaric and sorbic acids) (Shahidi, Maziar, & Delaram,2014). The antimicrobial activity of short-chain organic acids (C1–C7) varies with their dissociation status, influenced by specific pKa values. Lower pKa values indicate stronger acids, affecting their ability to lower the pH of the environment. Most acids used as feed additives have pKa values between 3 and 5 (Kirchgessner & Roth, 1991). Many acids are employed

as salts of sodium, potassium, or calcium, offering benefits such as reduced odour, ease of handling during feed manufacture, lower corrosiveness, and increased water solubility compared to free acids (Huyghebaert, Richard, & Van Immerseel, 2011).

Types of Acidifiers

A. Organic acidifiers: Beyond their role as growth stimulators, serve as effective tools for controlling both pathogenic and non-pathogenic intrinsic bacteria. They influence the pH of digesta, enhance pancreatic output, and exhibit trophic effects on the mucosa of the gastrointestinal tract, complementing their antibacterial action and impact on buffering capacity (Dibner and Buttin,2002).

B. Inorganic acidifiers: Includes hydrochloric, sulfuric, and phosphoric acids, are often overlooked despite being less expensive than organic acids. However, their pure forms are highly corrosive and hazardous liquids. Phosphoric acid, a prevalent inorganic acidifier, functions as both an acidifier and a phosphorus source for the body. Notably, phosphoric acid is beneficial for young fowl with an underdeveloped digestive system. These substances not only contribute to pH reduction but also offer a supplementary source of essential minerals, contributing to the nutritional balance of poultry diets (Andrys R, et al.2003).

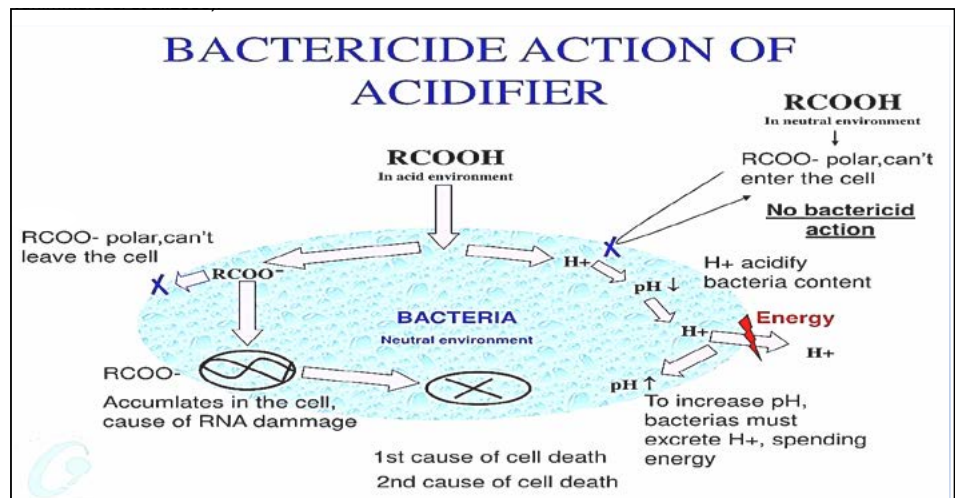
1. Effect on Growth Performance: The inclusion of 0.4% Butyrate has been linked to increased body weight and improved feed conversion ratios (FCR) in broiler. Acidifiers enhanced protein and energy digestibility by mitigating microbial competition with the host for nutrients and reducing endogenous nitrogen losses.

Additionally, they help lower the incidence of sub-clinical infections, minimize the secretion of immune mediators, and decrease the production of ammonia and other growth-suppressing microbial metabolites. These factors collectively contribute to improved feed utilization, resulting in enhanced overall performance in broilers (Dibner and Buttin, 2002).

2. Antimicrobial Activity of Acidifier: The incorporation of acidifiers into the diet has a beneficial impact on poultry performance by reducing the prevalence of pathogenic bacteria. Intestinal health in poultry affected by *Salmonella*, *Campylobacter* and *Escherichia coli*, can be effectively controlled through the supplementation of acidifier in the diet by inhibiting the growth and limiting microbial competition for host nutrients by influencing the pH levels (VanImmerseel et al. 2006).

The proliferation of pH-sensitive bacteria like *E. coli*, *Salmonella*, and *Clostridium perfringens* is minimized when the pH drops below 5, whereas acid-tolerant bacteria can survive. The undissociated form of acid, being more lipophilic, penetrates freely across the semi-permeable membrane of bacterial cells into the cytoplasm with a neutral pH. Subsequently, it dissociates and releases protons (H^+), leading to a reduction in pH inside the bacterial cell. This process impedes enzymatic reactions, glycolysis, signal transductions, and nutrient transport in microbes, causing energy deprivation as they struggle to balance the pH to normal levels (Mroz et al. 2006). The trapped anions of the acid also exert toxicity on the cell metabolites and disrupt bacterial membranes (Freese, Sheu, & Galliers, 1973; Russell, 1992). In contrast, acid-tolerant bacteria such as *Lactobacillus* sp. and *Bifidobacterium* sp. can withstand the imbalance between external and internal pH, allowing acids to leave the bacteria by returning to their undissociated form at the lower internal pH.

3. Effect on the Gastrointestinal Tract: Maintaining optimal intestinal health is crucial for achieving target growth rates and feed efficiency in the poultry industry. Acidifier salts have demonstrated a significant impact on the gastrointestinal tract by improving villus height, width and area of duodenum, jejunum, and ileum (Kum et al 2010). This increase in



villus height is attributed to the role of the intestinal epithelium as a natural barrier against pathogenic bacteria and toxic substances in the intestinal lumen. Consequently, the use of acidifier salts reduces intestinal colonization and infectious processes, leading to a decrease in inflammation at the intestinal mucosa. This improvement in villus height enhances the secretion, digestion, and absorption of nutrients within the gastrointestinal tract (Khan et al. 2013).

4. Effect on Nutrient Digestibility and Mineral Utilization: Acidifiers play a multifaceted role in improving nutrient digestibility and mineral utilization. Their functions include reducing gastric pH, prolonging gastric retention time, stimulating pancreatic secretions, influencing mucosal morphology, and serving as substrates in intermediary metabolism (Partanen & Morz, 1999). In broilers, the supplementation of acidifier has been associated with enhanced metabolizable energy (ME) and nutrient digestibility for components such as crude protein (CP), ether extract (EE), crude fibre (CF), and nitrogen-free extract (NFE) (Ghazala, Atta, Elkloub, Mustafa & Shata, 2011). Furthermore, the complexation of dietary organic acids with minerals has been found to improve digestibility while reducing the excretion of supplemental minerals and nitrogen. The acidic anions of acidifier promote the absorption of essential minerals such as calcium, phosphorus, magnesium, and zinc (Edwards & Baker, 1999).

5. Effect on Immunity: Acidifiers exhibit the potential to stimulate the natural immune response in poultry. Inclusion in diet has resulted in significant increases

in antibody titres against diseases like Newcastle disease and for infectious bursal disease (IBD) (Houshmand M. et al. 2012).

6. Impact on Intermediary Metabolism: Acidifiers act as intermediates of the citric acid cycle, contribute a significant amount of energy during metabolism. The citric acid cycle is a central metabolic pathway that takes place in the mitochondria and is crucial for the generation of energy in the form of ATP.

