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HIND POULTRY

Vol. XX April 2022 No. 10

Suguna Foods Announces Mr. Vignesh Soundararajan as its new Managing Director

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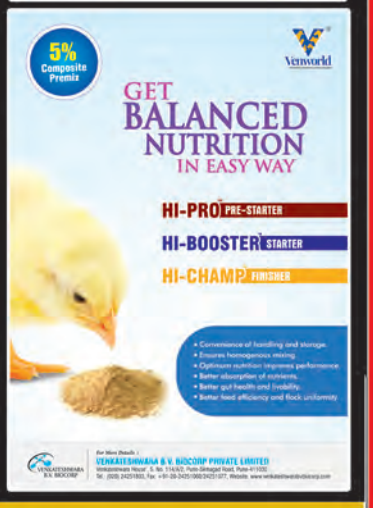

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National Conference on Poultry & Poultry Products by CII

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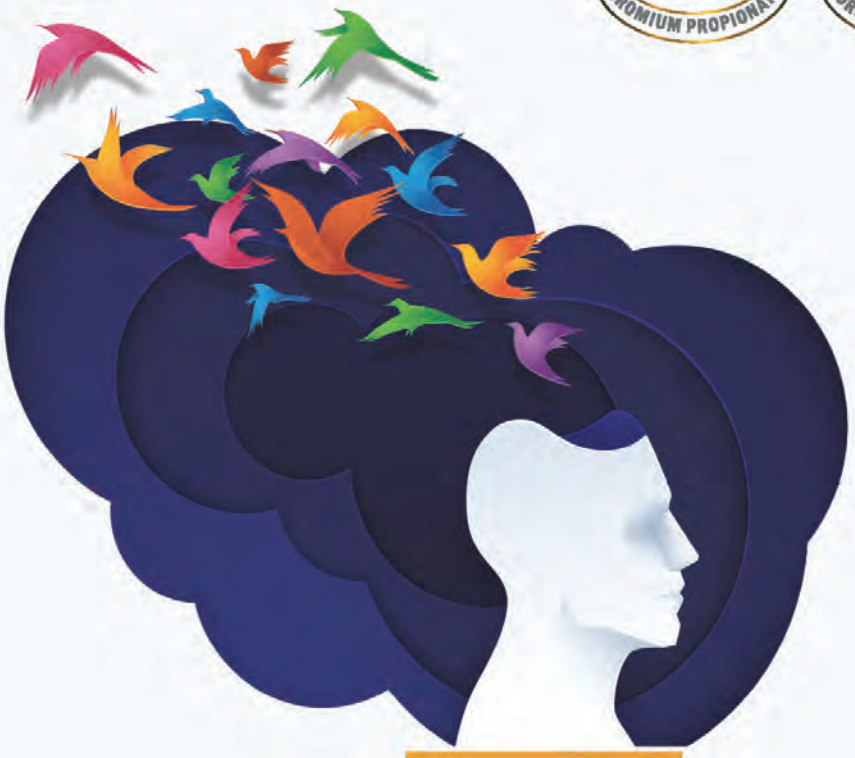

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KEMIN

Suguna Foods Announces the Appointment of Mr. Vignesh Soundararajan as its new Managing Director

Suguna Foods announced the appointment of Mr. Vignesh Soundararajan as its new Managing Director effective from April 1st, 2022. In his new role will lead the Farm, Feed & Process Food Division of Suguna Foods operations in India. In addition to this, Vignesh will also power the company's expansion within the poultry segment and focus on strengthening the footprints of the brand across the nation. The current Managing Director and co-founder Mr.G.B Sundararajan will continue to be associated with Suguna Foods as part of the Board.

Commenting on this Mr. Soundararajan, Chairman, Suguna Group said, "Sundararajan and I are truly satisfied with the transformation we have brought to the poultry industry through Suguna and how we have empowered farmers across the nation. From backyard farming to integrated growers' poultry industry has come a long way in being a significant contributor to the Agro-Food industry. The industry has also played a significant role in building a healthy and strong population. The foundation on which Suguna's legacy has been built and we are confident that Vignesh as the new Managing Director will continue this momentum which will benefit the farmers, industry, customers, partners and people." Adding to this, Mr. Vignesh Soundararajan, Managing Director, Suguna Foods said, "The last seven years have been very eventful, from facing the global pandemic to re branding Suguna Foods, we have faced the highs and lows of the industry. As a market leader and name which resonates across all geographic locations, Suguna Chicken has always been the favorite among consumers. We have also launched "Delfrez" the new age brand in meat retail, which has further strengthened our product portfolio adding diverse purchase options to consumers. While we are devoted to continuing Suguna Foods' legacy and strengthening its overall commitment to the people and nation, I am personally looking forward to bringing additional innovations and retail expansion across all operations in my new role. As we move towards a brighter tomorrow, I look forward to creating a mutually beneficial future for each of our betterment. With this in mind, we have placed a high value on our farmers and Business Associates, and we will continue to work hard to provide best - quality products for our consumers".

Dr. Vignesh Soundararajan holds an MBA degree from IESE BUSINESS SCHOOL , Barcelona, Spain, Bcom from Christ University and an Advanced Diploma in Management Accounting - Chartered Institute of Management Accountants (CIMA) – London, UK. In 2013, he joined Suguna Foods as a Management Trainee and now has risen to the level of the Managing Director of Suguna Foods. With a Close to a decade of experience, he has trained extensively in many domains and has gained a solid understanding of all the business functionalities. As part of his current role - Executive Director, Mr. Vignesh launched Delfrez, Suguna Foods' retail division, which catapulted the retail segment in South India. Mr. Vignesh contributed to the company's transformation by fostering innovation, bridging technology and positioning the brand to have a stronger consumer impact.

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CONTENTS

HIND POULTRY APRIL 2022

PLUS

Digital transformation and the World Organisation for Animal Health's Observatory: A synergic approach

Digital transformation is identified as a key objective in the World Organisation for Animal Health's (OIE's) Seventh Strategic Plan and is an important response to the need to become a more modern and agile organization. This is a vital shift in view of the increasing use of information technologies to support regulation for animal health, animal welfare, and veterinary public health. The OIE is responsible for the collection, analysis, and dissemination of a large volume of official data, through various platforms and processes. OIE data support both national decision-makers and the international community in making evidence-based decisions. Managing data to provide added value is becoming an increasingly complex and digitally driven task. It requires organizations that are responsible for compiling, managing, and communicating data to do so from a structured and strategic perspective, in line with best international practices. In recognition of its role as a steward of global animal health data, the OIE must ensure that its data governance systems manage data securely and provide access to validated data sets for the international community. It is hoped that, in this way, these data will become a valuable resource from which important insights and information can be gained: a process helped by ensuring compatibility with data from other trusted external sources. The development of a strong digital culture will be crucial to driving innovative data use and supporting the digital transformation of the OIE.

At present, the OIE is defining its expectations of data stewardship through the establishment of a data governance framework. These expectations include demonstrating responsible management of data and enhancing access to data for Members while respecting concerns for privacy and intellectual property. This work will provide essential organization-wide rules and processes while also determining the development and direction of each of our key information systems, including those contributed to regularly by OIE Members. The OIE Observatory will use data from multiple OIE work-streams, and also from external sources. Developing prototypes helps us to understand what data already exists, in what forms; how analytical processes applied to these data can serve the OIE Observatory's objectives; and how the results of these analyses can be presented to OIE work-stream managers and OIE Members to provide the greatest impact in driving the better implementation of the OIE international standards. Prototyping will enable each of the OIE work-streams identified in the OIE Observatory's standards monitoring framework to be ready to make systematic and ongoing contributions to the OIE Observatory annual standards implementation report.

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Launch of millTALK YouTube series by KEMIN

Video marketing is catching up quickly in B2B sectors. Kemin South Asia has initiated, yet another video content marketing video series in the name millTALK, ***explainer videos on the concept of feed milling*** by Sarwar Ali, Marketing Manager.

The series is launched on the YouTube platform and short glimpses of which are being uploaded on Kemin's social media pages. The first episode was on the *impact of shrinkage*, the loss of material during manufacturing & material handling processes in the feed mill.

Watch https://lnkd.in/gRj4w5hk

The second was on *cold mash conditioning* and how it helps improve the quality of feed and bird performance

Watch: https://lnkd.in/eYVP-UUC

Surge in Feed costs and steep cut in Production resulting in Sharp increase in prices of Broiler Chicken Across the Country - M.K. Vyas

Chicken prices have shot up sharply across the country with the poultry industry witnessing a steep cut in production induced by a sudden surge in mortality of the birds with the onset of summer. A good part of the production cut is also attributed to the increase in input prices and culling of birds. The average price of chicken meat has now increased up to Rs. 215-240 a kg over the past few days.

Farm gate price of live chicken has also increased currently to over Rs. 130 to nearly Rs. 160 a kg This has resulted in prices in the retail market witnessing a sharp increase.

Mr. Suresh Chitturi, Chairman and Managing Director of Srinivasa Hatcheries and Chairman International Egg Commission (IEC), says that "Due to high mortality rate Production has come down by at least 15-20 percent. The mortality rate, which would be close to 6 per cent in the summer, has surged to over 12 per cent, resulting in the short supply of the birds in the market." He further said that the farm gate price at Rs. 148 a kg is probably the highest so far. "It is not going to come down for few more weeks.

Ricky Thaper, Vice president Indian Broiler Group and treasurer, Poultry Federation of India, said,"Currently live bird at the farm gate is selling at an average ¹ 125 a kg in north India and is expected to touch Rs. 135 a kg very soon.

Hind Poultry feels that the increase will help recover the losses to some extent, but cause of concern for the poultry producers is that Poultry feed prices, which have jumped sharply in last three months. "A live bird requires 1.6-1.7 kg feed and increasing of feed cost directly affect the profitability of poultry producers. Further many small poultry players in Maharashtra have also stopped production as prices of soya and maize have turned chicken farming non remunerative.

According to sources at the Poultry Farmers and Breeders Association production costs have gone up so much that small poultry farmers are unwilling to go for further placement of chicks.

Poultry Waste Management Waste to Wealth

by
Mr. Shirish Dhopeshwar

On 21st March 2022 CII conducted a National Conference on Poultry at Hotel Taj Palace- News Delhi. The conference was attended by large number of people from poultry fraternity and policy makers. Mr. Shirish Dhopeshwar, Managing Director of Dhopeshwar Engineering Private Limited also made a power point presentation on Poultry Waste Management. Poultry Waste Management presents significant environmental, biological and financial problem for the poultry industry. He elaborated as to how different kind of poultry waste can be converted in to valuable material. This article is written by Mr. Varun Dhopeshwar, Director- Dhopeshwar Engineering Private Limited and is also an excerpt from the presentation made by Mr. Shirish Dhopeshwar at the National Conference on Poultry at New Delhi

Mr. Shirish Dhopeshwar
Managing Director of Dhopeshwar Engineering Private Limited

Mr. Varun Dhopeshwar
Director - International Marketing : Dhopeshwar Engineering Private Limited

Poultry waste is generated at every stage of the supply chain from farm to fork. Despite the proportion of waste generated at each stage, it still continues to be the most neglected sectors of the Poultry Industry. There was a time in the past where the issues being created by poor waste management could be overlooked but not anymore. The alarming increase in damage done to the environment due to this has made the legal rules & regulations stricter.

