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Vol. XXI February 2023 No. 8



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MONTHLY POULTRY MAGAZINE

VOL. XXI No. 8 February 2023

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Website : www.hindpoultry.com

YEARLY SUBSCRIPTION :

India Rs. 500/-

OTHER COUNTRY : \$ 60 or Equivalent

Edited, Printed, Published and owned by
M.K. Vyas and Published from
204, Plot No. 19, Huda Complex,
Saroor Nagar, Hyderabad - 500 035. INDIA.

Design and Typesetting

Akshaya Graphics, Hyderabad.

Printed at

Akruti Offset Printers, Hyderabad.

A Magazine of

HIND PUBLICATIONS

RNI No. 7030/2002

Subject to Hyderabad Jurisdiction

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at Meat Pro Asia colocated
with Asia 2023
at Impact Bangkok**



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Hind Poultry Goes Global- Visit Our Booth No. 1492 at Meat Pro Asia colocated with Asia 2023 at Impact Bangkok



Visit "HIND POULTRY" at Meat Pro Asia colocated with VIV Asia 2023. **BOOTH NO. 1492, HALL: Challenger 1, VENUE: Impact- Bangkok, DATE: 8 to 10 March 2023**

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Hind Poultry has published over 70 books on poultry and livestock. Management, diseases, processing, feed formulation and nutrition. Hind Poultry has participated in over 90 exhibitions across the globe which includes India, France, Thailand, Malaysia, Indonesia and Nepal.

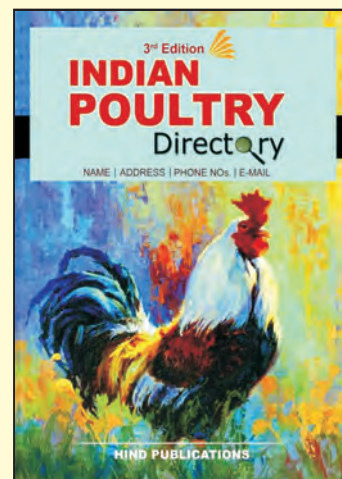
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Meat Pro Asia, the Premier Trade Platform for Processing & Packaging Solutions for Egg, Poultry, Meat, Seafood and Food Products in Asia which create the new brand under the prototype of the IFFA, the number 1 exhibition for Meat Industry combining with VIV Asia 2023, the international trade show from Feed to Food for Asia in Bangkok.

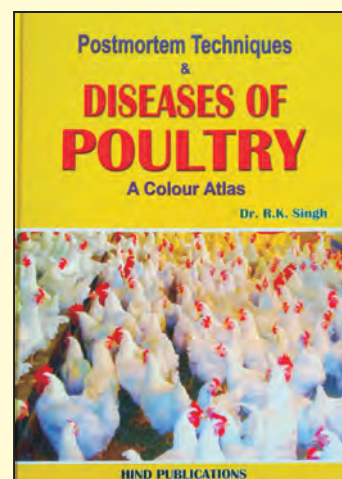
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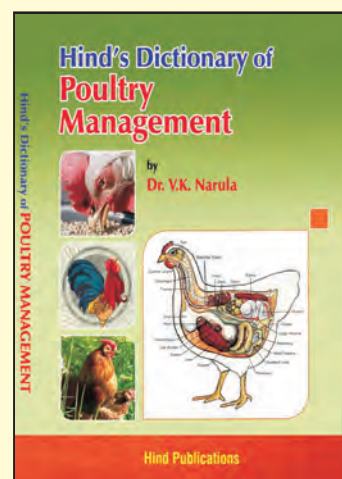
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Friends P F	Rajasthan		Sneha P F	Telangana		Natrayan P F	Tamil Nadu	
KG N P F	Rajasthan		Srinivasa Farm Pillaipally Unit	Telangana	Vimala P F	Telangana	26	
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Emerging Challenges & Opportunities for Sustaining Future Expansion of Poultry Sector

Livestock sector plays a critical role as a subsector of agriculture in the Indian economy. The sector has huge potential in terms of its contribution in total economy, employment generation and world trade. The sector comprising poultry meat, eggs, dairy and fisheries witnessed a compound annual growth rate (CAGR) of 8.15 per cent. As per the estimates of National Accounts Statistics, 2020 for sector wise Gross Value Added (GVA) of agriculture and allied sectors, the contribution of livestock in total agriculture and allied sector GVA (at constant prices) has increased from 24.32 per cent (2014-15) to 29.35 per cent (2019-20). Livestock sector contributed 4.35 per cent of total GVA in 2019-20. Development of the livestock sector has led to improvement in per capita availability of milk, eggs and meat.

According to FAOSTAT production data for 2020-2021, India ranks 3rd in egg production and 6th in broiler production in the world. Egg production in the country has increased from 78.48 billion in 2014-15 to 122.11 billion 2020-21. The per capita availability of eggs is at 91 eggs per annum in 2020-21. Meat production in the country has increased from 6.69 million tons in 2014-15 to 8.80 million tons in 2020-21. The average per capita consumption of meat in the country is around 5.7 kg per annum. As per the Department of Animal Husbandry and Dairying, more than 85% of India's poultry meat is produced by organised commercial farms and the rest is produced by backyard poultry, mostly in the rural areas. Out of commercial broiler production, major poultry companies who follow vertically integrated operations have a share of around 60-65%. The poultry sector at present provides employment opportunities to around 6 million small and medium farmers (who own farms with 5,000-10,000 broiler size).

Driving demand of Poultry Meat

In the last three decades, the India poultry market has undergone significant transformation, and the region has emerged as one of the major sectors of the economy. The poultry market in the country is being largely driven by the rising disposable incomes and changing consumer food habits. In the post Covid19 pandemic phase also the demand for the protein rich food like poultry meat and eggs have increased sharply. The growing awareness regarding health and wellness is further driving the demand for a protein-rich diet.

According to industry estimates, the Indian poultry industry in 2022 was valued at around \$28 billion. Aided by the increasing popularity of online services and growing



Ricky Thaper

Treasurer, Poultry Federation of India

"Sustained consumer demand continues to drive the poultry meat sector, while there is a need to step up investment in infrastructure in the value chain as well as ensuring reliable feed supplies"

online food delivery channels, the market is expected to witness a further growth in the next 5 to 10 years with a growth in CAGR of 8.1%. As per Agricultural and Processed Food Products Development Authority (APEDA) data, in 2021-22, India exported 3,20,240 tons of poultry products valued at Rs 529 crore (\$ 71 million). Traditional export destinations have been Oman, Maldives, Indonesia, Vietnam and Russia. Malaysia for the first commenced importing eggs from Namakkal (Tamil Nadu) recently. Though both the quantity and value of the exported processed poultry products have increased during the last few years and further efforts are being made to increase poultry exports from India, the trade is very small in comparison to the global trade.

To support the livestock sector, the government has initiated several measures. The Animal Husbandry Infrastructure Development Fund (AHIDF) of Rs 15000 crore is being implemented from June 2020. The key objectives of the scheme is to fulfill the objective of protein enriched quality food requirement of the growing population of the country and prevent malnutrition. As far as poultry development is concerned the fund has provisions for technologically assisted layer farms with environmentally controlled systems, broiler breeder farms with environmentally controlled systems and hatcheries with environmentally controlled facilities. The support is also provided for Meat processing and value addition infrastructure and establishment of animal feed plants including poultry feed. Under AHIDF, farmer producer organizations (FPOs), Micro Small and Medium Enterprises, Section 8 Companies, Private Companies and individual entrepreneur availing credit facilities will get 90% loan for which 3% interest subvention is provided by the Central Government. The Central Government is also providing Credit Guarantee of 25% of total borrowings for those projects which are fulfilling the definition of MSME projects.