7. Effect on Layer Performance: Acidifiers into the diet has increased average egg production and reduction in issues such as soft-shell and broken egg in birds (Dhawale et al. 2005).

8. Effect on Egg Quality: Supplementation of acidifiers in layer diets demonstrates potential in enhancing the integrity of reproductive organs, such as the shell gland in the oviduct. This improvement manifests positively in terms of eggshell colour, egg production, Haugh unit score (a measure of egg quality), and overall egg quality (Park et al. 2009).

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Meandering the Milky Way for Health and Happiness

SHRIDHAR speaks



Tarun Shridhar
Former Secretary,
Ministry of
Fisheries, Animal
Husbandry and
Dairying,
Govt. of India

"I love milk so much! I make a point of drinking a glass of milk every day. So now anyone who did those milk ads with the milk moustaches, they're my heroes," Natalie Portman, the celebrity Hollywood actor and heartthrob of millions describes her passion for her most preferred food. After all, cultures across the world refer to milk as the "food of the gods." Grapes may be sour and not worth the effort, but the sour milk is the succulent cheese; nothing short of a miracle: a food going bad creates another delectable food item.

A whopping 230.6 million tonnes is the quantity of milk we produced last year. This constitutes one fourth of the global production. The number two country behind us is the USA, but then it is a distant second with production not even half of ours. Isn't it a sterling achievement! To add to the crowning glory is our share in the global production of ghee and butter which stands at 40%.

Millions of stars, each not big enough to count individually, define our galaxy aptly named the Milky Way. The half-litre poly pack of frothing milk that millions

in India open each day is, likewise, the output of innumerable dairy farmers and their bovines. The unique system of some 50 million litres of milk being collected daily from over 16 million producers and being processed for sale by our dairy cooperatives is a Milky Way that we have successfully demonstrated to the world. It has also enabled our country to become the world's largest milk producer, an undisputed champion with no equal.

About seven billion people worldwide consume milk and milk products. According to the FAO, 81 percent of world milk production is contributed by cattle, followed by buffaloes with 15 percent, goats with 2 percent and sheep with 1 percent; camels provide 0.5 percent. The remaining share is produced by other dairy species such as equines and yaks. About one-third of milk production in developing countries comes from buffaloes, goats, camels and sheep. In developed countries, almost all milk is produced by cattle. Milk from dairy species other than cattle represents 40 percent of milk production in Asia, 23 percent in Africa, 3 percent in Europe and 0.5 percent in the Americas; it is almost non-existent in Oceania. Obviously, the dairy sector is more diversified in Asia and Africa, the developing regions. Half of India's milk production is from buffalo. We are the true buffalo soldiers.

"Land flowing with milk and honey" is how symbolically a place of prosperity and abundance has been traditionally described. The Bible uses this expression over and over again as a hyperbole to a Garden of Eden like paradise containing

all the riches of the universe. Likewise, milk is considered a life sustaining drink in Hinduism having purifying qualities. Thus milk is symbolically used for bathing too in quite a few rituals. Milk is a powerful symbol within most cultural traditions. It is universally acknowledged as the fluid of eternal life, fertility and abundance. In quite a few religious and cultural traditions, it is regarded as the first human diet. Quite aptly so, since it is the nectar of the gods. Millions of Hindus revere and worship cows as they provide life sustaining milk, hence for them it symbolises the mother. And then milk is believed to be a provider not only of robust physical health and high energy but also of intelligence and wisdom. No doubt, therefore, that the power of dairy is incredible, encompassing all facets of life from basic food to a strong influence on religious, social, cultural dimensions; and further the immense potential of economic transformation.

Milk is a complete food. Of course, there are sceptics who advocate that a complete food is one which contains animal meat, their line of argument being that animal protein is an essential nutrient for the human body and that it is available only through meat. They make a valid point but then milk too is animal protein. Virat Kohli, the champion cricketer and acknowledged as a supremely fit athlete is a vegetarian, so is the erstwhile cricket sensation Virender Sehwag. Majority of the Indian wrestlers who have brought glory to the nation in international events, including the Olympics, are diehard vegetarians. Where

do they draw their strength and stamina from? You need not look for an answer beyond milk. Milk is one of the lowest-costing and most nutritionally-dense foods you can get today. It is packed with the essential nutrients our bodies need, including protein, calcium, potassium, phosphorus, riboflavin, and niacin, besides the important vitamins, including vitamin A, vitamin D, and vitamin B12. Let us outline the nutritional virtues of milk.

Milk is a great source of natural, high quality protein. Milk proteins support muscle growth and repair. According to a recent analysis, an increased milk intake can boost muscle mass and strength during resistance exercise in both younger and older adults. Knee osteoarthritis currently has no cure but researchers say drinking milk every day results in reduced progression of the disease. So there is no reason to not enjoy milk as a part of a balanced diet and healthy lifestyle, not to forget its heavenly taste. Some of the important nutrients provided by milk and their functions are: i) Calcium builds healthy bones and teeth, and maintains bone mass; ii) Protein serves as a source of energy; builds and repairs muscle tissue; iii) Potassium helps maintain a healthy level of blood pressure; iv) Phosphorus strengthens bones and generates energy; v) Vitamin D helps absorb calcium and phosphorus to maintain strong bones; vi) Vitamin B12 helps maintain healthy red blood cells and nerve tissues; vii) Vitamin A improves immune system, normal vision and healthy skin; viii) Riboflavin (B2) helps convert food into energy, ix) Niacin metabolises sugars and fatty acids; and x) Tryptophan, an amino acid, assists in inducing sleep. Consumption of even small amounts of milk and dairy products correct amino acid deficiencies in cereal-based human diets.

Milk provides proteins with a wide range of amino acids that meet the

requirements of the human body. Research has shown that eating cheese can help protect against dental caries because milk contains casein, phosphorus and calcium. Spicy food often leaves

Milk is neutral. It is neither in competition with meat or non-vegetarianism, nor with veganism. It stands on its own firmly established reputation as a complete and nutritious food

one with a burning sensation. Casein in milk soothes the burning sensation in the stomach and the digestive tract. Cultured dairy products such as yoghurt, buttermilk, and some cheeses have some additional advantages. They have

less lactose and are good for lactose-intolerant individuals. The microbes, added as culture, help to improve digestion as well as absorption of digested nutrients. Some experts claim three servings of dairy in a calorie-controlled diet can help achieve greater weight loss. Isn't it amazing?

At the other end of the spectrum are the vegans who would outrightly reject milk for being of animal origin and, therefore, look for milk substitutes. Sorry to say, milk has no substitute. Let there be no doubt that there is no such thing as soy milk; it is soy juice. Almond milk is not milk; it is a beverage. Above all, these juices and beverages, masquerading as milk, contain chemical additives and unhealthy quantities of sugar. Giving them the moniker of milk is both misleading and against the law. The global food standards Codex Alimentarius define Milk as "the normal mammary secretion of milking animals obtained from one or more milkings without either addition to it or extraction from it, intended for consumption as liquid milk or for further processing." Milk product is "a product obtained by any processing of milk, which may contain food additives, and other ingredients functionally necessary for the processing." Veganism, therefore, at this point of time is more a matter of belief and ideology than proven science.