There are three primary sectors in Poultry - Farming/ Hatchery / Processing.

Poultry in 2022 is no more a back yard operation as it was when it started a few decades ago. It has achieved remarkable growth over a period of 25 years & is expected to grow further in the future.

However, the escalating cost of production & the by-product of poultry waste are creating difficulties in growth & sustainability.

3 Types of Waste

There are 3 primary types of wastes in the Poultry sector –

1. FARM – Layer manure, Breeder manure, farm mortality.
2. Hatchery waste – Egg shells, unhatched eggs, rejected chicks.
3. Poultry Processing / slaughter waste – Head, feet, feathers, intestines etc.

5 REASONS why Poultry-Waste needs to be managed / processed & nullified?

1. Poultry-waste is polluting the environment & creating nuisance to communities living nearby, creating hurdles for itself.

2. Poultry-waste is effecting the survival of poultry farms & are a threat to their expansion plans
3. Poultry sector cannot neglect its waste any more.
4. Poultry-waste means – Bio security hazard at farm site | Disease outbreaks | Ground water & air pollution
5. Poultry-waste management will eliminate waste, pollution & nuisance |Generate alternative revenue stream by providing a sale-able by-product | recycle waste generated

There are different poultry wastes being generated among the different sectors depending on the process&each creates their own set of problems.

Sectors > Final product > Waste

Layer farm > Eggs > Dead birds, Manure, Rejected Eggs

Hatchery> Day Old Chicks > Egg shells, Rejected Day Old Chicks, Rejected Eggs

Slaughter> Dressed meat waste > non-edible waste, fat& effluent water.

Problems caused by waste –

Layer & hatchery > Flies, Ammonia smell, Ground water & Air pollution

Slaughter – Ground water & Air pollution

Poultry-waste quantities from different sector :

- 1,00,000 Layers farm – Manure 10.0 Metric Tonnes / day
- 1,00,000 Eggs hatchery – Hatchery Waste 12.5 Metric Tonnes / day
- 1,00,000 Slaughter – Slaugher Waste 50,000 Kilograms/ day

EXAMPLE 1

Layer/Breeder manure

Poultry manure has Highest quantity of nitrogen & is considered the bestmanure from animal source but fresh manure cannot be used as is. It can be used only when decomposed / composted. A layer farm of 1 lakh birds on average generates 10 Tonnes of fresh manure per day which is 3650 Tonnes of fresh manure per year.

Present disposal methods:

1. Leave it as it is on the floor for 6 mn to 1 year
2. Composting
3. Anaerobic digestion
4. Simple drying on conveyor belt

Layer & Breeder manure differ & are mainly liquid - 75% water.

Main problem associated with it: Flies, Odour (Ammonia smell), Bacterial Contamination & Ground water contamination where dumped – Needs urgent solution. We see similar problems are faced due to hatchery waste and Slaughter waste. Solution? – HTST technology.

Clean & Green Technology for Poultry Waste Management

DHOPESHWAR has been involved in design, development and supply of completely Integrated Process plants for chemicals since 1965. It has developed HTST technolgy with Vacuum drying for Poultry waste management. HTST stands for High Temperature Short Time technology to Convert waste into a saleable bye-product. This technology for Poultry-Waste Management involves a DIGESTOR- COOKER- VACUUM DRIER (A 3 in 1 Equipment) based on 'Clean & Green' technology for Converting poultry-waste into saleable products such as:

1. Manure to Organic Fertilizer
2. Hatchery waste to egg shell meat meal
3. Slaughter waste to Meat meal, etc.

Process

The HTST based Rendering Plant comes with 3 in 1 DIGESTOR that acts as a cooker – homogenizer – vacuum drier&a uniqueBAROMETRIC CONDENSOR (for odour controlled operations) and steam generating BOILER with auxilliaries.

Process stages:

- Pressure cooking poultry-waste to eliminate bacteria, homogenise & sterilise waste
- Vacuum dry the waste into dry final product.

Benefits of this process –

1. Zero discharge solid or water
2. Water feom condensed steam can be released for irrigation after filteration
3. No stagnation or holding poultry-waste
4. Waste eliminated same day, saleable bye-product same day.
5. Important Plant feature - Advanced Odour control system – No odour / foul smell

The Direct fired Digestors also act as a substitute for incinerators.

Tangible & Non Tangible Benefits from Poultry waste Management (P.W.M.) :

Tangible benefits – additional revenue – value from waste

In – tangible benefits – Improves the product quality | Gives hygienic & pathogen free product & reduces pollution | Improves working conditions | Improves sanitation & health of communities. P.W.M. means Saving on cost and creating 2nd revenue source as well as making Poultry operations more sustainable due toelimination of pollution and nuisance.

National Conference on Poultry & Poultry Products

Creating an Economically Viable and Sustainable Poultry Industry

Under the aegis of CII and supported by Huvepharma SEA, the 'Nationalconference on poultry &poultry products- creating an economically viable and sustainable poultry industry' was held in New Delhi on 21st March 2022.

The conference could not have come at a better time for the embattled industry. It has been besieged with seemingly never-ending crises- COVID, bird flu, escalating feed ingredients and logistics cost, so on and so forth. The conference, the first in person, sit down one since COVID hit, served as a platform for the industry to come together, and collectively make representations to the government, policy makers to help alleviate problems faced by the industry.

In attendance were Dr. Sanjeev Kumar Balyan, Hon'ble Minister of State of Fisheries, Animal Husbandry and Dairying Government of India, Mr Atul Chaturvedi, Secretary Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry & Dairying, Dr O P Chaudhary, Joint Secretary (NLM) Department of Animal Husbandry & Dairying, Government of India, industry titans and stakeholders of the industry. A major and recurring theme in the proceedings was the size of the world population, which is projected to get to 10bn by 2050. More importantly, India will become the MOST populous nation in the world. Feeding this population is going to be a challenge considering the limitations in resources. Food production will have to be doubled, but it will have to be grown in the same amount of land, with lesser amount of water and probably with more expensive inputs. There were more questions than answers- questions to which this conference has paved the way for finding answers.

The industry was in agreement that the 'consumer' will emerge as a key consideration and newest stakeholder in the industry. Why? COVID has changed the manner in which consumers shop. Gone is the preference of making a visit to the wet market. It is replaced with clicking 'buy' on the phone, laptop, only after having checked all the label claims. Stores like Nandu's are a manifestation of what the consumers want- hygiene, traceability of meat, processing, storage conditions- the full experience.

In attendance were Dr. Sanjeev Kumar Balyan, Hon'ble Minister of State of Fisheries, Animal Husbandry and Dairying Government of India, Mr Atul Chaturvedi, Secretary Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry & Dairying, Dr O P Chaudhary, Joint Secretary (NLM) Department of Animal Husbandry & Dairying, Government of India, industry titans and stakeholders of the industry. A major and recurring theme in the proceedings was the size of the world population, which is projected to get to 10bn by 2050.

Today, chicken is the most common meat served in Indian homes. With improving purchasing power, more disposable income, better awareness associated with benefits of animal protein consumption-its going to hold this position undisputed. So, what do we need to do today to ensure that we satisfy the burgeoning demand of tomorrow?

The panelists emphasised and re-emphasised about the nature of conducting poultry production- it has to be sustainable. Available resources cannot be utilised indiscriminately, with disregard to the ecosystem. Poultry production should be regenerative. And for it to be such requires a large-scale collective effort centred on small-scale farmer success and system-level collective impact.

Dr. Sanjeev Kumar Balyan, Hon'ble Minister of State of Fisheries, Animal Husbandry and Dairying Government of India, in his address mentioned that only if there is a farmer, there will be poultry. Integration of small and marginal farmers with poultry production is an area that needs attention. There is definitely a case here for better hand holding and integration of marginal, small & medium farmers with poultry production houses.

The need to guarantee feed safety was highlighted by several speakers. We are ultimately, what we eat…so if what we eat is not fed safe food, it makes its way up the food chain, creating a considerable risk to human health. It would serve the industry well to embrace the 'food safety culture' – a top down heightened consciousness towards feed safety.

This redirected the focus to food processing. Currently, in India, about 5% of poultry meat is sold in processed form, of which only about 1% undergoes processing into ***value-added products*** (ready-to-eat/ready-to-cook). The poultry processing industry in India is expected to expand at a CAGR of ~12% between 2018 and 2023. For this statistic to become a reality, food processing needs to be pushed and encourage for better promotion of chicken protein. Presentations were made by stakeholders showcasing the various capabilities currently available and those under development for the India market.

There is growing pollution from poultry waste. Poultry operations generate a lot of waste throughout various stages of production. The waste needs to be treated , processed and disposed off or repurposed to limit littering and pollution. Poultry waste management solutions were presented and discussed. Disease management in poultry was also discussed aggressively. Especially because avian influezaand other diseases continue to wreak havoc with the industry, eroding its value.

There has been a lot of evolution and innovation in enhancing poultry production efficiencies. One of the sessions deliberated on technology adaptations and innovations leading to increased quality of feeds in terms of nutrition, technology towards environmental control farms, hatchery technologies, automation in processing, innovations in packaging and integration of safety and hygiene that are the essential requirements to produce healthy and nutritious poultry products. The way forward is automation- to limit the degree of

human involvement and thus, error, leading to better output.

The world is looking to India to claim its rightful place on the world stage as a leading producer of poultry and value added products. As a low hanging fruit, Indian chicken meat should be promoted to targeted countries where meat is imported on a large scale. The panel discussed the deterrents in import of Indian poultry output. Perception, lack of image building and networking , sluggish lobbying were identified as some of the culprits. The answer to which was that the industry should put up a united front. This was reiterated by Mr. Bahadur Ali, Founder and Managing Director IB Group. He said there is strength in numbers, better influencing and bargaining power too. Mr. Ali expressed his concern about the volatility in pricing of corn and soya, which is upending the cost of production. Mr. Ram Reddy, Managing Director Sneha Farms requested for FTAs with targeted countries which will act as a stimulus for exportability of hatching eggs, table eggs, value added chicken meat and egg powder. A key announcement that was made by Dr. Sanjeev Kumar Balyan Hon'ble Minister of State of Fisheries, Animal Husbandry and Dairying Government of India, was to reactivate the Poultry Advisory Committee. This committee would serve as the conduit between the ministry and industry and function as an effective tool to compile efforts being made by both sides for the betterment of the industry. Mr Atul Chaturvedi Secretary Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry & Dairying and Dr O P Chaudhary Joint Secretary (NLM) Department of Animal Husbandry & Dairying, Government of India, both shared how various government schemes have fared and what new ones have been launched. The conference presented an opportunity to look beyond problems- tap into opportunities that would shape the future of the poultry industry. As it turned out, there are limitless possibilities and untapped potential. One thing is for certain- the stage is set for explosive growth of the industry in the decades to come.