The National Livestock Mission has been revised and realigned with an outlay of Rs.2300 crore for the five years commencing from 2021-22. The mission aims at development of entrepreneurs in rural poultry. The central Government is currently providing 50% subsidy up to Rs 25 Lacs to establish parent farm, rural hatchery, brooder cum mother unit for production of hatching eggs with minimum 1000 parent layers and chicks and rearing of the said chick up to four weeks in the mother unit. The Self Help Group, Farmers Producer Organizations

organization's (FPO)/Farmers Cooperatives organization's (FCOs) /Joint Liability Groups (JLGs) and Section 8 companies can avail financial assistance under the mission. Department of Animal Husbandry and Dairying has developed an online portal for a completely digitized Process with all the important documents to be uploaded on the portal nlm.udyamimitra.in.

Key future challenges

Rising consumption of poultry meat, supply of feed in the coming years has to be sustained to avoid volatility in the feed prices. Poultry feed comprises mainly maize and soya meal and the country needs to increase supplies of feed in the coming years. Another key challenge is that soybean productivity has largely stagnated in the last few years. In August 2021, as an exception due to domestic supply constraint, the government had allowed import of 1.2 million tons of genetically modified (GM) soybean meal to help the poultry industry tide over higher feed prices. The government must take steps to increase feed supplies and allow cultivation of GM hybrid soybean so that future feed supplies could be assured. For the future demand of poultry meat, the government must liberalize imports of GM soybean meal and maize.

Trust on creating infrastructure of Poultry Processing

Processing and marketing of poultry range from live bird markets to highly sophisticated, fully automated, adhere to International Standards Organization (ISO) certified facilities and ready-to-eat convenience products. Lack or inadequacy of refrigeration is probably the biggest challenge poultry industry faces. The poultry industry in the country is consistently growing due to the use of modern technology and there has been a gradual shift in demand from live bird to fresh chilled and frozen poultry product market. The government must step in supporting the sector in creating infrastructure for reducing losses in the poultry value chain. The better transportation infrastructure for live birds and more cold storage facilities for the processed meat will go a long way in modernizing the industry while sustaining the future growth prospects of poultry meat. Although the wet market continues to dominate the poultry industry, there has been a significant increase in e-commerce with the expansion of home delivery of various poultry meats and processed meat. Now there is an urgent need for setting up of modern poultry processing plants to cater to both domestic as well as export markets. 

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Exhibitors to showcase solutions that counter rising meat prices at next month's Meat Pro Asia

With global meat prices rising more than 10% in 2022, reliable processing methods and quality assurance are becoming vital pieces of the puzzle when it comes to reducing costs from wastage and extracting maximum value from the food processing chain. With the exhibitor line-up for next month's inaugural edition of Meat Pro Asia now confirmed, it's clear that these considerations will be at the top of the agenda in Bangkok from 8 - 10 March. The focus will be on how to deliver meat from farm to table in a cost effective and scalable way, with more than 80 exhibitors from 20 countries and regions participating.

"It's pleasing to see the exhibitor list take shape, and in particular the presence of suppliers with strong research and development backgrounds who are pushing the industry forward in areas such as food preservation and

sample analysis; the building blocks of a safe and cost-effective food chain," says Mr Jack Wong, Deputy General Manager, Messe Frankfurt (HK) Ltd. "This has set the stage for a productive fair in March, with exhibitors delivering plenty of value for the local market, and day two of the fringe programme focusing heavily on the topics of sustainability and food safety."

Ms Panadda Kongma, Director of Agribusiness and Operations, VNU Asia Pacific, adds: "Although Meat Pro Asia is a new fair and therefore still in its growth stage, we see strong potential for the first edition due to its co-location with VIV Asia - the largest trade fair from feed to food in the region. This guarantees a solid turnout of engaged buyers from the meat industry, and extensive cross-over business opportunities."

Sample analysis and preservation

While fuel inflation and the cost of grains fed to farmed animals are two of the main causes of increased meat prices, food wastage is also a consideration when it comes to keeping costs under control. Offering solutions to this issue, and in recognition that rising affluence is driving more meat consumption in South East Asia, many European and Chinese brands have identified Meat Pro Asia as an opportunity to showcase their sample analysis and preservation solutions.

Some highlights include:

- **Bizerba** - a German manufacturer of inspection systems for food production. The company will present their metal detection system iMD pro, with integrated conveyor for reliable and flexible quality assurance. The system ensures safe detection of contaminations such as steel, stainless steel, or non-ferrous metals such as aluminium.
- **HiperScan** - offering quick and reliable examination for all types of meat products. The company's Finder SD nir-analysis-device can be used for process control and incoming and outgoing goods inspection, including exact determination of fat, moisture, protein, collagen, ash, salt and saturated fatty acids.
- **Mettler Toledo** - a manufacturer of analytical instruments including high precision laboratory scales, digital balances, industrial scales and inline analytical instruments.

Reliable processing and sawing is another important part of the

production chain, and a key product segment that will be showcased from well-known brands including:

- **Munkfors** - a Swedish manufacturer who will present their SPS10 Carcass Splitting Blade, 4TPI Meat Bandsaw Blade and Tothed Bacon Slicer.
- **Rieckermann** - a reliable service and technology provider developing customised, high-quality solutions along the entire value chain of industrial production. For the growing food market, the company supplies a wide range of processing technology and packaging systems.
- **HI-COOK Group** - providing high-performance food processing equipment as well as safe and reliable maintenance services for the food industry around the world.
- **Ecolab** - with close attention to human and environmental impact, the company has a long history of innovation with a team of 1,200 scientists, engineers and technical specialists that create best-in-class solutions.
- **Hind Poultry** - Hind Poultry is one of the largest circulating monthly magazine on POULTRY from Hyderabad- India. Over the last 23 years of its publication it has developed a large circulation and gained both national and international readership of industry professionals, poultry buyers, producers, manufacturers, Govt. and media circle. It deals specially with activities and problems of the poultry industry besides emphasizing

development in this sector with comprehensive coverage of activities, events & exhibitions and advertisement which reaches directly into the hands of targeted decision makers. Hind Poultry has published over 70 books on poultry and livestock. Management, diseases, processing, feed formulation and nutrition. Hind Poultry has participated in over 100 exhibitions across the globe which includes India, France, Thailand, Malaysia, Germany, Indonesia and Nepal.

Held together with VIV Asia - the largest fair in Asia for livestock production and animal husbandry, Meat Pro Asia focuses exclusively on solutions that deliver meat from farm to table. This includes slaughtering, the full processing chain, packaging, labelling, cold chain logistics, quality control, hygiene, IoT and automation, waste water treatment and more. The inaugural edition, organised by Messe Frankfurt (HK) Ltd and VNU Group, will take place from 8 - 10 March 2023 in Challenger 1, IMPACT, Bangkok. Messe Frankfurt accompanies the dynamic growth of the food industry with four trade fairs on four continents. The global industry meets at the events in Thailand, the USA, Argentina and Germany. The international trade fairs showcase trends and innovations and bring together experts from all over the world. Learn more at: www.food-technologies.messefrankfurt.com

Background information on Messe Frankfurt

The Messe Frankfurt Group is one of the world's leading trade fair, congress and event organisers with their own exhibition grounds. With a workforce of some 2,200* people at

its headquarters in Frankfurt am Main and in 28 subsidiaries, it organises events around the world. Group sales in financial year 2022 were around •450 million*. We serve our customers' business interests efficiently within the framework of our Fairs & Events, Locations and Services business fields. One of Messe Frankfurt's key strengths is its powerful and closely knit global sales network, which covers around 180 countries in all regions of the world. Our comprehensive range of services - both onsite and online - ensures that customers worldwide enjoy consistently high quality and flexibility when planning, organising and running their events. We are using our digital expertise to develop new business models. The wide range of services includes renting exhibition grounds, trade fair construction and marketing, personnel and food services. Sustainability is a central pillar of our corporate strategy. Here, we strike a healthy balance between ecological and economic interests, social responsibility and diversity.