Milk is neutral. It is neither in competition with meat or non-vegetarianism, nor with veganism. It stands on its own firmly established reputation as a complete and nutritious food. A per capita availability of 459 grams per day in our country, way above the global average of 394 grams, should be an obvious answer to our nutritional requirements.

Cry over spilt milk? Us? Never. For we have plenty to fill our glass, even the pail, right to the brim, time and again.

Cover



Poultry Processing: Guide to Performance

Commercialisation requirements and intense competition makes today's meat market an intensely controversial zone. It increases the importance of preserving and guaranteeing the credibility of the way the animals are slaughtered and the carcasses processing in the processing houses, ensuring basic food safety. IPR researches key indicators for optimal performance

To obtain good results in the industrial performance, even before processing, we consider that the performance of the animals in a flock depends on the variables related to genetics and nutrition, being influenced by the uniformity of flocks, as well as by the farming facilities. Therefore, the interaction of the variables such as animals, management, nutrition, facilities and ultimately sanitation status will determine how the performance will be during the processing. It is characterised by the raw material received, considering the live weight received and the flock uniformity, and even the total number of animals effectively available for the slaughter and the processing conditions (carcass integrity and slaughter line speed).



The integrity of the carcasses takes into account the sanitary conditions of the animals received, determined by the indicator of sanitary sentences criteria, expressed in condemned kg, in condemned animal units total or partially. Consider still the need to distinguish between causes, considering the causes of condemnation.

The intensity of the meat market environment develops immense competition and commercialisation requirements, increasing the need to preserve and guarantee the credibility of the way the animals are slaughtered, and the carcass is processed in slaughterhouses, ensuring food safety, and at the same time presenting a good economic result of operational viability.

The performance of industrial operations in slaughterhouses results from:

1. The interaction of variables that depend on the characteristics of the raw material received (especially related to the carcass yield), considering the health of the flocks
2. The proper use of the carcasses during the operational procedures
3. Considerations of the customer's expectations and the markets' requirements

The time variable influences, in a decisive way, the operations depending on the of the number of animals slaughtered, or the number in kg processed per hour of processing.

This variable depends on:

- The size or weight of the animals slaughtered

- Need for reprocessing of carcasses due to sanitary and non-sanitary condemnations
- Of the slaughter equipment's conditions
- Of the dimensions of the environment, the number of personnel available for the operations, as well as the degree of mechanisation of the processes

In this way, the variable attributed to the number of employees associated with processing, and the variable kg of meat obtained, depending on the time, indicates productivity by kg-processed/man/hour.

Impact of Diseases on Processing Parameters

Several diseases can impact in the processing parameters as carcass yield and kg – processed/ma/hour.

- IB (Infectious Bronchitis)

IBV infections can cause clinical signs in the poultry respiratory system which the impact will be well observed in the field and processing performance results. Important to be noted that subclinical infections will cause impact in parameters as condemnations, and mortality during transport from the farm to slaughterhouse.

- IBD (Gumboro Disease)

Gumboro Disease protection is one of the bases for the immunity system for a broiler. This way, it will contribute for the broiler health. It was already observed in several poultry operations, that the disease can cause impact specially on the broiler flock uniformity and its operational performance in the speed during slaughterhouse. The carcass and breast yield and the lower contamination of final product was appointed during previous field research.

Table 1 – Processing time

Line Speed	Kg/day	Slaughter Costs \$/Kg
12.000	633.600	0,972
11.000	580.800	1,060
10.000	528.000	1,166
9.000	475.200	1,296

This example is from Paraná State (Brazilian TOP 4). With Daily slaughter 320.000 3 kg LW.

These parameters as condemnations and flock uniformity will have influence as well on the productivity of the processing plant, as well as the slaughter line speed, and impact directly in the profitability of the operation.

Analysis of Indicators

In the method of calculation and the interpretation of the main performance indicators and their implications for the operational result in the poultry processing, it is necessary that these data be obtained in a cartesian and systematic way.

That is, based on methodology and instrumental appropriate to the conditions in which the processes are carried out (procedure standardised operating and instrumental calibration); taking care of the necessary frequency with which these data are obtained; and that allows the repetition of the method, the correct transcription and feeding of a reliable database and agile enough to carry out a subsequent analysis of the data, helping to increase the industry performance, and helping to evaluate the quality attributes of the products.

Table 2 – Costs of primary production, costs of slaughter and total costs in eurocents per kg carcass weight. Source: Wageningen 2018

	EU	USA	THA	BRA	ARG	RUS	UKR
Farm-level costs	123	98	109	89	103	117	94
Slaughter costs	28	25	17	17	20	19	18
Total	152	123	126	106	123	136	112

The training of personnel for data collection and monitoring of processes deserved special attention, just as it is essential to carry out the regular monitoring of how the data is obtained, if the frequency is adequate, if the instruments are adjusted as prescribed, and if the procedures to minimise possible adjustments that may occur during monitoring or data collection. These deviations or adaptations can distort the analysis and interpretation of key indicators, impacting decision making, operational and product cost.

It is necessary to ensure that the data is available, adding benchmarking, in a way to contribute to the decisions by the managers, considering the best performance of operations.

The key is to keep in mind that the transformation process in the plant can be optimised continuously, as long as there is regularity in these processes of collection and analysis of data, in the discussion and interpretation of performance indicators, as well as establishing feasible goals of the targeted. To maintain the link

between flocks information and client requirements contributes to improve the operational performance in slaughterhouse. The costs of slaughter play a special role in the operational performance and in the industries competitiveness.

So far, we have discussed the importance of managing poultry production performance using key parameters as capability indicators that help producers make better decisions and contribute to operational improvement during slaughter. Through specific training in data collection, and by using consistent statistical methodology while monitoring the results to make permanent improvements in the poultry production process, we have discovered the right strategy.

The meat market is an intense competition field, and commercialisation requirements increase the need to preserve and guarantee the credibility of products and to ensure business sustainability. Credibility and safety are primary concerns.

Considering diseases such as Infectious Bronchitis and Gumboro Disease, the health status of the poultry flocks, the impacts thereof, require attention in the processing plant. Furthermore, various aspects during meat processing can impact several operational parameters, and, of course, the economic result of operational viability.

Now, we shall take a closer look at the parameters, associated causes and their economic impact on the poultry production chain.

Poultry Uniformity

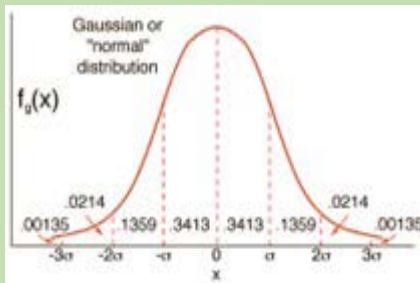
The uniformity of poultry flocks will be greatly affected by several factors, including the farm's facilities, management, nutrition and sanitary status. When the broilers are affected by diseases such as Infectious Bronchitis or Gumboro Disease, the flock will not perform to its full potential, and each bird is affected in a different way and to a different degree. This results in uneven growth, and further down the production line, at slaughter and during processing, will impact carcass uniformity, causing slaughter line balance challenges and a reduction in the slaughter line speed. Consequently, processing costs will increase, which will also impact the cost of the final products.

Carcass Uniformity and Weight

A significant variation in the weight of each broiler will lead to a larger variation between the predicted carcass weight (planned to cover the commercial needs) and the real product obtained and variable for the market. Variations in the final weight of chicken meat products could mean that the required carcass weight or cuts are out of the market standard, which will damage the credibility of the brand in the market.