The principal sponsor of the conference was Huvepharma SEA. Huvepharma is a Bulgaria based multinational specialising in veterinary healthcare with an experience of over 50 years. They are the world's first carbon neutral approach company, revolutionizing the way poultry industry does business. To know more about them please visit www.huvepharma.com.

Suresh Rayudu: Mr. Rayudu, Chairman: IEC at CII Conference

Suresh Rayudu: Mr. Rayudu, Chairman: International Egg Commission and M.D – Srinivasa farms; in his presentation mentioned viable economic farming & Government - industry intervention. He said that India is 40% - 60% higher side of the input cost in poultry production, which is the biggest issue we are facing whereas, in terms of efficiency, no other country is there to match India in Poultry & egg Production. Still, we did not need the modern practices and technology involved in farming, but now I think we are looking forward to it but not as they are used in the western world. We don't need a million bird farms. A smaller and more efficient farm is needed in India. We need modern solutions which should also suit our requirements. He said that working fragmented, lack of unity, and more priority to the personnel issue is the main issue for our Poultry Industry. If we look at the opportunity, there is a huge domestic and export opportunity in this industry. Talking about the weaknesses, he said that always talking about what we could do five years back instead of talking about the future roadmap of the next 10 years is the main issue with both; the institutions and government. Not sharing enough data with the government is our weakness and must have some corrective measures to rectify the same. Cultured and Plant meat is not an immediate concern for us.

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2	HOUSE TYPE-2	45'x270'	17,654	528/-	93,21,312	2	13	6	27,54,024	3.4 yrs
3	HOUSE TYPE-3	45'x220'	14,192	576/-	81,74,592	2	13	6	22,13,952	3.7 yrs

* Prices are valid until 30th of September 2022 and exclusive of taxes, erection, installation, transportation 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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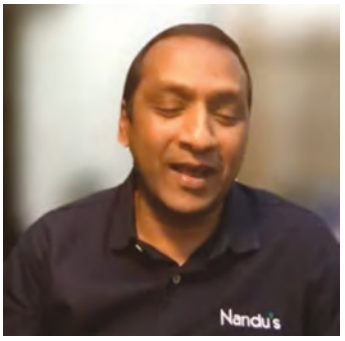
First online round table of STARTUPS in POULTRY SECTOR organized BY CPDO &TI addressed by Mr. Mahesh Joint Commissioner & Director, CPDO & TI, Mr. Narendra Pasuparthy of Nandus, Krishna Prasad of Delfresh

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 First Online Round Table of startups in poultry sector.

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 5 billion broiler population, 250 - 300 million layers and about 4.5 to 5.0 crore broiler breeders are being reared in India. This has established Indian Poultry Sector as one of the best farming activity at a global scale with highly efficient production systems in place. However, poultry products namely egg and meat are being traded as commodities in the traditional market system. The new age companies are entering into poultry sector by adopting technology expertise of brand building and consumer focus approach in re-defining marketing of poultry products.

The founders of different startups who were invited for the online round table were, Mr. Abhay Hanjura – Licious (Unicorn of 2021), Mr. Shan Kadavil – Fresh to Home, Mr. Narendra Pasuparthy - Nandus, Mr. Vignesh Soundararajan/Mr. Krishna Prasad – Delfresh (Suguna Foods), Mr. Nishanth Chandran - Tendercuts, Dr. Sanjoy Kumar Das & Mr. Sushil Kanujolu - Fipola, Mr. Abhishek Negi - Eggoz, Mr. Mahesha – my Chicken & More, Mr. Harsha – The Meat Factory. The Online Round table confrence started with the opening remarks by Dr. Mahesh P.S., Joint Commissioner & Director, CPDO &TI.



Mr. Narendra Pasuparthy, producer cum startup from Nandus while speaking said that "We being producers end up in a local broken supply chain not getting my price for my product. He said that he got inspired by chairperson of VH Group Dr. Anuradha Desai's words to start retailing and to build a brand is essential for getting the price for the product

Mr. Vignesh Soundararajan, Son of Mr. Soundararajan, Chairman and Managing Director, Suguna Foods has established a parent endorsed brand "Delfresh" in this category during last quarter of 2021. Representing delfresh, Sri. Krishna Prasad, Vice President Suguna Foods mentioned that Suguna being expert producer and processor wanted to expand as a consumer facing brand in the new ecosystem. Even though Suguna is having a revenue of more than 10,000 crores per year but Past two years have been a great challenge for poultry producers with escalating costs of inputs of Corn and Soya. They have undertaken a new journey of branding 280+ stores of Suguna with Delfresh with new signage and brand identity and focusing "only offline model as of now".

Speaking on the processing sector he said that presently the overall capacity of processing in India is 1.4 lakh birds per hour with maximum utilization of only 70%, rest being idle because of processing alone being not lucrative.

Other participants also shared their experience and acknowledged the contribution of private entrepreneurs in the poultry development in India.

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Marcelo Lang,
global marketing excellence at Chr. Hansen

Why is it important to understand the modes of action of probiotics?

Marcelo Lang : There is a connection between the typically measured variables of economic importance in the production of animal agriculture and probiotic bacteria's major modes of action. At the same time, not all probiotics are the same. Strain matters! By gaining a better understanding of what probiotics do and how they affect performance in farm animals, veterinarians, nutritionists, and other professionals can make better decisions about which products will help the animals in their care.

Not all probiotics are the same.

Strain matters!

Is the realack of knowledge in the feed industry regarding the use of probiotics?

Marcelo Lang : There is a lack of knowledge, but it's an uneven picture. Some professionals are quite familiar with the effects of probiotics and use them very effectively, while others still haven't caught up and are missing out. Thanks to new techniques, the science is advancing so quickly that even those professionals who are already familiar with and using probiotics will have a lot to gain from this programme.

What is your target group for the programme?

Marcelo Lang : We developed the Modes of Action programme with food animal veterinarians and nutritionists in mind. Other professionals in the industry will also benefit from the program, but they may find some aspects a bit challenging. For example, the lessons on the effects of probiotics on the microbiome or the modulation of the innate and adaptive immune system may require some extra attention.

A recently released self-learning programme teaches professionals the different modes of action of probiotics. Marcelo Lang, global marketing excellence at Chr. Hansen, tells us more.

It's a difficult task to choose the right probiotic since probiotics have various modes of action which support the health of animals. According to Marcelo Lang, this wast the reason for setting up a programme for professionals in the industry: "The aim of this programme is to educate professionals in the animal protein industry on the modes of action of probiotic bacteria."

Can you tell us a bit more about the content of the programme?

Marcelo Lang : There are four courses. The first one is a short introduction to the overall programme. The other three courses contain two or three lessons each, divided by specific types of interactions of probiotics with feed stuffs, with other microbes, and with the host. At the end of each lesson, there's a short quiz to help reinforce what has been learned.

What is the mode of action of probiotics?

Marcelo Lang : Probiotic bacteria affect animal health and performance through interactions with feed stuffs, with other microbes, and with the host animal. In interactions with feed stuffs, we learn how these bacterial actions improve the digestion and availability of essential nutrients. In interactions with other microbes, we learn how probiotic bacteria successfully out compete and eliminate potentially pathogenic organisms from their micro environment and how those actions can lead to lasting positive changes in the intestinal microbiome. Finally, in interactions with the host, we learn about the myriad interactions of probiotic bacteria with the intestinal lining of their host. These interactions actively support the major barrier and immune functions of the intestinal tract.

Can you say more about these different modes of action?

Marcelo Lang : When interacting with feedstuffs, some probiotics can convert sugars to organic acids that improve the intestinal environment and that serve as precursors to absorbable volatile fatty acids. Some probiotics produce an array of enzymes that drive the digestion of relatively hard-to-digest fibres andt hat improve the solubility of proteins. When interacting with other microbes, probiotics are able to produce and secrete potent anti microbial peptides that kill potentially pathogenic organisms, without causing any harm to other probiotic or commensal organisms. Probiotic bacteria can competitively exclude the binding of potentially pathogenic organisms to intestinal microvilli, the site of nutrient absorption. Probiotic bacteria support the proper development of absorptive capacity in young, growing animals. They also actively support the barrier functions of the intestine tract, specifically the proper function of apical tight junctions. In addition, probiotic bacteria interact with specialized cells of an animal' simmune system to improve its capacity to respond to challenges.

What are the health benefits for animals when using probiotics?

Marcelo Lang : Through their effects on feed stuffs, probiotics improve the digestion and availability of essential nutrients; these are nutrients that animals can use to maintain themselves, defend themselves, grow, and produce meat, milk, or eggs. Direct antagonism of potentially pathogenic organisms helps keep your animals healthy and thriving. Gaining an understanding of the trillions of organisms that make up the intestinal microbiome is an essential element in making the most informed product choices for your animals. Finally, through their direct effects on the host, probiotics reinforce the gut barrier functions, which stop pathogenic organisms from invading animal tissues and causing disease.

How do you know which probiotics to use in a certain situation?

Marcelo Lang : No tall bacteria are equal in their ability to interact positivelywith feed stuffs, with other microbes and with the host: strain matters! Choosing the right probiotic depends on the specific situation or challenge facing each particular food animal production system. Understanding the modes of action of probiotic bacteria will enable you to make the most informed product choices for the animals in your care.

Incredible Eggs - Why are eggs good for us?

1. **You'll lose fat** - Largely because of their satiating power, eggs have been linked with fat loss.
2. **You'll lower inflammation levels -** Eggs are a major source of dietary phospholipids: bioactive compounds which studies show have widespread effects on inflammation.
3. **You'll fend off metabolic disease -** Eating eggs is one of the best ways to increase your HDL "good" cholesterol levels. People with higher levels of HDL cholesterol have a lower risk of heart disease, stroke, and other health conditions.
4. **You'll build lean muscle -** When you work out, your body needs protein to repair the tears in your muscle tissue from exercising. Eggs are a great post-workout snack or meal because just one has about six grams of the muscle-building macro.
5. **You'll boost your immune system -** Just one large egg contains almost a quarter (22%) of your RDA of selenium, a nutrient that helps support your immune system and regulate thyroid hormones.