About VNU Asia Pacific:

VNU Asia Pacific is part of VNU Group, a globally operating exhibition company with offices in Utrecht, Shanghai as well as in Bangkok, and consolidates the international exhibition business of Royal Dutch Jaarbeurs. In South East Asia, Jaarbeurs has formed a Joint Venture with TCC Group. From its business hub located in Bangkok, VNU Asia Pacific co-verts all key exhibition markets in South East Asia. VNU Asia Pacific has a constantly expanding portfolio with currently 12 trade shows and event formats including brands from the AgriTech, Animal Husbandry, Animal Companion, Food, Life Sciences and Biotechnology industries. 

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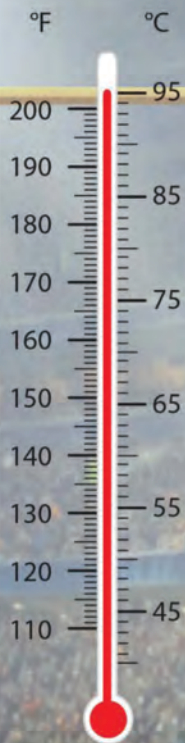


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Intrinsic Heat Stability of a Phytase

An additional criterion for a good phytase

Lode Nollet, Huvepharma.

Summary

The biochemical characterisation of a phytase such as pH profile, pepsin resistance, speed and affinity, can provide information on the potential efficacy of the phytase *in vivo*. The focus on improvement of the intrinsic heat stability has been driven by the market and forms part of the selection criteria.

Introduction

Exogenous added phytase in feed is already in practice for more than 25 years. It is used to liberate phosphorous (P), bound to phytate present in raw materials, lowering the feed cost by reducing the amount of added inorganic P and to degrade the concentration of phytate, a well-known anti-nutritional factor. At the same time, environmental sustainability is improved, as P excretion in the environment is reduced. Also, the awareness grows that the sources of inorganic P are not inexhaustible. As different phytases are commercially available, it is important to understand which criteria are important to make a good choice.

pH profile and pepsin resistance of the phytase

These criteria have already been used for a long time as a first quick screening of phytases. It is common knowledge that phytate must be in solution to allow the exogenous phytase to hydrolyse its phosphate groups. Phytate is largely soluble at pH levels below 4.0 (gizzard) while at higher pH levels it forms complexes with positively charged ions and amino acids, making it insoluble and unavailable for hydrolysis by phytase. Therefore a phytase with a high activity throughout the complete acid pH range from pH 2 to 4 has shown to be superior. As phytases work in the gizzard, screening for a phytase which is not prone to degradation by pepsin is also an important parameter to consider.



Speed of phytate hydrolysis and affinity for phytate

A key criterion for selection is speed of phytate hydrolysis. The aim is to have a maximal speed so that quick degradation of phytate is achieved. This is not only providing a high P release in short time, but the destruction of phytate also leads to the release of micro-minerals and proteins (amino acids) complexed by it, enhancing their digestibility. This maximal speed (V_{max}) is determined in so-called MichaelisMenten kinetic studies, in which *in vitro* the speed of phytate degradation is measured with increasing levels of phytate (Fig. 1). However, as indicated in Fig. 1, two phytases having a similar V_{max} , can have lower speed of action when phytate levels decrease due to phytase action. This is due to a difference in affinity (K_m) of the phytase for phytate. The affinity, defined as the concentration of phytate at which the speed of its degradation equals half of its maximal speed, indicates how long this high speed can be maintained when the phytate concentration is decreasing. A low K_m (so a high affinity) gives a benefit to a phytase as it will lead to a prolonged high speed of phytate degradation, and thus to a higher P matrix value as from *in vivo* measurement can be expected. Translating this into a practical situation: when birds consume feed, the initial phytate level will drop during hydrolysis in the gizzard, and so will also the speed of phytate degradation. A phytase with higher affinity (lower K_m) will be able to keep the high speed of phytate degradation up for a longer time, and will thereby give a higher P matrix value.

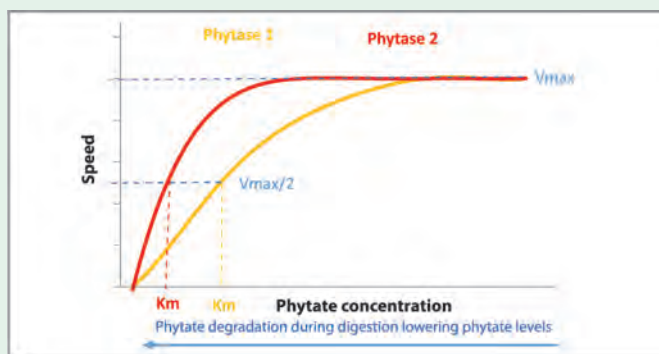



Fig. 1: The speed of phytate degradation by 2 phytases showing equal maximal speed (V_{max}) but a different affinity (K_m) for phytate

Striving for an intrinsic heat stable phytase

The first phytases commercialised 20-30 years ago were rather heat sensitive during pelleting, even when coated, requiring the post pellet liquid application (PPLA) of phytases. Next to the cost of installation, the risk of malfunctioning lurked around the corner requiring a high level of maintenance and quality control, which is a burden to the feed mill manager and technician. In that perspective, the intrinsic heat stability of a phytase has gained interest. An increase in intrinsic heat stability that allows pelleting to at least up to 85 °C was reassuring thermostability under normal pelleting conditions. When, by a coating technique, the thermostability could be increased to 90 °C (or even 95 °C), an alternative to the application of liquid phytases through PPLA is realised.

In the period 2017-2020, plural pelleting trials in Europe (at 5 different trial locations) and in the USA (at 5 different trial locations) were conducted to assess the heat stability of a newly developed intrinsic heat stable

phytase, either uncoated (granular) as well as the coated version. It was chosen to run these trials in different trial locations, so that the phytase were tested under a wide variety of different pelleting conditions (including impacting factors like equipment, feed composition, speed of cooling and others). As the universal definition of stability states that “stability is achieved when recovery of the active substance is > 80 % of the original value”, it can be seen that the newly developed phytase can claim an intrinsic heat stability at 85 °C (Fig. 2) when applied in the granular form (G), while it’s coated version (CT) can stand pelleting temperatures up to 90 °C, and even 95 °C with acceptable (25 %) losses of activity (Fig. 2). 

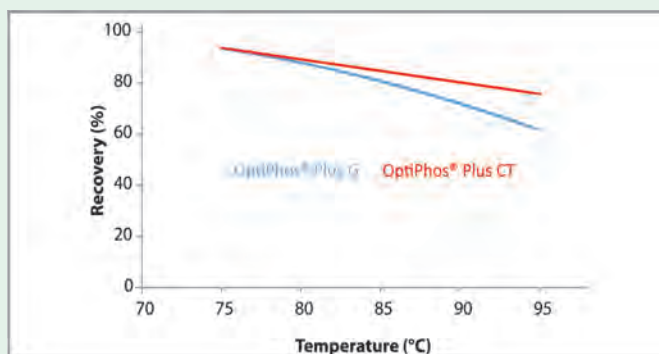


Fig. 2: Average recovery of pelleting studies ran with a granular and coated intrinsic heat stable phytase (2017 to 2020, EU and USA data).