Table 3 and Table 4

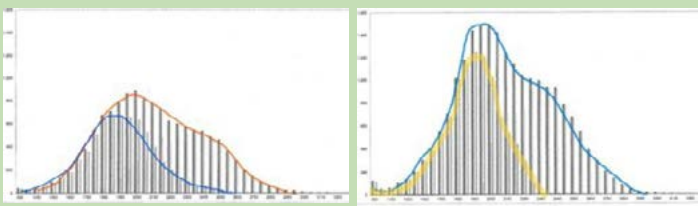
% Uniformity	CV (%)
95,4	5
90,4	6
84,7	7
78,8	8
73,3	9
68,3	10
63,7	11
58,2	12
55,8	13
52,0	14



See in the Table 3 and Table 4, the range of weight trends to follow a Gaussian or normal distribution. Still, according to the uniformity and coefficient of variation (CV%). The quantity of carcass on the extreme right and left will vary.

The ideal flock's average live weight CV% accepted under automatic evisceration during slaughter condition must be lower than 8%, assuring ideal balance related to the speed line and also reduced carcass contamination during the sanitary inspection.

Situation A and Situation B



Situation A and B illustrate the carcass weight that was obtained during monitoring in the slaughter plant after chilling. The different weight range and their frequency show us in Situation A that a larger CV% from female flocks (blue) with limited frequency of heavier carcasses. This reduces the possible range of the carcass and the consequent sales possibility. The orange line illustrates heavier male flocks, offering more carcass weight range possibility opening the sales opportunity.

Situation B illustrates one slaughter day from flocks with a reduced CV%, with a shorter curve considering the carcass weight range (female), concentrating the frequency (yellow line) with very high uniformity, and reducing the sales opportunities. The same characteristics were obtained by evaluating male flocks (blue) with an atypical curve with larger range options.

Carcass Yield

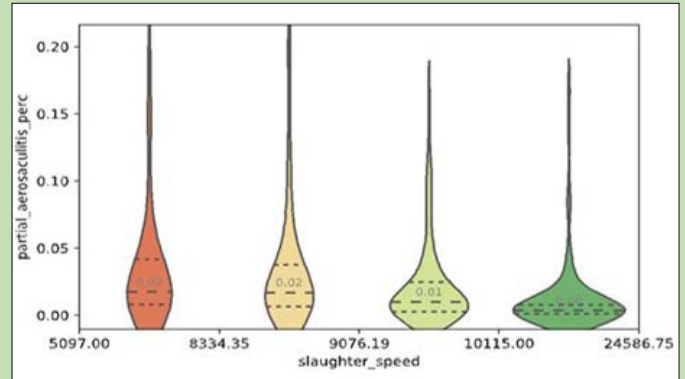
In combination with the weight of the cuts that will be impacted by the uniformity, non-uniform carcasses impact industry yields due to ineffective deboning equipment adjustments. The faster the speed of the deboning line, the more imperfect it will be when processing various weights, and the more likely yield will be reduced.

Table 5

	breast	Live weight %
	Meat, bone, skin	21,46
	Breast skin	2,38
	bone	0,22
	meat	15,17

Sanitary Condemnations

Table 6-A lower speed is related to flocks with higher rates of condemnation by airsacculitis



Condemnations made due to sanitary reasons will affect operational viability not just because meat is lost from the carcass but because it slows down the operation.

Controlling Infectious Bronchitis Disease

It is known that controlling Infectious Bronchitis Disease is essential to reducing carcass condemnations. In Brazil, a study was conducted in 19 companies where the production of over 100 million broilers was analysed. The benefit of the specific viral strain vaccine to control Infectious Bronchitis is described (Table 7) in the reduction of sanitary condemnations in slaughterhouses, connecting the benefits of vaccination in the slaughterhouse operations, the economic aspects and the processing performance.

Table 7

Parameter evaluated	Productive gain (*)	Economic gain each 1,000 poultry (USD)
Reduction airsacculitis partial	0.01 a 2.55 %	4,31 – 22,24
Reduction airsacculitis total	0.02 a 0.31 %	0,67 – 5,97
Reduction colibacillosis	0.01 a 1.88 %	6,46 – 37,08
Reduction faecal contamination	0.8 a 1.15 %	4,31 – 6,19
Reduction cachectics poultry	0.15 a 0.67%	0,96 – 4,31
Total	0,99 - 6,56 %	16,71 – 75,79

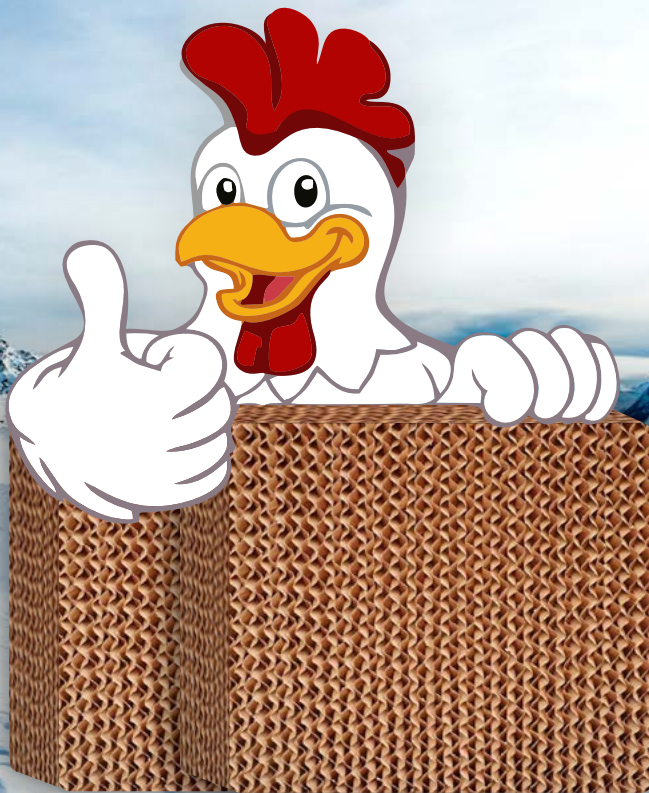
In conclusion, the best operational and economic viability in the slaughter process is characterised by the raw material received considering the live weight and flock uniformity and the total number of animals available for slaughter as well as their processing conditions (carcass integrity, sanity and slaughter line speed).



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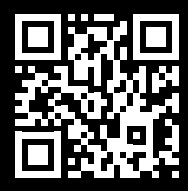
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Country's Corn Exports Plunged at Year Ending 2023

Indian corn exports have almost ground to a halt since last December and fell to a halt due to rally in local markets prices on strong demand from the poultry and ethanol industry, making shipments from the country more expensive than those from rivals.

The country usually exports around 2,50,000 to 3,00,000 metric tonnes of maize every month but in December the exports of maize had come down only to 30,000 confirmed the dealers' sources.

Typical buyers for maize from India like Bangladesh, Vietnam, Malaysia, Nepal and Sri Lanka have preferred purchases from South American countries that are offering the grain at a steep discount on Indian prices. "India's corn exports have nearly stopped", said Nitin Gupta, senior Vice President of Olam Agri, India.