New Phytogenic Solution contributing to Poultry Fertility

As part of Delacon's phytogenic product line for poultry, Biostrong® Fertile represents proven natural fertility support for breeding flocks. The unique formulation was specially developed to enhance reproductive performance and control oxidative stress in breeding males. A comprehensive range of essential oils, flavonoids, and saponins, all obtained from natural sources, support the oxidative resilience of semen and its components and contribute to optimized hormonal processes. With Biostrong® Fertile, Delacon offers a revolutionary natural solution to support the reproduction of breeding males, which increases the percentage of fertilized eggs. The formulation is based on extensive and deep knowledge in the universe of phytogenic active substances and their respective effects on the metabolism of farm animals. Phytogenic compounds can mitigate adverse oxidative effects since those substances can raise the sperm count and functionality and have a positive impact on reproduction. Improving males' fertility is the most efficient way to strengthen the production of day-old chicks.

Reduction of oxidative stress – a positive effect on semen

Sperm cells are sensitive to free radicals due to their significant content of lipids. This oxidative reaction may impact the morphology and functionality of the spermatozoa. Moreover, the free radicals can interfere with the DNA transported by the sperm cells, reducing the viability and quality of embryos and the offspring. Biostrong® Fertile is a unique and compelling contribution, helping to reduce oxidative stress in healthy breeding males, which can regulate testosterone production and semen quality parameters, thus indirectly contributing to the health of the reproductive performance level. "Biostrong® Fertile is a tailored solution, addressing a primary customer need to optimize breeding flocks' fertility. Its technology is based exclusively on natural plant-derived compounds that enhance males' healthy fertility, which is the most efficient way to strengthen the production of day-old chicks. The Delacon team is convinced of the effectiveness of Biostrong® Fertile to support producers in boosting the reproductive performance of their breeders' flocks.", so Roberto Montanhini Neto, Global Unit Lead Monogastrics at Delacon.

Perstorp launches Gastrivix™Avi–a unique gut health solution combining the benefits of valeric and butyric acid

Perstorp is expanding on its innovative range of broiler feed solutions after the launch of Gastrivix™ Avi inlate March 2022.

The company is the first to pioneer the commercial use of valeric acid in animal nutrition, following successful trials of Gastrivix™Avi. Like butyric acid, valeric acid is naturally created bythe gut microbiota of broilers, although in too small quantities for optimal gut health during production cycles. Perstorp has used complex organic chemistry to create esters of valeric acid, which were tested over many years in a multitude of combinations with butyric acid esters to develop the right synergy, and the best match with nature. Gastrivix™Avi has been created to meet the bird's biological needs, support gut integrity and promote reliable growth and performance. Perstorp believes that the solution will solve multiple challenges for the industry, by reducing feed volumes for the broiler's lifecycle, providing consistent growth results, and boosting ROI.

Dr. Antonia Tacconi, Global Product Manager of Gut Healthat Perstorp commented: "We can now prove that the synergy of these two esterified acids works better than one. After multiple trials, we have seen a reliable and consistent improvement on FCR for broilers thanks to the effects of butyric and valeric acid. With valeric acid, we have essentially found the missing ingredient." Gastrivix™Avi is a dry product that is easy to handle, palatable, has no dangerous goods restrictions and has no odor issues . Perstorp believes Gastrivix™Avi represents an new important step in supporting and improving animal performance. The product will be the first new product to be produced on the brand new state of the art production line for powder products at Perstorp's Waspik plant in the Netherlands.

trouw nutrition
a Nutreco company

Impact of Mycotoxins on Gut Health and Immunity

Dr. Sabiha Kadari, *Technical Head, Trouw Nutrition India*

Sustaining the poultry production at its peak is one of the critical taskfor any poultry producer to optimize their operations and associated profitability. Out of the various factors that can influence poultry productivity, the significant one willbe mycotoxins and itsdeteriorating effects on gut health and immunity of birds. These mycotoxins, particularly Aflatoxins, Ochratoxin A, Fumonisins, T-2 Toxin, & DON can have adverseeffects on poultry depending on the contamination levels in raw materials and finished feeds. With the rising volatility in raw materials with respect to quality, supply and pricing, poultry producers are compelled to include alternative raw materials, consequently increasing the threat of mycotoxin incidences. High-fiber raw materials and grain by-products have proved to contain higher concentrations of mycotoxins as compared to their parent grains since mycotoxins tend to concentrate on outer portion of grains. In these scenarios, its crucial to understand the type of toxicity, the source of mycotoxins (which raw materials), itsimpact on animals and take correctivemeasures with respect to quality control and judicious inclusion of apt feed additives.

Acute and Chronic Toxicity

Acute toxicity with mycotoxins occurs when animals are exposed to higher concentrations of mycotoxins within a short time frame, like say, feeding of 250 ppb aflatoxin-contaminated feed to broilers. Acute toxicity is often easy to identifyas they present themselves with clear and specific symptoms in poultry (aflatoxin, ochratoxin, T2 etc.). Chronic toxicity on the other hand is hard to diagnose due to multiple reasons like – no clear animal symptoms, low concentration of mycotoxins, masked mycotoxins, mycotoxin interactions, limited mycotoxin analysis etc. Chronic toxicity occurs when animal is exposed to lower level of mycotoxin or group of mycotoxins over a long period of time, say, 10 ppb of aflatoxins in laying birds over several weeks. Both types of toxicity are harmful to animal performance, with the chronic been more detrimental, as they are hard to infer. Chronic toxicity may manifest itself through its impact on gut health and immunity system of birds, leading to symptoms like poor feed efficiency, wet litter, vaccine inefficacy, increased bacterial/viral infections etc. These symptoms are hard to be associated to mycotoxicosis, as they often could be a result of pathogenic infections or management issues also. Feed analysis performed in a proper manner, can be a way out to deal with chronic toxicity, which would then pave way to assess associated mycotoxin risks and manage/ mitigate the risks accordingly.

Mycotoxins and gut health

Most mycotoxins compromise gut health (Table 1). They cause cellular damage to gut cells via increased pro-inflammatory cytokine secretion and protein synthesis inhibition effects. As a result of such effects, intestinal tight junction protein functions are compromised leading to “leaky gut” (Fig. 1). This further leads to translocation of mycotoxins and pathogens into the blood stream, leading to further inflammation and the subsequent increased susceptibility to bacterial and viral infections.

Fig. 1: Leaky gut with mycotoxins

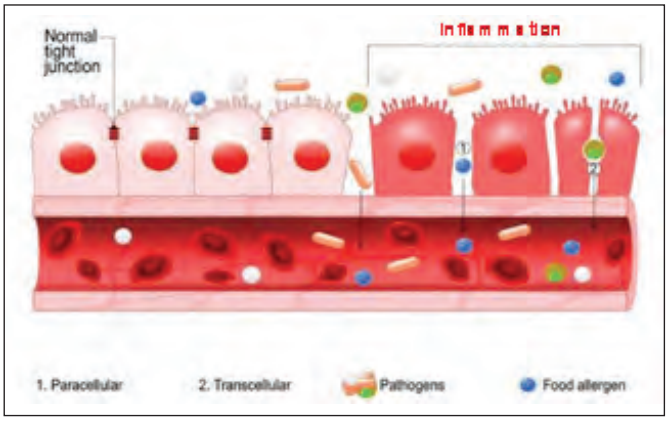


Table 1: Mycotoxin impact on gut health

Mycotoxins	Adverse effects
Aflatoxins	• the disruption of intestinal barrier function; poor intestinal cell proliferation and cell death; compromised intestinal immunity
Ochratoxins	• altered intestinal nutrient absorption; increased intestinal permeability; intestinal cell death; decreased villi height
T-2 toxin / DON	• poor intestinal water and glucose absorption (diarrhea); necrotic lesions in GIT; shortening of intestinal villi (poor nutrient absorption); increased intestinal permeability (lowered tight junction proteins); decreased IL-8* cytokine (responsible for pathogen removal); decreased mucin production
Fumonisins	• decreased cell viability and proliferation; altered intestinal barrier integrity by suppressing tight junction protein; increased intestinal permeability; increased mucin secretion/depletion of goblet cells; altered gut immunity

Mycotoxins and Immune response:

It is a well-recognized fact that most of the mycotoxins affect the immunity system of birds, reducing the bird's capacity to fight infections, as shown below in Tables 2 and 3.

Table 2: Impact of mycotoxins on immune response

Mycotoxins	Adverse effects
Aflatoxins	increased gene expression of IL-6, reduced complement and interferon, suppressed macrophagic phagocytosis, suppressed DTH, reduced weight of thymus and bursa, poor antibody titers, vaccination failures
Ochratoxins	regression of lymphoid organs, lymphocyte depletion, poor DTH, antibody response is affected to a lesser extent
T-2 toxin	regression of bursa of Farbricius, leucopenia, proteinemia, immunosuppression, increased disease incidences
DON	interferes with DNA, RNA and protein synthesis, immunosuppression, poor antibody titers, increased disease incidences
Fumonisins	Thymus atrophy, decreased spleen weight, increased susceptibility to E coli and other bacteria

Table 3: Multiple mycotoxins lowered antibody titer against New Castle and Infectious Bursal Disease

Treatment	NCD titres, log_{10}		IBDV titres, log_{10}	
	day 21	day 42	day 21	day 42
Control	1.36 [a]	1.07 [a]	1103 [a]	1625 [a]
Multiple mycotoxins*	0.96 [b]	0.51 [b]	700 [b]	981 [b]
p-value	0.006	<0.0001	<0.0001	0.0001

*- 250 ppb of AF, OTA and T2 Malathi*et al.*, 2019

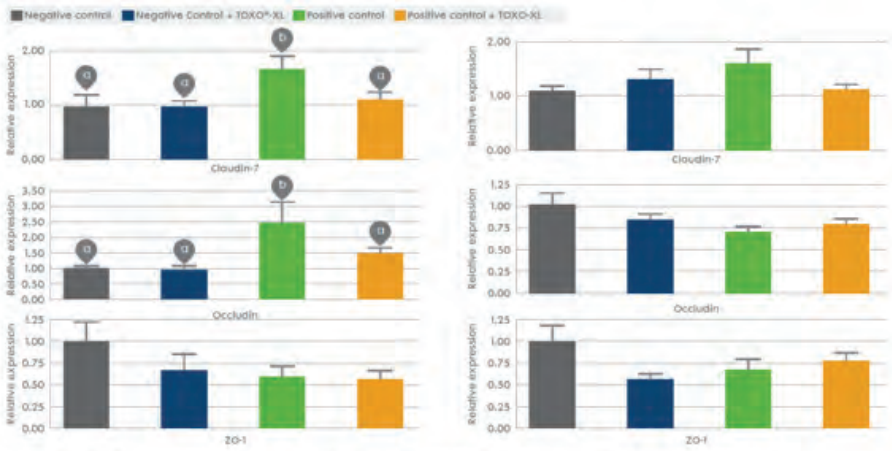
Mycotoxin mitigation strategy

As observed from above data, mycotoxins do have significant negative impact on gut health and immunity. Consequently, a mere mycotoxin binding strategy may not be enough to protect the birds. Additionally, there is theneed of ingredients for improving immunity and gut health, along with protection against multiple mycotoxins. The multiple mycotoxin protection is a necessity as the feed is usually contaminated with more than one mycotoxin and a broad-spectrum solution will enable poultry producers to safeguard their business.