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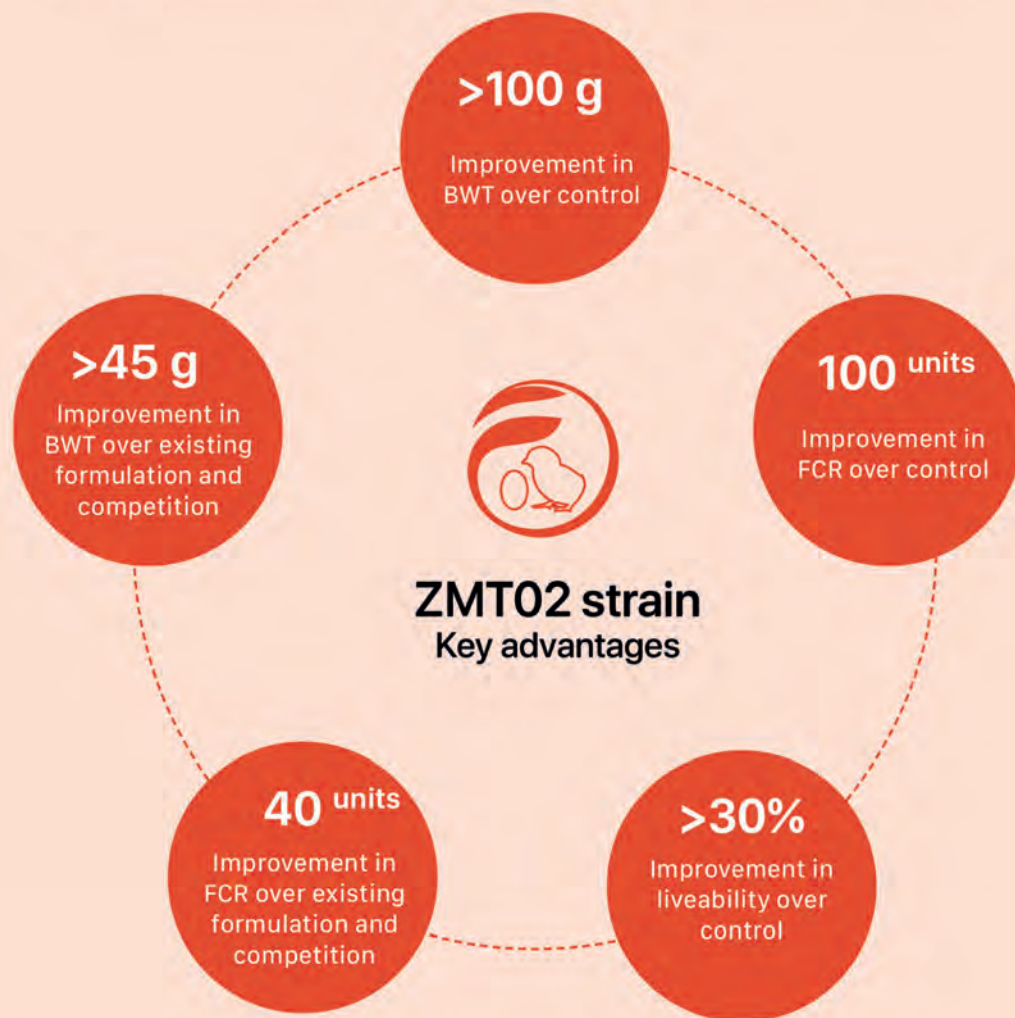
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Namakkal poultry farmers hope export of eggs to Malaysia to rise

Malaysian Minister of Agriculture and Food Security Mohamad Sabu’s visit to Namakkal gives poultry farmers a hope that egg exports from Namakkal will increase in the coming days. Namakkal, known as “Egg Town” and “Poultry Capital,” has around 1,100 poultry farmers and produces five to six crore eggs per day, transporting 1.50 crore to 1.75 crore eggs to Kerala, 45 lakh eggs to the Noon Meal Scheme, 40 lakh eggs to Bengaluru, and the remaining eggs are sent to various parts of Tamil Nadu and other States on a daily basis. Likewise, eight crore eggs are exported to foreign

countries such as Muscat, Dubai, Qatar and the United Arab Emirates (UAE) per month from Namakkal. In December, for the first time, eggs from Namakkal were exported to Malaysia, and in the first phase, 50 lakh were exported. On Sunday, Mr. Mohamad Sabu visited a poultry farm and an egg collection centre in Namakkal and interacted about how the chicken eggs are processed before being exported to Malaysia. The Minister discussed with Tamil Nadu Poultry Farmers’ Association (TNPFA) president K. Singaraj and All India Poultry Products Exporters’ Association (AIPPEA) secretary Valsan Parameswaran. 

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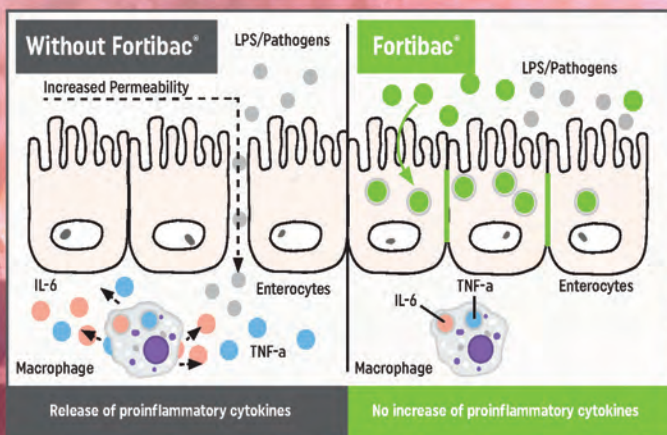
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Aviagen India's Venkatesh Gunasekaran Strengthens Global Nutrition Team with Expertise, Passion and Commitment


Aviagen® India is pleased to announce that Venkatesh Gunasekaran, Technical Manager for Aviagen India since 2020, has been appointed to Aviagen's Global Nutrition Team. This team is dedicated to promoting bird welfare, sustainability, and performance through optimal nutrition. In this new role, he will share the latest nutrition advice with customers across India, as well as with his colleagues at Aviagen India.



"Good nourishment from the start of a bird's life is vital. I am excited to join the Global Nutrition team, as this role will allow me to make a difference by helping to continually improve the health and robustness of both our internal flocks and the birds we provide to poultry producers," commented Venkatesh. Marc Scott, Business Manager for Aviagen India, added that this appointment is a recognition of the considerable talent within the India team. "Aviagen India realizes that to breed the best, we need the best, and we therefore seek to expand our operations with the industry's most insightful, bright and passionate poultry professionals. With his background and insight, Venkatesh will greatly benefit our customers, as well as our internal teams in their efforts to strengthen the poultry industry throughout the country." Venkatesh will report directly to Marcelo Silva, Aviagen's Global Head of Nutrition Services.

"We welcome Venkatesh to the Global Nutrition team. He will be a valuable asset to our team as we work to enhance bird health, welfare and sustainability through good nutrition. Through this mission, we promote the economic sustainability of our customers and their ability to feed the world," concluded Marcelo.


About Aviagen

Since 1923, Aviagen® has been a preferred global poultry breeding company with a mission to help its customers – the world's chicken meat producers – supply sustainable, affordable and nutritious protein to their growing communities. Putting into practice its corporate value of "Breeding for Welfare and Sustainability," Aviagen implements efficiencies that make commercial chicken production environmentally and socially responsible and economically beneficial to producers, while at the same time promoting bird performance, health and welfare. To meet varied market demands, Aviagen offers a full portfolio of breeding stock under the Arbor Acres®, Indian River® and Ross® brand names. The Rowan Range® and Specialty Males® target slower-growing and other niche market needs. Aviagen is based in Huntsville, Alabama, US., with operations across the UK, Europe, Turkey, Latin America, India, Australia, New Zealand, Africa and the US, and joint ventures in Asia. The company employs close to 8,000 people, and serves customers in 100 countries. 