"In the local markets demand is robust for corn from poultry feed and ethanol marketers, which is keeping corn prices firm."

Indian corn is offered around \$ 300 per metric ton on a free-on-board (FOB) basis, while competing South American corn is being offered around \$ 230, dealers informed.

"A very small amount of Indian maize is currently going to Nepal, Bhutan and Bangladesh. The South East Asian countries have complet

EU Further Reduces the Limits of Antibiotics in Livestock Feed

According to leading egg producers and exporters talks regarding the exporting of eggs to Russia from Namakkal, the leading egg exporting district of Tamil Nadu, are still in the very primary stage and it is too early to confirm the possibility.

Due to the war with Ukraine and other factors, egg production at Russia has significantly decreased. As a result there are reports that Russia may need to import eggs from other countries, including India, and Namakkal could take advantage of this opportunity.

Valsan Parameswaran, Secretary of the All India Poultry Products Export Association (AIPPEA), said that talks with Russia for exporting eggs are only at the primary stage. "There are many processes, including trade policies, certification process, quality standards and many terms and conditions, that are to be discussed and finalised. The latest information says that egg

NATIONAL

production in Russia is now better. At present we cannot exactly say whether Namakkal eggs will be exported to Russia. Union and State governments are helping poultry owners to export eggs to foreign countries. The major demand for poultry owners are incentives for egg exports as the price of eggs is changing in domestic market everyday", Parameswaran added.

According to poultry owners, there was a long pending demand to declare Namakkal an avian influenza disease free zone, because an outbreak of bird flu in any part of the country would affect the exports of eggs from Namakkal. Declaring Namakkal an avian influenza disease free zone will save poultry owners from losses, and precautionary measures introduced by the government and animal husbandry department were being followed, he added.

Country's Dairy and Poultry Output Grow Faster than Human Population

India's agro, dairy and poultry food production has grown multiple times than its population over the past few decades, paving the way for increased processing opportunities, said R. S. Sodhi, President, Indian Dairy Association.

"While the population has grown by 2.5 times, cereal production has grown by 2.8 times, fruits and vegetables by six times, dairy by 10 times, and poultry by 2.5 times," said Sodhi, the former Managing Director of Amul, speaking at the two-day India Food Forum conclave in its 16th edition.

This increase in primary output has led to an increase in regional and local brands and they are seen challenging national brands, according to experts at the forum. "Local regional brands are emerging. National brands are trying to be positioned now as regional brands," said Sodhi.

Sodhi also pointed out that the Indian supply chain is extremely efficient, with margins and logistics being minimal compared to global standards, enabling more livelihood and nutrition for the farmer and consumer, respectively.

Earlier in the event, Kanaka Bhagwat, Retail Vertical Lead (FMCG), NielsonIQ, a consulting firm, also raised this point that local brands were driving growth in fast-growing super-categories and they continue to pace year-by-year, now constituting almost 70 percent of APAC sales.

Poultry Feed Market Expected to Reach US \$365.6 Billion by 2033

Farmers use poultry feed to nourish domesticated bird and other fowl including chickens, ducks, turkeys, and geese. In order to provide a highly nutritious diet that maintains the health of poultry birds and improve the quality of final products like meat and eggs, modern feed is compounded by carefully choosing and combining ingredients. For growth and reproduction, upkeep and general health, poultry birds need a wide range of vital elements such as water, minerals, vitamins, carbohydrates and proteins.

When poultry birds' intake of carbohydrates and fats is insufficient, protein is essential source of energy. The demand for poultry feed is rising due to the shortage of antinutritional components such as phytic acid and the effects of unrestricted feed intake on the digestive tracts of poultry birds.

The rise in population is a crucial factor that is anticipated to support the expansion of the global poultry feed market. Furthermore, due to their low cost and a shift in customers' tastes toward white meat rather than red meat, consumption of poultry based products has expanded dramatically, globally.

Increased awareness of the value of protein in the diet can be partly blamed for the rising global per capita meat intake. Additionally, in the Middle East, Africa, production and consumption of meat has increase, which has supported market expansion.

A significant growth in consumers' demand for poultry meat products is the main factor driving the poultry feed sector. An increase in the output of industrial livestock and the demand for organic feed are further market growth drivers.

Both income and population have a big impact on the demand for poultry products. As packaged poultry feed developed more swiftly than conventional chicken feed, the market is expected to rise.

Quality and the price of feed, products have become two of the most crucial factors in this sector, and suppliers are more crucial to the poultry feed industry. Chicken feed companies are projected to get more involved in the manufacture of raw materials in order to control pricing, which is likely to alter market purchasing procedures, reports the latest press release.

EU Further Reduces the Limits of Antibiotics in Livestock Feed

With the focus of this year's European Antibiotics Awareness Day on the 2030 targets to prevent and reduce antimicrobial resistance, European Platform for the Responsible Use of

Medicines in Animals (EPRUMA) partners believe that aiming for overall improved health for both people and animals needs to remain the key objective.

The targets set out in the Council Recommendation on stepping up EU actions to combat anti-microbial resistance are a welcome step towards a more 'One Health' focused effort to reduce the

INTERNATIONAL

need for antibiotic use, the organisation said in a recent press release, but further promotion of preventive health measures is needed to truly reduce disease occurrence in the first place.

The successes of preventive measures and more holistic animal husbandry practices over the past decade are continuously reflected in the decreasing trends shown in the European Medicines Agency's annual ESVAC report. The latest report with 2022 sales data shows that veterinary antibiotic sales have decreased 53% on average across the EU, UK and EEA since 2011, hitting the 2030 'Farm to Fork' strategy target at the halfway mark.

"As EPRUMA, we insist on the widely accepted principles of "prevention is better than cure" and "as little as possible, as much as necessary" when it comes to antibiotic use," said EPRUMA chair Cat McLaughlin. "Protecting animal health through preventive means, ensuring holistic care, and using antibiotics only when necessary, is the best way to reduce the need for antibiotic treatment."

"Setting targets and collecting data is a necessary part of addressing the challenge of antimicrobial resistance," she added. "As disease situations and practices vary across countries whether for human, plant or animal health, such actions must also be underpinned by enhanced surveillance of use, what diseases are being treated and where are antibiotics needed. Together with promotion of preventive measures and hygiene control, such data collection can offer greater clarity as to what actions can be most effective for addressing resistance development."

EPRUMA partners will continue efforts to ensure antibiotics are used responsibly in farming and animal care. As antibiotics remain valuable tools to treat infectious bacterial diseases in people, animals, and plants, so it is our duty to do our utmost to ensure they remain effective for all.

Thai Chicken Exports Expected to Grow in 2024

Thailand's 2024 chicken meat exports are expected to grow 3% relative to 2023, according to a recent US Department of Agriculture (USDA) Global Agricultural Information Network (GAIN) report.

Growth will likely be due to the expected recovery in exports of cooked chicken meat that will likely offset the reduced exports of uncooked chicken meat.

Uncooked chicken meat exports are expected to decline significantly as Brazil's broiler production recovers from the 2023 HPAI outbreak.

Japan's imports of Brazilian uncooked chicken products will likely bounce back due to more competitive prices than Thailand's uncooked chicken meat. The USDA post projects Thailand's 2024 uncooked chicken meat exports will return to the typical 30-35% share of total chicken meat exports.