TOXO®-XL is a broad-spectrum mycotoxin risk management concept from Trouw Nutrition, that offers wholesome protection against mycotoxins in an integrated manner through three science-based modes of action. One of the modes of action is effective in reduction of mycotoxin bioavailability through high quality bentonite (smectite-based). The other mode of action is maintenance of intestinal epithelial integrity with the help of selected glucose biopolymers of yeast origin. The tight junction integrity is attained through the increased production of multi-protein complexes which inhibit the intercellular transport of toxins and pathogens into the blood circulation. Various trials with TOXO®-XL, have shown that it effectively reduces the mycotoxin-induced tight junction damage (Fig. 2) and improves villi height to crypt depth ratio (Fig. 3).

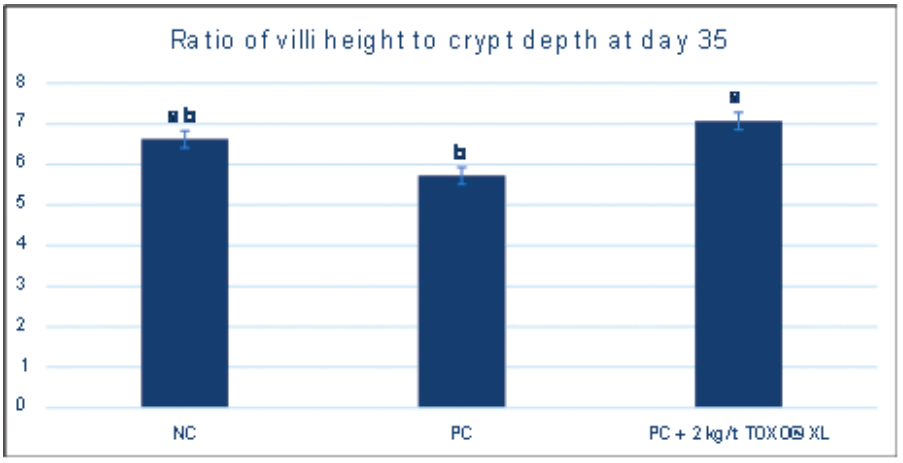
Lastly, TOXO®-XL modulates the immunity of birds through purified beta-glucans. Mycotoxins-induced immunosuppression can be due to various mechanisms, one of which is poor effector cell function of macrophages. Macrophages can recognize beta-glucans by their membrane receptors and get activated without causing negative effects such as inflammation, loss of appetite and poor growth. For superior activation and better immunostimulatory capacity, this activation requires exposed and intact beta-glucans that are extracted through specific processes. Exposed Beta-glucans selected in TOXO®-XL originate from the middle layer of cell walls of Saccharomyces cerevisiae, through

Fig. 2: TOXO®-XL reduces tight junction damage caused by mycotoxins



. Results of the quantitative Polymerase Chain Reaction (qPCR) analysis. Data represent the relative gene expression of three tight junction proteins in the duodenum (left Panel) and colon (right panel).

Fig. 3: TOXO®-XL improves intestinal health (villi height to crypt depth ratio)



NC – negative control; PC: positive control - 6 ppm DON challenge

enzymatic extraction. Unlike the traditional technique of using chemicals to expose Saccharomyces cerevisiae structure, this enzymatic technique ensures a maximum production of intact beta-glucans, to cater to better immune response and vaccine efficacy.

Conclusions

Presence of mycotoxins in feed and their accompanied risks are inevitable. Monetary losses due to harmful effects of mycotoxins, in both clinical and sub-clinical form, can be huge if not taken care of in a holistic way. Due emphasis needs to be placed in terms of stringent quality control measures of incoming raw materials, outgoing finished feed, optimal storage and logistics practices and adoption of broad-spectrum mycotoxin mitigation programs in feed. Effective mycotoxin binding along with technologies to improve animal intestinal integrity and immunity should be included as part of a total solution to combat multiple mycotoxin challenge.

India's push to capture Ukraine's international markets for eggs revolves around boosting shipments to the UAE, which account for almost 40 percent of Ukraine's egg Exports

India is looking to boost its egg and poultry exports in the wake of the war in Ukraine which has wrecked that country's exports of the produce. New Delhi plans to quickly establish exports to the United Arab Emirates (UAE) and Saudi Arabia, among Ukraine's largest markets for the products. While it hasn't featured in the list of major egg-producing nations in Europe, Ukraine was considered to be the poultry source for large parts of Central and Eastern Europe till a decade ago. Ukrainian company Avangardco remains the continent's biggest egg producer, producing both shelled eggs and egg products. Much of India's push to capture Ukraine's international markets revolves around boosting sales of Indian poultry meat and eggs in the UAE. The Emirates accounted for almost 40 percent of Ukraine's egg exports, according to the Ukraine State Statistical Service. In December 2021, the UAE lifted a five-year-old ban on the import of eggs and other poultry products from India. The move followed an assurance by New Delhi that it would follow biosafety norms set by the World Organisation for Animal Health to prevent infection from bird flu. This change in policy allowed India to export table eggs, hatching eggs and day-old chicks to the country.

"The largest shipments of bird eggs from India flow to Oman and Maldives, followed by Indonesia, Vietnam, Russia, Japan and Vietnam. Overall, the Middle East is the largest market for eggs. However, despite being the largest buyer in the region, the UAE has historically bought only a fraction of all Indian poultry products that flowed into the region. We want to change that," a commerce department official said. Ukraine's poultry industry had been taking major hits even before the Russian invasion began in late February. In 2021, Ukraine's egg production plummeted by 25 percent (3 billion eggs) compared to 2020, according to the Ukraine Association of Poultry Producers, media reports from that country had earlier reported Ukraine's poultry stock dropped by 11 million head during the past two years, while broiler meat production decreased by 40,000 tonnes, the reports said. Most of this was blamed on unprecedentedly high electricity, natural gas and feedstuff prices in the aftermath of successive waves of the Covid pandemic. However, long-term contracts and industry linkages meant that Ukrainian companies continued to monopolise supplies to the UAE and other markets right up to the beginning of the war.

In India, egg production had been growing at a rate of 8 percent annually according to government estimates. Tamil Nadu is the biggest egg exporter state in India accounting for more than half of all such shipments. It is followed by Maharashtra and Kerala. The combined share of these top three states in egg exports is a huge 95 percent. Chhattisgarh, West Bengal and Andhra Pradesh are also witnessing fast growth in the poultry sector. The segment still has major room for growth given that eggs only constituted the 629th most exported item from the country.

"India's push to sell poultry products abroad came after the government saw the massive export opportunities in the agri space, just waiting to be exploited. Poultry meanwhile has been increasingly favoured by farmers as a source of added income in parts of the country," said a senior official from the Agricultural and Processed Food Products Export Development Authority. Export of poultry products stood at $71 million in FY22, up 21 percent from $51.7 million in FY21, he said. Overall exports of agricultural products (including that of marine and plantation products) for 2021-22 crossed $50 billion, the highest level ever achieved. According to the provisional figures released by the government, agri exports grew by 19.9 percent during 2021-22 to touch $50.2 billion, up from $41.87 billion. This was higher than the growth of 17.6 percent achieved in 2020-21

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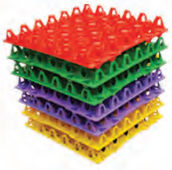

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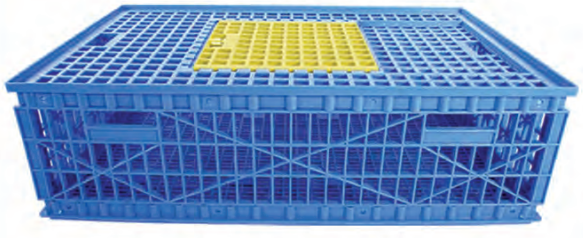

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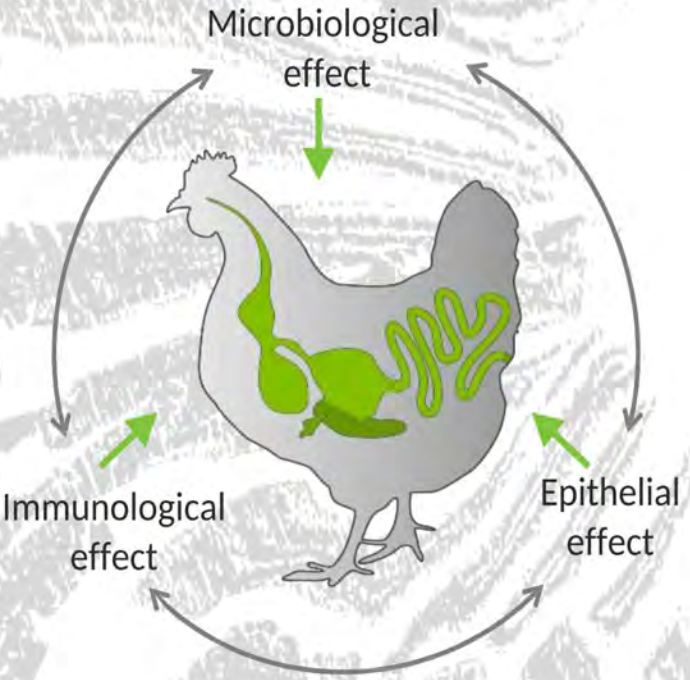

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Least Cost Poultry Feed Formulation Utilizing Unconventional Feed Resources in Northeast Region

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Introduction

Least cost feed is the feed comprising of all the essential nutrients required to meet the requirements of the birds for growth, maintenance, production, reproduction, etc. and overall performance of the bird without affecting quality and with least cost. It includes all the easily available feedstuffs having good nutritive value and available at reasonably low cost. Least Cost Feed may be defined as an economic ration which provides the nutrients in balanced proportion at the lowest possible cost.