INFAH gets IPJA Global Award for 2022 in the category of IPJA APPRECIATION AWARD

IPJA Global Award for 2022 in the category of IPJA APPRECIATION AWARD was given to Indian Federation of Animal Health Companies popularly known as INFAH for its outstanding work for the welfare of poultry industry in India. Indian Federation of Animal Health Companies (INFAH) is a unified force of 52 animal health companies in India. INFAH was formed in year 2012. INFAH is also affiliated with global animal health association "Health for Animals". Its motto is "Healthier Animals – Healthier India".

INFAH governance is based on structured subcommittees having subject matter experts to work on specific topics. INFAH has also significantly contributed towards poultry industries representations & the need for having Low Pathogenic Avian Influenza Vaccination (LPPI) Policy in India. With this policy poultry farmer shall be able to minimize the risk of LPPI in the country & prevent economic losses. INFAH has also contributed towards National Action Plan for AMR 2022-2026 by making systematic representations to policy makers. INFAH promotes the judicious, responsible use of antimicrobials in poultry & ONE Health approach for addressing AMR.

Hind Poultry take this opportunity to congratulate INFAH. The award was received by Dr. Vijay Makhija President of INFAH & its team. It was given away by Dr. G. Ranjeet Reddy, honorable member of Parliament. 



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Maharashtra is facing a shortage of one crore eggs per day




Maharashtra is facing a shortage of one crore eggs per day an official from the state's animal husbandry department said. The official informed the PTI news agency that they have chalked out a scheme to increase the production of eggs in the state. Animal husbandry department's additional commissioner Dr. Dhananjay Parkale said, "The department plans to give 50 White Leghorn chickens at a subsidised rate of ₹ 21,000 along with 1,000 cages to each district in an attempt to increase the production".

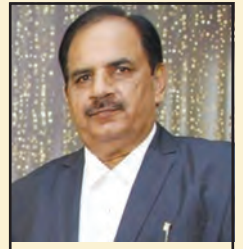
Maharashtra's animal husbandry department has sent the proposal to the state government for further sanctions, he added. According to the official, more than 2.25 crore eggs are consumed in Maharashtra per day. And, the state has the capacity to produce 1 to 1.25 crore eggs per day, Parkale said. Currently, Maharashtra is procuring eggs from Karnataka, Telangana, and Tamil Nadu to overcome shortages. In Aurangabad, the price of eggs has increased in the last two months. "As of date, the price of 100 eggs in Aurangabad is Rs. 575. The prices have been above Rs. 500 (100 eggs) for more than two months," wholesaler Abdul Wahid Shah told PTI news agency. 

How SPACE the international show for livestock and Poultry can be helpful for exhibitors and visitors from INDIA and South East Asia

From 12th to 14th September, SPACE 2023 The 36th edition of SPACE France in Parc Expo Rennes. will again unite international visitors and exhibitors -

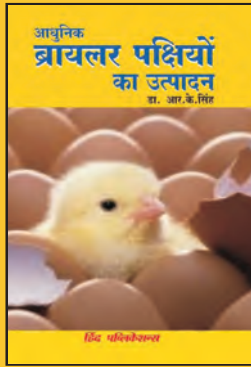
The 36th SPACE event edition will bring three days of unmissable exhibition, conferences and business exchange. The showgrounds will cover the complete spectrum of livestock and farming products, including cattle, poultry, Poultry processing, pigs, bovine, rabbits, Agro-industry equipment, and more. Stakeholders involved in the livestock breeding and product distribution supply chain levels will benefit from attending SPACE 2023 as it has a solid international reputation. It will also be a great opportunity even for the exhibitors from India and South East Asia specially the Poultry and livestock equipment manufacturers, processing equipment manufacturers, Pharmaceutical and supplier of raw material for animal health industry to showcase their products and services. Visitors from African, European, South East Asia and other western countries will provide a strong market lead for exhibitors.

The SPACE exhibition will also provide opportunity to the visitors from South Asian countries and India to witness the latest technology in Animal industry specially the Dairy and Poultry industry. Visitors will also be encouraged to tour the Innov'Space 2023 to explore the latest know-how brought by start-up companies in the animal production sector. Featuring an insightful supporting programme with over 100 conferences on the agenda, the trade show will illuminate all significant themes relevant to today's livestock, including animal feeds, livestock farming practices, international issues, the environment and more. If your participation at SPACE 2023 is confirmed, contact HIND POULTRY and PDF News Point for help in finding comfortable and hassle-free procedure for processing the VISA and getting the invitation letters from the organizer. It is also advised that due to the high competition for hotels located near Parc Expo Rennes start planning well ahead of the trade fair dates. 



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Malaysia's egg shortage sets Indian hatcheries on path for record exports

India is set to export a record 50 million eggs this month, boosted by sales to Malaysia, where there have been acute shortages as soaring feed prices caused by the Ukraine war forced many small-scale farmers to cut output, industry officials said. Middle Eastern countries, including Oman and Qatar, are the main buyers of eggs from India, but over the past few months, Indian hatcheries have received large orders from surprising quarters as output fell in some of the world's top suppliers. The biggest such unexpected order came from Malaysia, which used to export eggs to Singapore and other Asian countries. To secure egg supplies as prices rose to record highs, Malaysian Minister of Agriculture and Food Security Mohamad Sabu earlier this month visited Namakkal, in the southern Indian state of Tamil Nadu, where several leading hatcheries are based. "For the first time, Malaysia is buying large quantities of eggs from India, and it seems that India's egg exports to Malaysia will remain strong during the first half of 2023," Sasti Kumar, joint managing director at Namakkal-based Ponni Farms, one of India's leading egg exporters, told Reuters. India shipped 5 million eggs to Malaysia in December, and will ship 10 million in January and up to 15 million in February, according to Kumar. The outbreak of highly pathogenic avian influenza, commonly called bird flu, has curtailed supplies of eggs and chicken in many countries around the globe, pressuring already high food prices and triggering trade restrictions from countries that import poultry.



The imports from India have helped Malaysia bring prices down from the record highs seen in late December. Having suffered a shortfall of 157 million eggs in November, the market gap was down to just one million in December, the Malaysian minister said in a statement earlier this week. Malaysia's egg production would recover in a few months as the government has increased a subsidy, said Tan Chee Hee, president of the Federation of Livestock Farmers' Association of Malaysia. Meantime, prices in India have shot up to a record 565 rupees (\$6.96) per 100 eggs, up by nearly a quarter on year ago prices and adding to domestic concerns over food price inflation. Exports are rising amid robust local consumption during the winter months, said Prasanna Pedgaonkar, general manager of poultry-focused At the same time, Pedgaonkar said, domestic supplies have fallen by around a tenth as small-scale Indian farmers, like their counterparts in Malaysia, have curtailed production after incurring losses in the past two years due to the high price of feed and the impact of the pandemic. India's domestic prices could eventually make exporting eggs less profitable, in which case foreign buyers will have to look elsewhere, said C Panneerselvam, an exporter also based in Namakkal who sold one million eggs to Malaysia last month. But for the time being, demand is not abating. Countries such as Singapore and Sri Lanka could be next in line to buy from India in coming months, said Kumar of Ponni Farms.

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Bringing the Next Generation Mineral Nutrition Solutions

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Trace minerals (TM) play a crucial role in various metabolic and biological processes within the animal's body. For example, Zn is a component of metalloenzymes, whereas Cu and Mn are cofactors for many enzymes. Given their importance in physiological processes, they play a vital role in the growth, production, and reproduction of animals. Numerous research have been conducted with respect to the TM requirements of animals according to their age, production stage, stress conditions, etc. The common practice of feeding extra does not apply to trace mineral nutrition as higher levels do not guarantee improved performance. The common sources of TM used even today are mostly inorganic (sulfates or oxides) which have different bio availabilities based on the method of mineral production (source or base materials used for production).