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IPR Knowledge Review 2023 Finale at Kolkata



The season finale of IPR Knowledge Review 2023 series was held in Kolkata on 13th January. The cold Kolkata winter day saw an impressive turn out of attendees keen to hear the specially curated line up of speakers talk about “Innovative Approaches in Poultry Farming: Embracing Technology for Enhanced Efficiency.”

Opening the seminar, Chief Guest, Madan Mohan Maity, General Secretary, West Bengal Poultry Federation said that the poultry fraternity in the country is serving a very large social cause – providing employment and protein security to the population. Speaking about the scenario in West Bengal, Maity said that the state was now producing 140% and 72% of its chicken and egg requirement respectively and employing



nearly 28 lakh people directly and indirectly. He predicted that by mid 2026, West Bengal will achieve self-sufficiency in egg production. The focus of the Federation and the government is now to drive breeding stock development in the state, added Maity. He also said that the long term objective was to achieve self-sufficiency in egg and chicken production for the eastern states and this initiative will be led by West Bengal

which achieved a 20% growth in poultry production last year. Maity further stated that West Bengal is taking the lead in the growing of poultry related crops. He also stressed the importance of importing GM maize for ethanol production instead of diverting regular maize that goes towards the production of animal feed.

Keynote speaker for the session, Dr. Sudipto Halder, Research Director, Agrivet Research and Advisory Pvt. Ltd. He began by saying that diverting maize to ethanol production is a very serious issue facing the animal agriculture sector currently. The key question, he said, that needs to be addressed is that if 30% of the maize produced in the country goes into ethanol production, how will technology, innovation and efficiency be maintained in the sector? This is where technology

and innovation have to combine to increase efficiency, he opined. He said for example, there are many sources of energy besides maize but we need to be aware of their efficiency levels. This is where the importance and role of data comes into play. He urged the poultry industry to welcome new technological developments and to embrace them wholeheartedly. Dr. Haldar stressed the importance of information in farm operations and gave the example of being aware and informed about the various diseases including emerging diseases to achieve proper and effective compartmentalisation. Gathering this information requires the use of technology, he added. He concluded by saying the crucial importance in modern times is to have information, generate data and embrace technology to interpret and use the data for more efficient and effective operations.

The first speaker of the day, Peter Markert, Area Sales Manager, TPI Polytechnik, addressed the audience on "Keeping Optimal Control Over the Indoor Climate in Tropical Areas." He said that while open houses were inexpensive to build and operate, they provide very little control for the harsh climatic conditions of the tropics. Closed houses help in significantly increasing the production yields. Closed houses need mechanical ventilation and TPI Polytechnik manufactures the air inlets that control mechanical ventilation, added Markert. He explained about heat stress in poultry birds and how to spot it. He went on to describe various poultry house designs – open and closed; and finally the optimal poultry house design.

The topic of the presentation by Sunny Sidhu, Regional Sales Director, VDL Agrotech was "Boost Your Breeder Performance". He began with an explanation of what boosting performance means – achieving the best possible results with the least financial footprint. He also spoke about maximising total eggs per hen housed. Sidhu further spoke about the necessity to have restricted feeding in broiler breeders as overweight hens reach sexual maturity too early, have reduced total egg production and increased number of abnormal eggs. He then elaborated about the three feed systems for breeders offered by VDL Agrotech. For broiler breeders, according to Sidhu, every day restricted feeding gives best FCR and most settable eggs. Further, he stressed on the importance of uniformity to avoid issues with overweight or underweight birds. Sidhu also discussed regarding the challenges posed by restricted feeding. He went onto speak about the various innovative products offered by VDL Agrotech.

Speaking on "Improving Life Through Brightness", Mex Tay, Business Development Manager, HATO Agricultural Lighting, began by talking about how poultry perceives light. He said that poultry birds can see ultraviolet light, something that is not visible to humans. Right lighting is very important to reduce stress of the birds and to promote animal welfare, said Tay. He went onto explain the light spectrum of incandescent light, fluorescent light and L.E.D. light. Tay gave a case study about a situation in a poultry house before and after installation of HATO lighting. He explained a lighting





plan for a poultry house. Thereafter, he spoke about HATO Agricultural Lighting's range of products. He concluded his talk by saying that while the industry is transitioning from open to closed housing, optimising poultry lighting is assuming critical importance.

Dr. Sanjay Singh, Chief Operating Officer, Stallen South Asia addressed the gathering on "Health and Welfare of Poultry: Addressing New Advancements in Disease Prevention, Vaccination and Welfare Standards." He said that with all the developments in the country's poultry sector, yet there are organised and unorganised sectors. The organised subsector needs a conducive environment to grow for which policy support and intervention is required mainly for disease surveillance, drug residue and drug/vaccine quality control, standardisation and quality control of poultry feed, eggs and meat.

Application of HACCP and GMP is yet to set in. He added that the progress in all sectors of poultry has happened due to advancement of technology in management, nutrition and healthcare systems. Dr. Singhal detailed the new trends that have emerged in poultry farming, particularly post COVID-19. Better productivity has resulted due to improved genetics, better nutrition, advanced climate controlled housing systems, excellent disease control, improved vaccines and vaccination techniques, effective use of antibiotics and AGPs. Further, he spoke about the challenges in modern animal protein production. Dr. Singhal went onto speak about the various alternatives available to poultry producers today as also the future research focuses. He spoke in length on poultry welfare and its various dimensions. Dr. Singhal added that precision farming or new farming systems like smart farms, automated farms, digital farms etc. will revolutionise the industry and pave the way to a faster and more sustainable poultry farming and profitability.

"Optimising Ventilation in Poultry Farms: Fan Selection and Operations for Efficient Farm Ventilation" was the topic on which Jagendra Singh, Sales Manager – India, Bangladesh and Nepal, Multifan Vostermans Ventilation addressed the gathering. In his talk, Singh covered the basics of ventilation, the importance of circulation, major technologies, energy efficiency, fan selection and improving fan efficiency with regular maintenance. He presented a detailed talk on how Multifan is different from its competitors and how it can help in boosting efficiency of the poultry farm.

The final presentation of the day, by

Ferry Monné Head – Sales & Marketing, Aviagen India, was titled "Aviagen and Modern Farming". He began by saying that the majority of the Indian population prefers to eat meat – more than 70% eat meat. Given its climatic conditions and regional diversity, India needs a broiler bird that is able to perform under different farm management styles, under different geographic regions and under different climatic conditions; robustness and resilience are critical. Ferry Monné gave a brief overview of the evolution of the selection criteria for broiler chickens. He also spoke about the genomic research that goes into Aviagen's birds. Monné's presentation included a view into Aviagen's farm in India and the facilities / technology used. He added that primary breeding companies are investing heavily in R&D, new technology is constantly evolving, management and environmental inputs need to keep pace with the continuous development of modern genetic lines. He concluded by explaining in details about the Ross 308 AP Broiler and Breeder.

The vote of thanks was proposed by Sanjoy Mukerji, Executive Editor, Indian Poultry Review.

IPR Knowledge Review at Kolkata was supported by Aviagen India, Stallen South Asia, TPI Polytechniek, VDL Agrotech, HATO Agricultural Lighting and Multifan Vostermans Ventilation.