Importance Of Least Cost Feed Formulation

About 70% of the total expenditure constitutes of feed cost. So in order to reduce the feed cost, low cost locally available feedstuffs, feed by-products, and agro-industrial by-products can be efficiently use in poultry feeding. Naturally available concentrate and roughage can be efficiently utilized by poultry. Most of the agricultural by-products such as different brans, meals, baggase etc can be effectively used in developing an economic ration that at the same time would be easily digestible for the poultry. Therefore use of these by-products would not only help reusing these products but also optimizing the net profit by reducing the feed cost. There is huge scope to utilize locally available byproducts for economic production of rural poultry like Vanaraja, Srinidhi, Gramapriya etc to produce more meat and egg with low input. Ingredients of poultry rations such as maize, soybean meal, groundnut cake meal, fish meal etc. are becoming expensive and the availability of such feed ingredients is also not adequate in northeastern region of India. Moreover the quality of these feed ingredients is also not up to the mark. Hence, considering the increasing demand for egg and meat, low cost poultry rearing using unconventional feed resources is a boon for marginal farmers and landless poor of this part of the country. There are certain unconventional commonly available and can be effectively use as poultry diet.

Preparation of Least Cost Feed

Least cost feed can be prepared using computer application or by manual calculations. Manual calculation may be tedious, time consuming and include trial and error process. Commonly used technique for formulation of least cost ration is the **Linear Programming Technique**.

Linear Programming Technique

The Linear program technique requires computer facilities and uses numerous equations to meet the minimum & maximum levels of nutrients and levels could be specified at the lowest possible cost by the user. Inclusion of feed ingredients can also be altered according to season, market price and availability. This method is widely accepted and used by various poultry farmers, entrepreneurs and feed manufacturers to formulate a least cost feed.

Linear Method of Feed Formulation

The following points are to be considered while preparation of least cost feed-

Table 01: Potentially feed sources

Category	Information
Oil seeds	Proteins of defatted soybeans, rapeseed and sunflower seed Sal fruits
Grain legumes	Peas, lupines and their concentrated, chick peas
Cereals and pseudo cereals	Proteins from oat and quinoa or cereal co-products
Roots and tubers	High starch content with low protein, powdery textureNeeds detoxification
Leaf proteins	Grass , sugar beet leaves
Tapioca meal	Tubers of tapioca, Safflower meal, Copra meal, Sesame meal
Animal protein	Dried poultry waste, Blood meal, feather meal, Hatchery byproduct meal, Fish meal, Meat cum bone meal, Poultry by product meal
Aquatic protein	Algae, both macro and microalgae, duckweed Mussel meal, Leaf meal , green algae, plankton, aquatic plant meal
Insects	Meal worm , housefly, black soldier fly , Silkworm pupae meal, Larva, termites and flies, Snail meal , oyster meal and shells, Earthworm and maggots
Microbial proteins	Bacterial protein meal, Pencillium Mycelium Waste
Molasses	Sugarcane bagasaae
Spirulina	0.1% inclusion level
Corn germ meal	9% inclusion level
Fruits and fruit By-products	Citrus, pineapple, plantain and mango

1. Cost of the feed ingredients
2. Nutrient content of the feed ingredients
3. Nutrient requirement of the bird
4. Availability of the feed ingredient
5. Minimum-maximum restrictions on levels

Steps For Formulation of Least Cost Feed

The linear programming technique involve the following steps-

1. Enlist all available feeds, fodders and other available ingredients in a database.
2. Enlist the nutrient values of the feed ingredients to be included in the ration.
3. Enter the limitations for usage of feed ingredients-both maximum and minimum.
4. Input the cost of the feed ingredients.
5. Give instruction to the computer for the type of ration desired depending upon the requirements of the birds.

Other important factors to be taken into consideration while developing economic rations are as follows-

1. Market availability of ingredients
2. Movement of feeds from one part to other part of the country.
3. Price forecast based on support and remunerative prices
4. Capacity of production and storage
5. Availability of non conventional feeds.
6. Limitations of use of non conventional feeds due to presence of certain anti-nutritional factors.

Software Developed For Least Feed Formulation

Typical packages used by most feed mills and manufacturers include Make feed, Brill, Mix it, Agridata.

Makefeed

CARI, Izatnagar develop a software for least cost feed formulatiopn which is user friendly and with little knowledge can be utilised effectively. It can be used for efficient balanced formulation of feed for a wide variety of poultry birds like layer and broiler chicken, quails, guinea fowl etc. using database developed in diversified agro-climatic conditions in India. It provides information on nutritive values for a wide range of feed ingredients along with maximum inclusion level for each ingredient. The users have options to edit the complete database or of certain feed ingredients and modify it suitably, add or delete particular feed ingredient due to change in nutritive composition and availability of feed ingredients.

Few other examples of software programes available for Indian poultry farmers & feed manufacturers-

1. Simple excel based feed formulation from CARI developed by Dr. D. Chandrasekaran, Namakkal Veterinary College

2. Sri Ayyappa software program, Hyderabad.
3. Brill and Mixit software programs with add on versions

Advantages Of Using Least Cost Ration

1. Certain non conventional feed stuffs can be is easily incorporated in the diet during scarcity period and to make the ration cost effective.
2. It performs in high speed and with great accuracy therefore saves lot of time and also labour.
3. It duly fulfils the nutrient requirements of the birds.
4. Inclusion of feed ingredients according to availability and quality can be made possible.
5. Gives more productive efficiency with least cost and thereby increases the profitability of the manufacturers and farmers and even the poor farms can afford to make use of it.
6. Under Indian condition, 2 types of situation of fodder availability exist namely flush and lean season. The prices of feeds are higher during lean season and cheaper during flush season. So attaining maximum profit would be possible by the use of economic ration throughout the year by linear programming.

Limitations Of Computer Based Model

1. Certain low cost ingredients may have no value and thus such a ration would not result in high production even at least cost.
2. Computer does not take into account the toxic material present in the ingredients.
3. Computer will not count the additive effect of feeds nor judge the digestibly, palatability of ingredients.
4. Skilful person and good programmers are required to run these softwares. Nutrient availability also varies.
5. Presence of non starch polysaccharide, high fibre, mycotoxins can lower the quality of the feed.
6. There may be viscosity problems, low palatability, risk of rancidity, poor texture.
7. Animals products such as hatchery waste, blood, offals must be incinerated, rendered before incorporating to the feed formulation.

Conclusion:

Presently a number of available by-products are to be exploited to full extent for inclusion in preparation of the poultry feed. These by-products and fodder leaves have good nutrient composition and reported to contribute to the productive value for egg and meat with reduction in cost of production. Hence, keeping their nutrient composition and potential feeding value in consideration, these by-products can be incorporated to some level in the poultry feed formulations to economise the feed cost and to increase the profit margin for the poultry farmers.

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Dr. Neeraj Kumar Shrivastava, President CLFMA at CII Conference

Dr. Neeraj Kumar Shrivastava ; President -CLFMA "Dr. Neeraj explained that in the last 20 years, India has seen remarkable growth in Poultry and layer industry, in terms of production and efficiency. The layer industry grew by 208% whereas poultry has grown a phenomenal 500%. He said that according to the survey of NSSO, India's 71% population above 15 yr. of age is Nonvegetarian. We are proud to be a part of the industry that has fostered in the growth of every vertical. Dr. Shrivastava has shown many slides and statical data that how India is a pioneer in Producing Milk, Egg Chicken, and rice but still several women and children are lacking in essential macro and micronutrients or are malnutritional. He explained to the audience that reason is not about affordability but the lack of awareness and knowledge of nutritious food. He said that 73% of Indians are protein deficient and it is the place where we all need to work upon. He also mentioned that India is consuming 47% of the protein of which only 10% is Animal protein. So we can see the gap and try to fill it as animal protein is the most bioavailable protein for humans as compared to plant protein.

HOUSING PREPARATIONS BEFORE SUMMER

Remove any metal objects from around sheds (machinery, vehicles and other junk) which could radiate heat into open houses.

Remove manure from houses in February/March.

Avoid over-crowding in cages.

Thatching material (straw or grasses) will reduce heat radiating through the roof.

White-washing roof helps to reflect more heat.

Roof sprinklers are also an effective combination with roof thatching.

Install/clean fans and foggers prior to summer.

Water tanks are best placed inside the shed or buried underground.

Tanks outside the shed should be insulated or painted white.

Routine window screen cleaning improves cross-ventilation.

Dripping water onto gunny bags reduces air temperature inside of the shed.

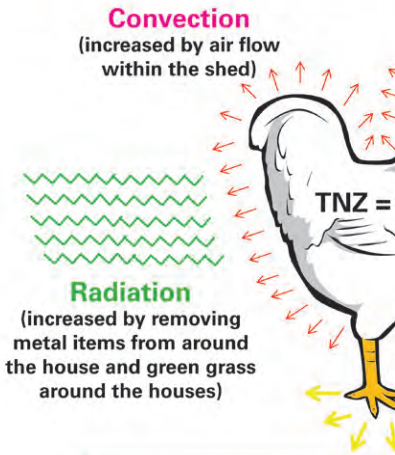
TEMPERATURE HUM

Relative Hu

°F	°C	5	10	15	20	25	30	35	40	45
68	20	63	63	63	64	64	64	64	65	65
72	22	64				66	66	67	67	67
75	24	66	67	67	68	68	69	69	70	70
79	26	68	69	69	70	70	71	71	72	73
82	28	70	70	71	72	72	73	74	74	75
86	30	71	72				75	76	77	78
90	32	73	74	75	76	77	77	78	79	80
93	34	75	76	77	78	79	80	81	82	83
97	36	77	78	79	80	81	82	83	84	85
100	38	78	79	81	82	83	84	85	86	88

Comfort < 70

Alert 70–75



THERMOREGULA

NUTRITIONAL M

Avoid feeding hottest part of the day.