Sources of trace minerals

Inorganic:

Inorganic trace minerals (ITM) are a group of minerals that are bound to groups like sulfates (SO₄), chlorides (Cl), or oxides (O) through ionic bonds (Taylor and Field, 1995). ITM are most widely used globally for decades due to its low cost. ITM has many limitations such as low bioavailability, higher reactivity, lesser stability, and higher interactions with other nutrients, in feed as well as in the gut of animals. Mwangi et al.(2017) reported ITM sources irritate the intestinal mucosa, form a complex with other nutrients, and finally get expelled into the

environment. Sulfate trace minerals contain a metal ion bound to a sulfate ion via an ionic bond. This ionic bond breaks apart easily in an aqueous environment, releasing a free metal ion at liberty to interact with other nutrients. Organic and IntelliBond (Trouw nutrition) hydroxy trace minerals (fig 1) contain stronger covalent bonds that protect the metal from being released too early in the feed or digestive tract, giving them an advantage in diet stability, palatability, digestibility, and bioavailability over sulfate trace minerals.

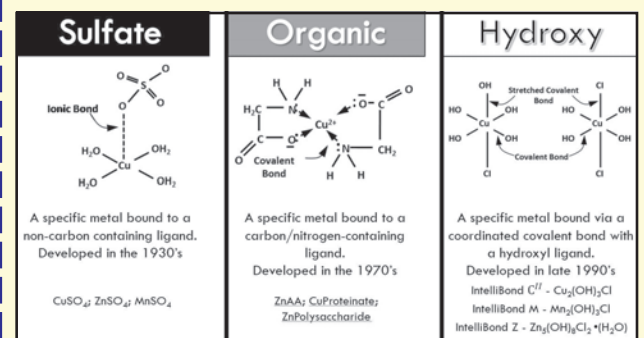


Fig1. Chemical structures of different trace mineral sources

Chelated Organic Forms:

OTMs are formed by the chelation of inorganic minerals with organic ligands like amino acids, proteinates, or carbohydrate moieties. In chelation, the metal ion was bound strongly with organic molecules (ligands) through a covalent bond (Fig-2) to form a ring structure. Optimal chelation provides the highest stability to the chelate with the right amount of trace mineral being made available at the point of absorption, enhancing the bioavailability of

trace minerals fed. However, given the varied production processes, the variability in ligand selection, and lower mineral concentration, there is a lot of concerns around the selection of the right chelated forms.



Fig 2. Chelated Trace Mineral structure

Hydroxy Forms:

HTM is the new group of minerals that offers optimal delivery of highly bioavailable trace minerals at the right part of the gastrointestinal tract. HTM is produced by reacting a pure form of mineral with an alkali to form a hydrolyzed inorganic metal complex. HTM is non-hygroscopic, free of dust, and non-oxidative due to the presence of covalent bonds in its crystalline

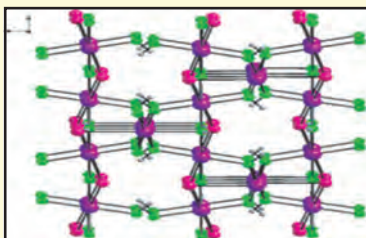
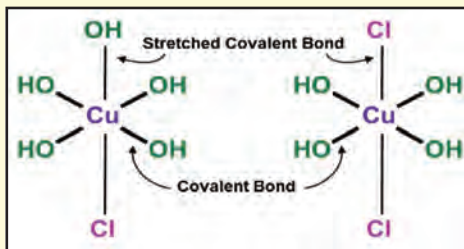


Fig 3. Hydroxy trace minerals with overlapping crystalline structure

structure (Leisure et al., 2014), and exhibits superior bond strength (Fig 3). HTM are considered inorganic as they are covalently bound to an OH group instead of carbon-containing ligands like organic TM (Arthington, 2015). European Union approved the usage of HTM in all animal species and even in organic feeds.

Above crystalline structure allows slow and steady release of trace minerals with significantly higher bioavailability than their counterparts (fig 4) which supports better animal performance and wellbeing.

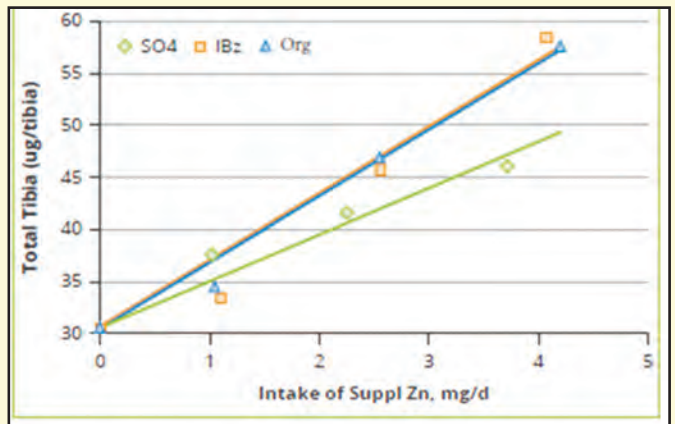


Fig 4. Bioavailability of inorganic, chelated and hydroxy zinc forms

As opposed to chelated mineral forms, the hydroxy ones, have higher metal content and are comparatively priced much lower.

Impact of hydroxy trace mineral sources:

The rapid growth of modern birds will increase the susceptibility of birds to oxidative stress and pathogens which in turn leads to reduced performance. Poultry diets supplemented with organic or hydroxy trace minerals showed better performances and immune responses compared to inorganic trace minerals due to the better bioavailability of minerals. M Sadeq et al. (2018) reported broilers fed with optimum levels of hydroxy minerals showed greater feed efficiency, increased percentage breast yield, and greater weight gain than sulfate source. Similarly, Olayinka et al. (2019) observed superior weight gain in broiler chickens supplemented with HTM as compared to those receiving sulfate trace minerals at 15, 80, and 80 ppm of Cu, Zn, and Mn. Broiler groups fed with lower levels of OTM and HTM showed higher weight gain and lower FCR at a lesser cost as compared to ITM fed group showing the superiority of HTM and OTM over inorganic sulfates or oxides (Perez et al., 2017). Egg loss due to defective eggshells was reduced by using hydroxy Zn, Mn, and


Cu trace minerals in place of sulphate inorganic sources. Toghiani et al. (2019) concluded that using hydroxy sources of Cu, Zn, and Mn in layer diets will improve feed stability, egg production rate, and FCR. Toghiani and coworkers conducted an experiment to estimate the effect of replacing ITM with HTM sources on egg production, egg quality parameters, and feed stability in layer diet during post-peak production. The inclusion of hydroxy Zn, Cu, and Mn reduces the extent of oxidation in the feed, as indicated by lower peroxide, higher free fatty acids, and higher iodine values in feed samples. In addition, Enzymes added to the diet are also susceptible to degradation by free inorganic metals. Phytase fed to improve phosphorus availability in poultry diets showed 16% greater retention in the feed when formulated with IntelliBond copper compared to copper sulfate, indicating prevention of phytase degradation during feed storage (Liu et al., 2005). Using a less reactive HTM and OTM source appears to protect vitamins, lipids, and enzymes in feed, ensuring the nutrients formulated to retain their optimum quantity and quality.