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Event

Innovation and Growth Take Centre Stage at 10th KIPF 2024



The 10th Kolkata International Poultry Fair 2024 (KIPF 2024) was held between 7th and 9th February at Eco Park, Kolkata. Organised by West Bengal Poultry Federation in association with Animal Resources Development Department, Government of West Bengal, this event holds a significant position in the Indian poultry industry's annual calendar. The three days event brought together poultry farmers, industry experts, and stakeholders from across India

and South Asia. KIPF 2024 served as a comprehensive platform for knowledge exchange, networking and business opportunities.

The precursor to the expo, NOVACON, a conference on innovation kicked off on 6th February, setting the stage for insightful discussions and in-depth exploration of relevant issues. Renowned experts and thought leaders graced the event, sharing their expertise on a variety of topics. The conference not only offered

a platform for intellectual discourse but also fostered an environment conducive to collaboration and idea-sharing among industry professionals.

The 10th Kolkata International Poultry Fair 2024 was inaugurated on 6th February by Swapan Debnath, Hon'ble Minister for Animal Resources Development, Government of West Bengal in presence of Pradip Kr. Majumdar, Hon'ble Minister, Department of West Bengal Panchayat and Rural Development. He emphasised





the pivotal role of the poultry sector in ensuring food security, economic growth and employment generation.

Spread across multiple halls, the expo featured a wide array of booths representing various segments of the poultry industry. Visitors had the opportunity of interacting with experts, witness live demonstrations, and gain valuable insights into emerging. Bhandari Group used the expo to launch their new line of fish feed.

A number of concurrent technical sessions were organised covering a variety of relevant topics. Renowned veterinarians, researchers, and industry specialists shared their knowledge and experiences.

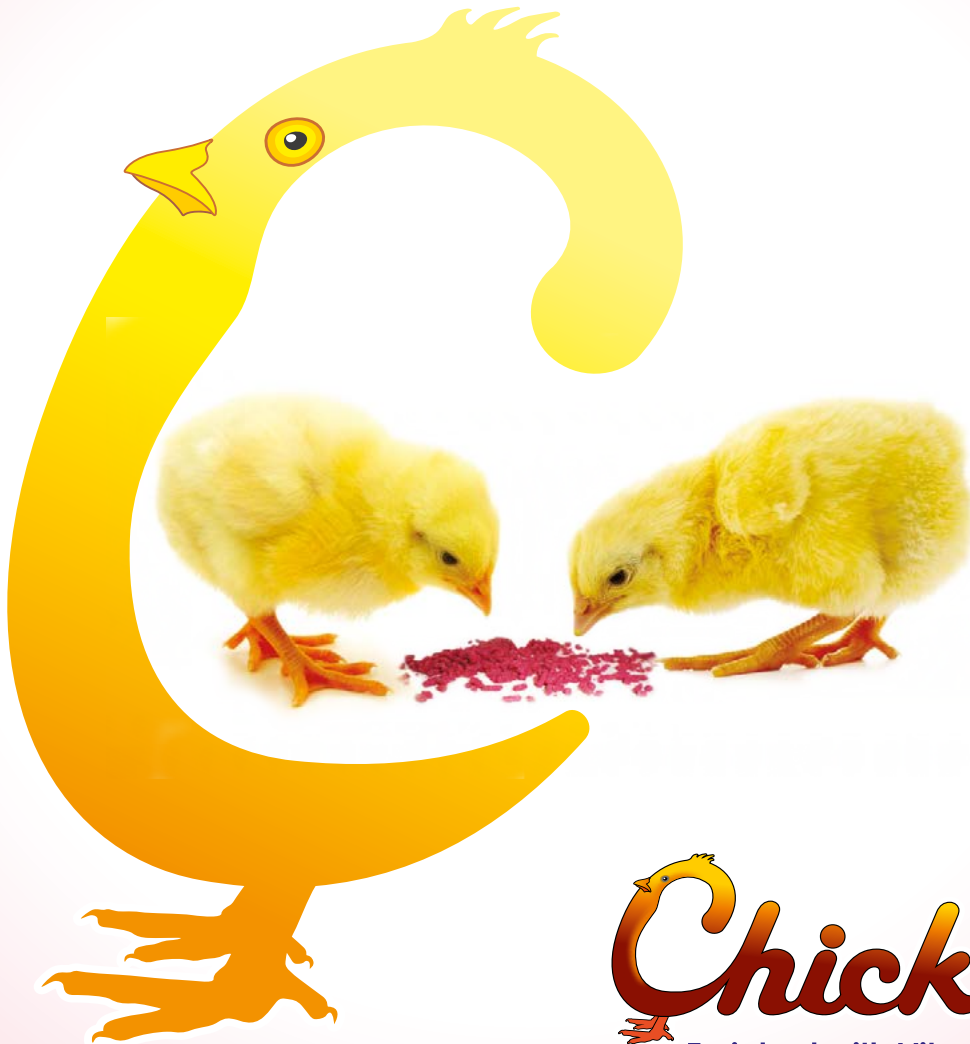
In addition to visitors from various states, KIPF 2024 attracted visitors from Bangladesh, Nepal, Myanmar and Bhutan. It provided an excellent platform for business networking, fostering interactions between industry players,

suppliers, and potential buyers.

One of the highlights of KIPF 2024 was the seminar by officials of Department of Animal Husbandry and Dairying, Government of India on HPAI free compartmentalisation, an absolute necessity for egg exports.

11th Kolkata International Poultry Fair 2025 will be organised from 5th to 7th February 2025 with NOVACON being held on 4th February 2025.

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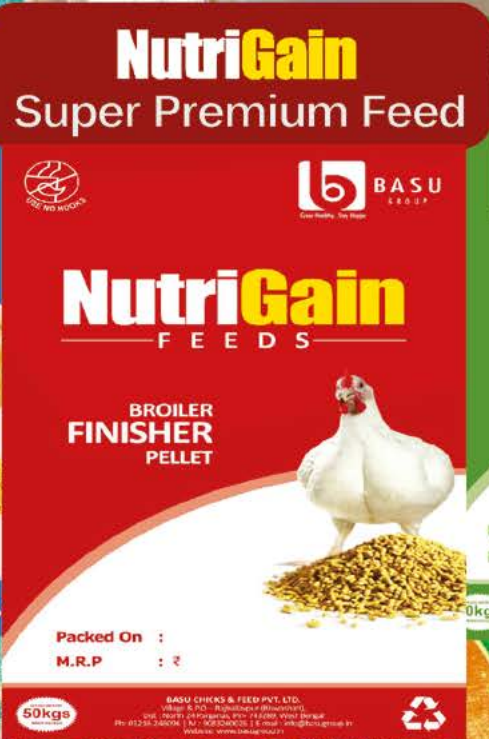


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Announcement

Innovation of the Year Award for Glamac



Glamac International was recently awarded the “Veterinary Pharma Innovation of the Year” award by The Economic Times for its product, CYNKA HBR.

CYNKA HBR is a specialized preparation with strong antimicrobial action and protects the flock against development of digestive tract disorders and maintains overall performance.

Speaking on the award, Abir Mukherjee, Managing Director, Glamac said, “This award is a testament to our commitment to innovation and excellence. We are proud to be recognized and we strive to be technically driven to bring cutting-edge formulation to the ecosystem supported by our strong technical expertise headed by Dr. Sumon Nag Chowdhury and dedicated team. We expect CYNKA HBR to be a game changer, particularly eyeing the antibiotic free eggs and chicken segment of India and global market in the days to come and as the successful alternative of Halquinol and conventional antibiotics (AGP) for effective antidiarrhoeal and antimicrobial solution.