- Formulate feed according to actual
- Include oils and synthetic amino acid proteins.
- Increase the levels of vitamins (Vita trace mineral, sodium bicarbonate,
- Increase phosphorus levels up by 5
- Avoid Nicarbazine (anticoccidial dru

Srinivasa Hatcheries
Vijayawada Office
"Srinivasa House"
D. No. 59 – 13 – 3
Ramachandra Nagar
Vijayawada – 520 008
Phone +91 0866 – 6701211

IANAGEMENT PRACTICES DURING SUMMER

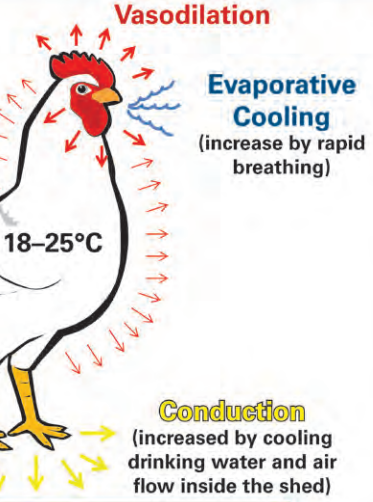
MIDITY INDEX (THI)

midity (%)

50	55	60	65	70	75	80	85	90	95	100
65	66	66	66	66	67	67	67	67	68	68
68	68	69	69	69	70	70	70	71	71	72
70	71	71	72	72	73	73	74	74	75	75
73	74	74	75	75	76	77	77	78	78	79
76	76	77	78	78	79	80	80	81	82	82
				81	82	83	84	84	85	86
81	82	83	84	84	85	86	87	88	89	90
84	84	85	86	87	88	89	90	91	92	93
86	87	88	89	90					96	97
89	90	91	92	93	95	96	97	98	99	100

Danger 76–81

Emergency >82



TION OF BIRDS

MANAGEMENT

Increase feeding hours in morning.

feed intake levels.

ds to replace energy and crude

min C at 200-300 mg/kg of diet), organic zinc and copper.

%.

g) during hot weather.

Srinivasa Hatcheries
Hyderabad Office
Plot #169, Road # 13A,
Jubilee Hills
Hyderabad – 500 033
Phone +91 - 40 - 23633560

MANAGING FLOCKS DURING SUMMER

Keep drinking water cool by flushing water lines during the hottest period of the day.

Avoid disturbing birds during day time – shifting, vaccinating, beak trimming etc.

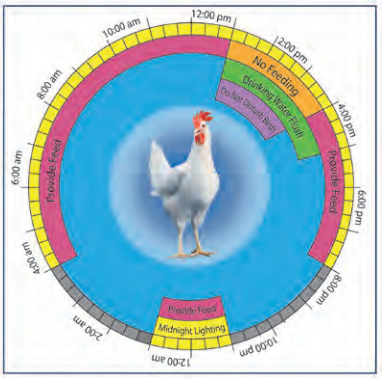
Fan and Fogger Management:

High Humidity - Prefer Fans ***Low Humidity - Prefer Fogger***

- Fan and Fogger run times decided based on shed temperature and humidity.
- Run the foggers for 2 minutes every 10 minutes (frequent short periods).
- Ensure that using foggers or roof sprinklers does not limit availability of birds' drinking water.

Midnight Lighting: 1–2 hours in night, leaving 3 hours dark before and after midnight light. Done effectively with the help of timers.

- This can be practiced from the age of 6 weeks onwards.
- Lighting schedule adjusted to provide more hours in the morning during summer when temperatures are cooler.



VACCINATION CONSIDERATION

- Vaccinate early in the morning to minimize heat stress. Water withholding time should be considered.
- Adjust medications and volumes of water to reflect the increased water consumption during hot weather.

EMERGENCY SITUATIONS

- Flocks sprayed with water to save its life.
- Potassium chloride, ammonium chloride and sodium bicarbonate (2-3kg/Mt) can be beneficial.
- Risk for E.coli infection is high, so usage of water sanitizer is advisable.

FOR MORE INFORMATION

See the "Understanding Heat Stress in Layers" Technical Update at www.hyline.com.

ENGLISH

TELUGU

Chicken egg shell a Cheap Source of Dietary Calcium for Humans

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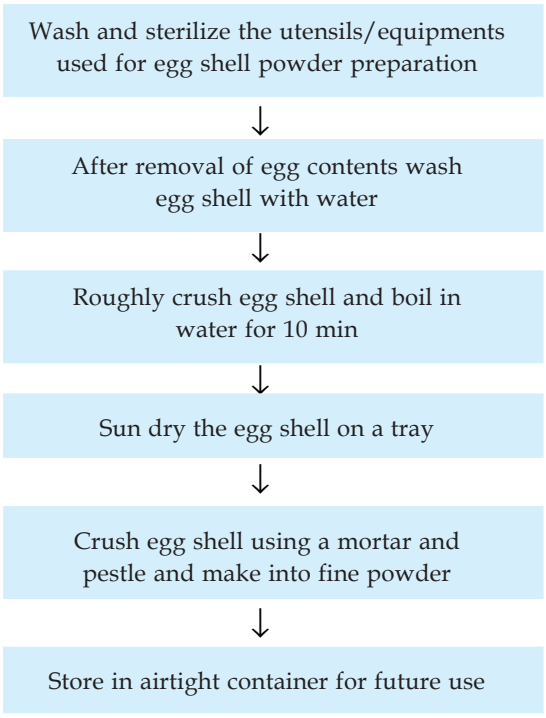
In the industrial production of chicken egg products, the egg shell is the major by-product. Of the total egg produced globally around 30% is processed in food industries with huge accumulation of egg shell. This egg shell is used in animal feeds as a source of calcium, applied in agricultural fields for pH correction of acidic soil and as biodiesel catalyst (Park et al., 2007). However, most of the egg shell is wasted and as per EU egg shell is a hazardous solid waste. As per a calculation in 2016, globally approximately 110 billion tons of egg shell was wasted. Disposal of egg shell from kitchen and other egg-based food industry without further processing ends in landfill and contributes to environmental pollution and carbon footprint.The decomposition of egg shell and related contents results in release of ammonia and hydrogen sulfide with offensive odour that attracts rodents and insects.

Calcium is an essential mineral for human body and constitutes 98% of the skeletal system. Reports from our country point to a drastic decline in the dietary intake of calcium. Higher occurrence of diseases such as beriberi, rickets, and scurvyare noticed with low calcium intake.Adult human daily requirement of calcium varies between 800-1000 mg based on the age and sex of the individual. For children the requirement is little lower. In India only around 37% of households took the recommended daily calcium levels indicating a deficit of this element in the population (Venkata et al. 2019). The egg shell is around 10% of the total egg weight. In the egg shell powder, the calcium content ranges about 33-40%. This calcium is present in the form of calcium carbonate and is approximately 92-96% (Quina et al., 2017).The calcium is found embedded in an organic matrix consisting of protein and peptidoglycans. The average calcium contentis 380mg in 1 g of egg shell. Thus, consuming one gram of egg shell powder will provide about half of the daily requirement in adults. Further, the egg shell has higher level of strontium and selenium; a lower level of fluorine or other harmful metals such as lead, cadmium, chromium and aluminum. The boron and strontium in the egg shell has been reported in the prevention of osteroporosis. Thus, egg shell has much beneficial properties for inclusion in the regular diet of humans. People suffering fromosteoporosis and children in their active growth stage can consume food supplemented with egg shell powder.

Consumption of the whole egg shell powder has other advantages. It has been shown that the egg shell matrix proteins increased the calcium transport of about 64% across Caco-2 monolayer (Daengprok et al., 2003). The Caco-2 cells are human colon epithelial cancer cell line which is used as a model of human intestinal absorption of drugs and other compounds.In addition to the availability of calcium from the egg shell powder inclusion of the shell powder has been shown to reduce the absorption of fluoride. The calcium in egg shell powder binds to fluoride and prevents occurrence of fluorosis (Mulualem et al., 2021). The calcium present in food ingredients occurs in the form of salt or complexed with other nutrients. However, after digestion, absorption of calcium happens only in cationic form. High protein content during digestion adversely affects calcium absorption. For better absorption of calcium the recommended ratio of calcium and protein is 16 mg calcium : 1g protein (Lynch Cronin et al., 2019). In piglet model representing human digestion it was reported that egg shell powder is a good source of calcium in comparison to casein based or soy-protein based diets containing calcium carbonate (Schaafsma andBeelen, 1999).The bio-availability of calcium present

Fig 1. Preparation of egg shell powder (Bartter et al., 2018)



in egg shell powder is similar to the calcium carbonate supplemented in food(Arnold et al., 2021). This indicates that there is no need for any processing of egg shell power and it can be used as such in human food. Clinical trials using eggshell powder in women with osteoporosis due to old age and in postmenopausal women indicated a reduction in pain and osteoresorption. Further it was observed that there is increase in mobility in such women and bone density. Egg shell powder can be included in the regular diet by mixing with other food ingredients. Inclusion of the powder in food does not affect the flavor of the food, however, some changes in food texture may occur (Brun et al.,2013). To overcome this issue sieving of the egg shell powder to bring uniform smoothness is suggested. Research has shown that inclusion of egg powder in the bread spread does not affect the sensory qualities and storage stability (Kobus-Cisowska et al., 2020). Nano powdered egg shell when added to probiotic yogurt improved its sensory evaluation and shelf life (Kamel et al., 2021). Egg shells can be incorporated in calcium fortified pork sausages, calcium biscuits, roasted and ground coffee, chocolate and other homemade food products. The main concern in the utilization of egg shell is contamination with bacteria and other microorganisms. Bacteria such as E. coli,Salmonella, Pseudomonas etc may be present on the egg shell. The probable source of contamination of salmonella on egg shell is by feaces. Disinfection of the egg shells may be done either with use of 1-2% sodium hypoclorite or boiling it in water. Boiling the egg shells for 10-20 minutes has been shown to destroy the salmonella and other microorganisms rendering the egg shell safe for consumption (Bartter et al., 2018). A number of patents are available for egg shell crushing and powder preparation at industrial scale (Ahmed et al., 2021). At small scale or family level egg shell powder for own consumption can be made easily by following the steps listed in Fig1.The procedure described can be followed easily even in rural areas.

In conclusion, egg shell generally considered as a waste product has a huge potential as cheap alternative for commercial calcium supplements for fulfilling the dietary requirement of calcium in humans. In addition, utilization of egg shell will prevent it ending in solid municipal waste and finally in landfill that ultimately result in environmental damage and a contributor to climate change. The concept of using egg shell powder has to be persuasively communicated to the consumers so that it is adopted by them. During egg consumption when egg shell powder is also used in diet then the statement 'Egg is a complete food' will be more meaningful.

Multiple Mycotoxins and the Indian Poultry Industry

Dr S.K.Maini, Vesper Group, Bengaluru.

Mycotoxins are the secondary metabolites of a variety of fungi like the Fusarium, Penicillium, Aspergillus etc. Fungi grow's on the crops in the field and on grains in storage. The spectrum of mycotoxins produced depends on physical factors (moisture, relative humidity, temperature) and chemical factors (oxygen, carbon dioxide, and composition of the substrate). Moisture and temperature are the major factors influencing mould growth and mycotoxin production. Some fungi are capable of producing a variety of mycotoxins.

Some Fungi and the mycotoxins they produce.