Copper, zinc, and manganese help in reducing oxidative stress and enhances immunity by acting as a cofactor for the enzyme Superoxide dismutase (SOD). Perez et al. (2017) showed an increased level of superoxide dismutase (SOD) when feeding increasing levels of Zn and Mn in both laying hens and broiler chickens challenged with lipopolysaccharides. In laying hens, a similar SOD level was reached with lower levels of Zn (50 ppm) and Mn (45 ppm) from HTM compared to higher levels (100 ppm Zn and 90 ppm Mn). Olayinka et al. (2019) reported that plasma levels of methylmalonic and uric acid are low in broiler chickens supplemented with a hydroxy form of Zn and Cu. Hence, talking of

trace mineral forms that assure their availability and further utilization in animal bodies, two forms that clearly stand out of the various other sources are the chelated and hydroxy forms. Lower concentrations of hydroxy and organic forms of minerals in poultry diets have been recommended as a solution to reduce the excretion of minerals without any objectionable effect on performance. Combining the best of both worlds – the hydroxy and chelated forms in this case has been observed to yield better results than when provided individually to animals. An innovative offering from Trouw Nutrition, that is in line with this concept is “IntelliOpt” – a precision trace mineral technology, that has been designed and validated through various animal trials. IntelliOpt combines the hydroxy (SelkoIntellibond) and chelated (Optimin) forms at optimal levels in one convenient package to consistently deliver higher mineral bioavailability.

Conclusion:

The main goal of trace mineral nutrition is to meet the ever-increasing nutritional demands of today’s high-producing animals without any harmful interaction with other nutrients in the feed in a sustainable manner. OTM and HTM are the most viable options available in achieving the goal of better bioavailability of TM to animals, while OTM is costlier than HTM. To obtain the higher bioavailability of trace minerals at a cost-effective price, both organic and hydroxy sources of trace minerals could be combined (IntelliOpt). Practicing this precision trace mineral nutrition is essential for optimizing the production cost, decreasing environmental pollution, improving animal productivity and better well-being.

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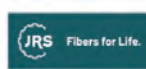
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Ib Jensen takes over from Jan Secher as new CEO of Perstorp Group

Effective March 1st, Ib Jensen takes over from Jan Secher as Chief Executive Officer of Perstorp Group, a leading specialty chemicals company headquartered in Malmö, Sweden and since 2022 part of PETRONAS Chemicals Group Berhad (PCG). Ib Jensen is a highly respected senior industry executive with a long career as CFO and extensive experience from M&A and integration of acquired companies, something that will be required in the next phase for Perstorp.

After more than 9 successful years as the CEO of Perstorp Group, Jan Secher has decided to step down. This decision is based on a personal direction set more than a year ago, prior to the acquisition by PCG, allowing for a full search process to be conducted for his replacement. Ib Jensen has been CFO of Perstorp for the past year and was considered the most qualified candidate based on his knowledge of the company, long term experience of the specialty chemicals industry and high level of appreciation in both Perstorp as well as in PCG. Previous experience include CFO and executive roles within Finance and IT at companies such as Arxada, Lonza, Syngenta, Danisco and LEGO. "I have had the pleasure to lead Perstorp through an exciting transformation, which has formed the company to what we are today; a sustainability frontrunner with a growing share of specialty



Ib Jensen (right) Jan Secher (left)
as new CEO of Perstorp Group

chemicals in the portfolio. This has been the crowning of my professional career and I have been surrounded with fantastic and inspiring people. I would like to take the opportunity to thank you all, externally as internally for a tremendous support. The company is entering a new chapter in its more than 140 year history and with PCG as our owner, a series of opportunities are opening well beyond what we have seen in the past. It serves as the perfect timing to hand over the reins to a most capable leader. I am proud of the company and the extraordinary team that Ib now takes over to lead. I wish him and the team all the success in the future", Jan Secher comments.

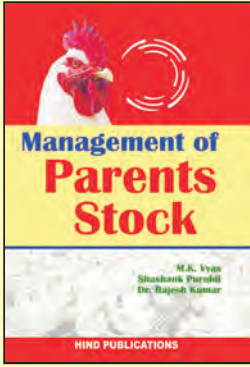
"On behalf of PCG, I am delighted to welcome Ib, as the new CEO of Perstorp. He is an experienced executive leader, with a strong and deep understanding of the specialty chemicals industry on top of a solid track record in business

optimization and financial management. He plays a key leadership role in the integration of Perstorp into the PCG family, while ensuring that Perstorp's business is uninterrupted. His insights, knowledge and leadership will be invaluable as we work towards unlocking the synergies between Perstorp and PCG, in bringing the company through its next phase. We look forward to working with him.

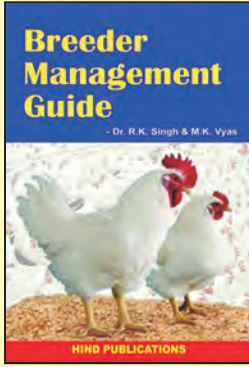
I also would like to put on record my appreciation and gratitude to Jan for his contribution for the past nine years. As the CEO, he led the company through challenging times, which required innovative solutions and decisions and has been instrumental to Perstorp's achievements and growth in the specialty business. More importantly, he helped to steer the company to play a pioneering role in sustainability particularly in the development of pro-environment solutions for its customers. I am confident that Perstorp will continue to benefit from the foundation that he has built," says Mohd Yusri Mohamed Yusof, PCG Managing Director/Chief Executive Officer.

"It is an honor to take over as CEO from Jan Secher and I look forward to lead Perstorp in this new exciting phase. With PCG as the new owners, their commitment and the support from the strong Executive

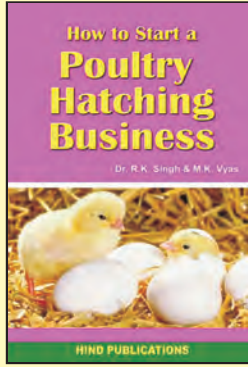
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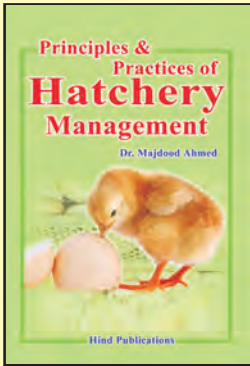
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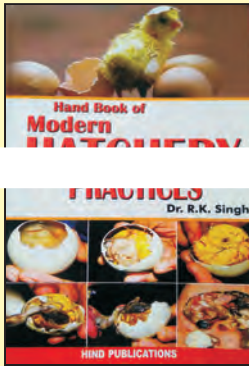
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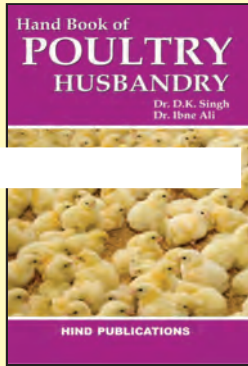
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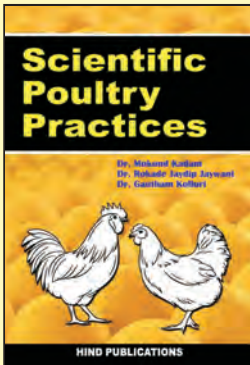
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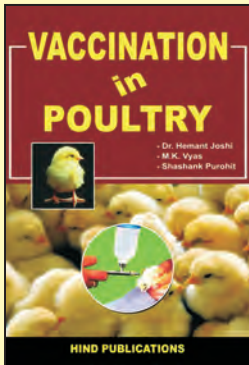
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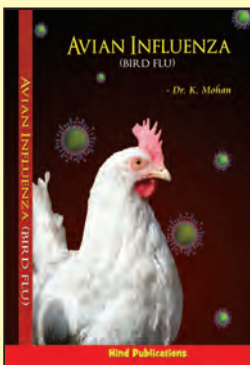
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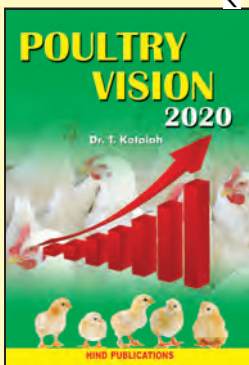
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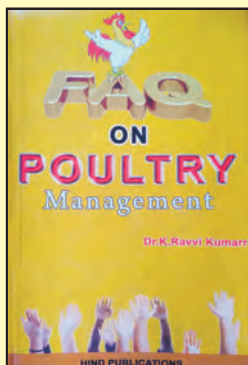
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Leadership Team, I feel confident about a successful time ahead of us”, Ib Jensen comments. Perstorp believes in improving everyday life – making it safer, more convenient and more environmentally sound for billions of people all over the world. As a world leading specialty chemicals company, our innovations provide essential properties for products used every day and everywhere. You’ll find us all the way from your car and mobile phone to towering wind turbines and the local dairy farm. Simply put, we work to make good products even better, with a clear sustainability agenda. Founded in Sweden in 1881, Perstorp’s focused innovation builds on 140 years of experience, representing a complete chain of solutions in organic chemistry, process technology and application development. Perstorp has approximately 1,430 employees and manufacturing units in Asia, Europe and North America. Sales in 2021 amounted to 13.5 billion SEK. Learn more at www.perstorp.com