“We are thrilled to receive this prestigious award, and we are grateful to The Economic Times for recognizing us for our innovation. CYNKA HBR is a breakthrough innovation which is born through a series of research and technical trials. It envisaged our vision of developing a non-antibiotic preventive feed additive that ensures effective gut health management in poultry;” said Meghana Mukherjee Salvi, Director, Glamac.

The award was received by the Glamac team comprising Meghana Mukherjee Salvi, Dr. Sumon Nag Chowdhury, Sujit Jadhav and Dr. Rahul Mogale.





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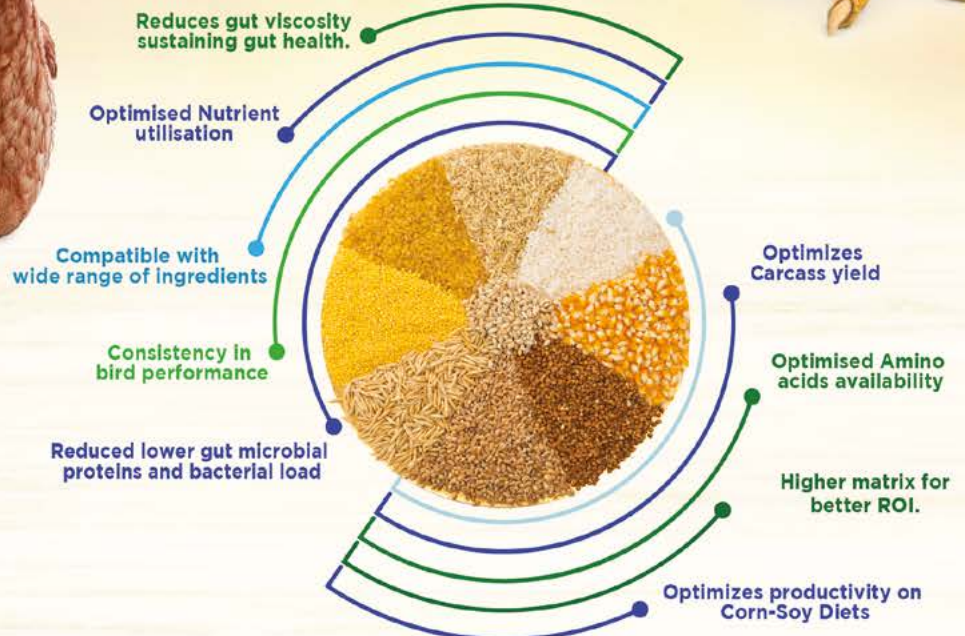
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Announcement

Honorary Doctorate for Sachindra Nath Mandal



Sachindra Nath Mandal, CEO and Founder, Trèsbien Biosynth Pvt. Ltd. has recently been conferred an Honorary Doctorate in Veterinary Healthcare Production and Management by Thames International University, France.

A professional with a proven track record, Mandal has worked for a number of reputed veterinary pharmaceutical organisations before turning entrepreneur with Trèsbien Biosynth, a nano biotech based veterinary pharmaceutical company in 2017.


Over the course of his three decades long career, he has been the recipient of a number of professional awards and has participated in numerous training programmes including those on nano biotech innovation. He is also involved with a number of social causes.





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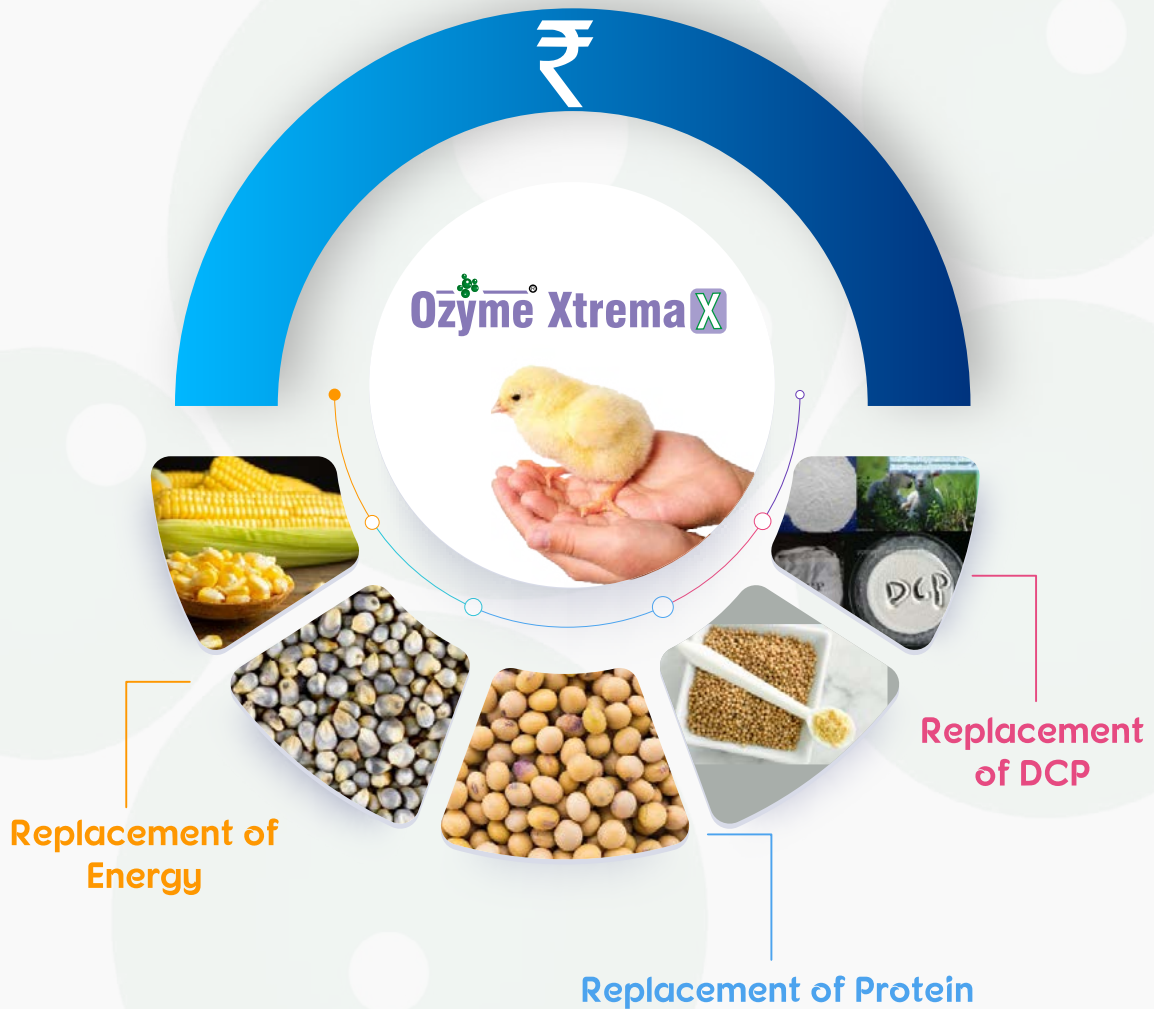
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