Fungal species	Mycotoxin Produced
Aspergillusparasiticus	Aflatoxins B1, B2, G1, G2
A. flavus	Aflatoxins B1, B2
Fusariumgraminearum,	F. roseum, Deoxynivalenol, Zearalelone
F. moniliforme	Fumonisin B1
F. Sporotrichioides	T2-toxin, HT-2 toxin,
Penicilliumverrucosum,	F. poae, F. tricintum, Ochratoxin A
Aspergillusochraceous,	A. paraciticus,
A. niger	Ochratoxin A

More than 400 different types of mycotoxinsare produced by nearly 350 species of fungi, these can be found in the literature, and normally tests are performed for the following few - Aflatoxins,Ochratoxins -A, DON, HT-2 or T-2-toxin, Fumonisin, and Zearalenone.

Multiple mycotoxicosis or mycotoxinco-contamination with various types of simultaneously occurring mycotoxins is a major problem of the Indian Poultry Industry, that slowly and steadily alters the birds metabolism, suppresses the immune system, damages the liver, kidneys, intestines and changes the blood parameters, complicating the situation, making it difficult to diagnose, control and treat. Confusion prevails and Guess work fails, non-specific symptoms make it difficult to address the situation properly before much of the damage is done, then begins the blame game, and few Veterinarians and Marketing personnel of Pharma Companies take advantage of the situation to promote their products vaccines fail to protect infections, antibiotics don't control the bacterial diseases, egg production reduces, body weights are depressed, farmer's loose heavily due to treatment cost and the reduced performance. No single Toxin Binder, can totally prevent, control and treat this condition.Non of the toxin binders normally used in poultry feeds will check/reverse or control Chemical toxicity of feeds.

Multiple mycotoxins can generate additive or synergistic effect, interfere in nutrients digestion, absorption, assimilation and metabolism, cause damage to the Intestinal tract, disturb the normal microbiota of the intestine, all causing negative impact on the birds performance. In a recent survey of the Mycotoxins Prevalence in India, it is reported that, 88 % of the samples were contaminated with more than one type of mycotoxin, and 24 % had contamination with more than 4 types of mycotoxins. Different physical, chemical, and biological methods to prevent mycotoxicosis in poultry feeds have been reported but practical and costeffective methods for efficiently decontaminating multiple

mycotoxins containing feedstuffs are currently not available. T-2 toxin is the most potent toxin of the trichothecene family, inhibits the DNA, RNA synthesis, cause neural disturbances, cytotoxicity and disturbances in the skin, intestine, liver and kidneys, and severe immunosuppression. There are about 190 different types of T-2 toxins with the same basic chemical structure, but will need different detoxifying agents for their control, depending upon their concentration.

Potential mycotixin absorbent materials include activated carbon, aluminosilicates (clay, bentonite, montmorillonite, zeolite, phyllosilicates, etc.), complex indigestible carbohydrates (cellulose, polysaccharides) the cell walls of yeast and bacteria such as glucomannans (MoS&FoS), peptido-glycans, enzymatic degraders or digestors, and synthetic polymers such as cholestryamine and polyvinyl pyrrolidone and their derivatives. Research on fungi and mycotoxins, various laboratories have tested more than 300 different materials e.g. organic binders, cellular components, alumino-silicates, activated carbon, etc. for their ability to bind mycotoxins.

The best strategy will be to use a combination of an anti fungal agent to control the growth of fungi, an absorber, an enzymatic degrader, a probiotic type of pH regulator and activated char coal as an adsorber to check the growth of fungi and production of mycotoxins, in combination with a product to protect the Intestines, liver, kidneys and to regulate the metabolic activity in the birds body, together all the above will ensure good health and performance.

HUVEPHARMA

SUMMER STRESS

Heat stress due to summer has several serious and economical effects on poultry. In broilers it can cause reduced growth rate, decreased feed intake and poor feed conversion. Laying birds experience a drop in egg production, poor egg weight and reduced eggshell quality.

THERMOREGULATION IN POULTRY

The poultry rearing is well managed in temperature between 21-25°C which is called as thermo neutral zone; temperature above 35°C will cause heat stress to birds causing physiological changes. Chickens, unlike most other animals, do not possess sweat glands to aid in heat loss. Chicken removes excess body heat by following mechanisms.

Radiation- Heat will radiate from the bird's warmer body to a cooler surface, such as air, without the use of a medium (surface).


Boiled appearence of Breast due to heat stress (Picture 1)

Conduction- Heat stressed birds will try to cool their bodies down by touching water pipes or digging into litter to come into contact with a cool floor.

Convection- Moving air over birds is the most effective way to reduce heat stress. If the air is not moving quick enough, heat will begin to build up around the birds, which will increase heat stress.

PHYSIOLOGICAL & BEHAVIORAL CHANGES DURING HEAT STRESS

Under high temperature conditions, birds alter their behavior and physiological homeostasis seeking thermoregulation, thereby decreasing body temperature. Following are the important changes which adversely affects the performance.

REDUCED FEED CONSUMPTION

Water intake increases which leads to loose or watery droppings and increased volume of urine causes wet litter condition. This makes the litter environment favorable for the sporulation of coccidian spores.

Decreased blood flow to digestive tract causes immunosuppression, dysbacteriosis results into coccidiosis and necrotic enteritis

HYPERVENTILATION OR PANTING - Evaporation of one gram of water from lungs dissipates 540 calories of maintenance energy due to increased muscle activity, hence it is said that summer feed should have more energy.

Increased panting under heat stress conditions leads to increased carbon dioxide levels and higher blood pH (i.e., alkalosis). It also makes birds more prone to respiratory distress. Because of rapid panting (up to 10 times more than normal) and oxidative stress, degradation of cilia occurs which facilitates lodgment of Mycoplasma. As the heat stress elevates the multiplication of Mycoplasma it further causes respiratory distress, air saculitis. Though Mycoplasma as own doesn't cause mortality it results into Immunesupppression and occurrence of secondary infection. Some epidemiological studies also suggests that prevalence of viral diseases like IBD, VVND, etc. which causes Immunesupppression. This also leads to occurrence of mycoplasmosis and further respiratory diseases.


Boiled appearence of Breast due to heat stress (Picture 2)

Increased loss of minerals like sodium, potassium, etc. through panting disturbs the electrolyte balance.

HORMONAL CHANGES DURING HEAT STRESS

High environmental temperatures alter the activity of the neuroendocrine system of poultry and elevate plasma Corticosterone concentrations. Increased Corticosterone concentrations i.e. epinephrine and nor epinephrine causes increase in blood pressure, muscular tone and blood sugar levels. The combined effect results into increased mentainance energy which ultimately reduces the performance of the bird.


Boiled appearence of Breast due to heat stress (Picture 3)

EFFECT OF HEAT STRESS ON IMMUNE -RESPONSE

Increased environmental temperature causes Immunosuppression by reducing growth of bursa, GALT and spleen, Circulating antibodies, lymphocytes, phagocytic activity of macrophages, etc.

Immunosuppression jeopardizes the birds into infection by opportunistic pathogens like mycoplasmosis, coccidiosis, necrotic enteritis, E.coli, ND, IBD, etc.

CLINICAL SIGNS

Low feed intake Increased water intake Diarrhea or loose droppings Incidence of ascites increases Panting and rapid respiration Poor FCR and lower body weight Reduction in egg production, egg size, egg weight, and poor shell quality.

POST-MORTEM FINDINGS

Dehydrated carcass Cooked breast appearance Mucous exudates in mouth and nostrils Pale or cyanotic comb Par boiled appearance of breast Increased body temperature Fluid contents in intestine Rapid decomposition of carcass.

HEAT STRESS MANAGEMENT

To overcome the huge economic loss by heat stress, control should be based on following steps-

MANAGEMENT ASPECT

- Hang wet gunny bags on the sides.
- Evaporative cooling- Sprinklers are commonly used for evaporative cooling when temperatures are more then 40-41°C.


Boiled appearence of Breast due to heat stress (Picture 4)

- Stocking density- Reducing the bird density in summer will give more floor space per bird and allow more heat to escape from underneath their bodies and from the litter.
- Ventilation- Proper ventilation is crucial for heat stress management. A good ventilation system removes moisture, brings in an equal amount of fresh outside air, directs incoming air to all areas equally, keeps inside air moving to flush hot, humid air from between the birds, etc.

NUTRITIONAL ASPECT

FEEDING PRACTICES

As there is decrease in daily feed intake increase the nutrition density, make the feed more concentrated. If there is enough floor space, extra feeders should be added. Encourage eating at cooler times of the day, i.e., early morning or in the evening. Remove feed 4 to 6 hours prior to an anticipated heat stress period. Birds should not be fed or disturbed during the hottest part of the day. Provide cold water for drinking especially during day times.

ENERGY- In order to provide higher energy levels fat inclusion should be more in feed which increases calorific value, palatability, feed intake by 5% and utilization of nutrients.

PROTEINS- The requirements for protein and amino acids are independent of environmental temperature. Oxidation of protein also elevates the heat stress hence it is good to keep protein level low with balanced amino acids. Hence low protein levels (1-2% lower than usual) with higher critical amino acids i.e. lysine and methionine (5-10% higher than usual) is more helpful in managing heat stress.

MINERALS & VITAMINS

The loss of activity of vitamins during storage at high temperature is prime concern during summer which makes it unavailable for bird. Heat stress also disturbs synthesis of vitamin C and absorption of vitamin A and E. Hence to avoid problems of vitamin deficiency due to above stated reasons 20-30% extra vitamins should be provided to the birds.

Vitamin C-200-500 gm/ton of feed, Vitamin E- 50 gm/ton of feed should be provided.

ELECTROLYTES

0.5-0.6% potassium and 0.5% sodium bicarbonate should be added to neutralize the respiratory alkalosis and its consequences.

MEDICATION

Proper preventive measures to avoid respiratory and gut health problems should be taken during summer as these two systems are getting more involved.

Antimycoplasmal agents (**Pharmasin**® - Tylosin, **Vetmulin**® - Tiamulin & **Tilmovet**® - Tilmicosin) should be provided with proper dose to prevent mycoplasmosis and secondary infection.

Anticoccidial program should be well maintained during the summer. As a managemental practice farmer keeps birds off feed during hot period, this lowers the concentration of anticoccidial and infection may occur. To prevent coccidiosis proper anticoccidial programme with suitable molecule should be adapted.

As heat stress causes dysbacteriosis and increases chances of necrotic enteritis probiotics (**B-Act**® - *B. licheniformis*) and feed additives (**Albac**® - *Bacitracin*, **Flavomycin**® - *Flavophospholipol*, etc.) should be given to birds as a preventive measure.

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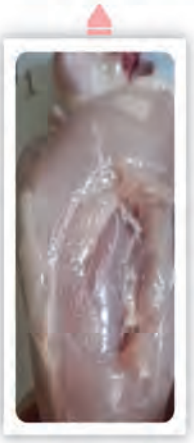
VAKSIMUNE® Coryza LE
Low or No Local Reaction



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