Jan Secher remains in the CEO role until March 1st and will thereafter serve as an advisor to the new CEO and the Chairman, focusing on strategy and transferring external relationships. Monica Jönsson, currently deputy CFO, will take on the role as CFO when Ib Jensen assumes the position as CEO. PCG is fully committed to the Executive Leadership Team of Perstorp and expects the team to continue the successful integration work as well as dealing with the volatile global macro situation. 

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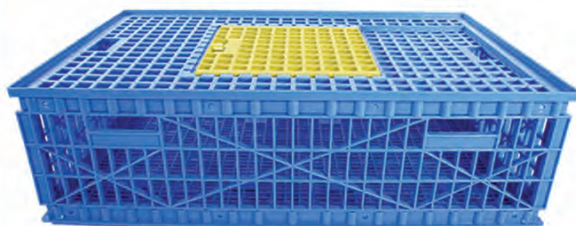
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Five Things to Know for Nutrition in the Real World

Profitability is essential for any layer farmer and egg producer. Feed prices around the world have increased, some more than double over the past year. Considering that feed can be 70% of the cost to produce an egg, how do farmers maintain profitability when egg prices do not also increase?

1. Know What You Need and What You Don't

Three fundamental components to any layer diet impact productivity- energy, amino acids and minerals. But how much of each is really necessary?

Energy - In general, feed 300 kcal per bird, which is the necessary average energy intake requirement of a layer. This can vary slightly depending upon the variety of the bird, egg mass and temperature.

Amino Acids - Know your target for egg weight to better define amino acid intake. For heavier eggs, you need higher amino acid intake per bird per day. Alternatively, there is no need to waste resources and money to feed more amino acids if you do not need heavier eggs.

For example, the nutrition recommendations in the Hy-Line W-80 India management guide account for the relatively smaller egg weight desired in this market compared to the global average. This diet requires less Lysine, making it 5.5% to 6% less expensive than the

nutrition recommendations in the international version of the W-80 management guide.

Minerals - Understand your sources of minerals and digestibility to allow for accuracy without excesses. The main minerals in the layer diet are calcium and phosphorus.

2. Know the True Cost of Energy Intake vs. Feed Intake

Decreased energy in a layer diet will always lead to increased feed intake. However, this is never an equal exchange. Stocking density, temperature, feather score, and housing layout are all factors influencing the outcome of feed intake. Decreasing energy may or may not be profitable at different ingredient costs. For example, with a 25% decrease in

energy, the bird with average stocking density and thermal neutrality can only compensate for 7.47% increase in feed intake, leaving a void of 16.25% in energy intake (Hy-Line International internal study, not published). This means lost production. Depending on the fiber source, it can be more costly to dilute the energy of the diet. Additionally, lower nutrient value creates a higher feed intake, which also creates a higher feed cost.

3. Protein Reduction vs. Performance

It is possible to have a very significant reduction in the amount of protein. If the amino acids in the diet are balanced, egg mass will continue at expected levels.

For example, a 16% reduction in protein with proper amino acid balance can be made without affecting the egg mass, while the same reduction in protein without proper amino acid balance can equate to a 36.6% percent change in egg mass (Harms et al., 1982). Given that protein can be the second most expensive nutrient in the diet, finding the right balance can mean substantial cost savings. It is proven, feasible and even benefits intestinal quality and decreases environmental impact.

4. Additives vs. Cost Reduction vs. Performance


One of the most cost-effective additives is a super-dose or non-starch polysaccharide (NSP) enzymes. The feasibility of this additive super-dose is not a common

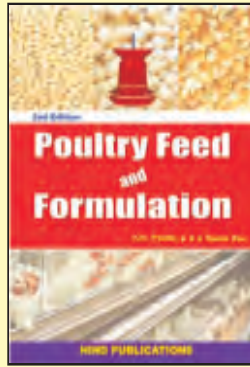
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practice and may change from time-to-time. It is important to know not only the recommendations of the additive supplier, but also to know the economic feasibility of each dose in the reality of feed costs. Enzyme activity is not linear according to the amount included in the feed. The most economically efficient point will be dependent on the ingredient cost according to the geographic location.

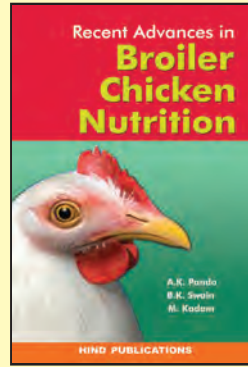
5. Alternative Ingredients - Do They Meet Expectations?

Though it may be tempting to consider alternative ingredients, consider investment cost, anti-nutritional factors, historical composition variation, and more. Alternative ingredients give the major opportunity to reduce costs if you find the right ingredients in the proper circumstance and price. Be very careful with non-traditional ingredients because of potentially low digestibility, composition variability, and many more nutritional anti-factors. When changing ingredients, allow time for birds to adapt their endogenous enzymes. Egg production may decrease slightly while adapting and recovering the loss of production. Prolong the time using the alternative ingredient to lessen the impact. Make sure to use lab analysis for alternative ingredients before incorporating them into the diet.

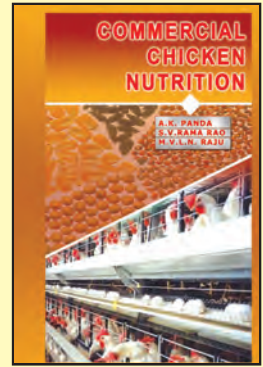
Know your objectives! If you do not need high egg weight, there is no need to pay for an expensive diet. Decreased energy will always lead to increased feed intake. 



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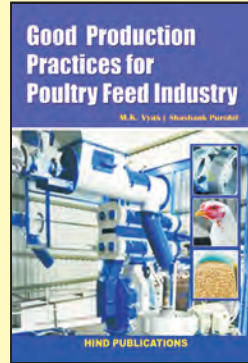
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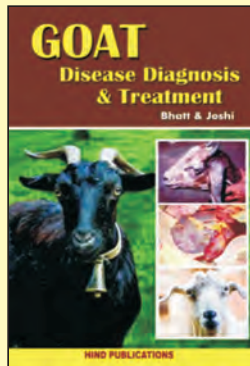
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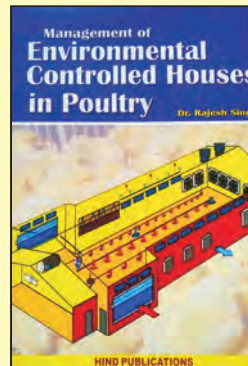
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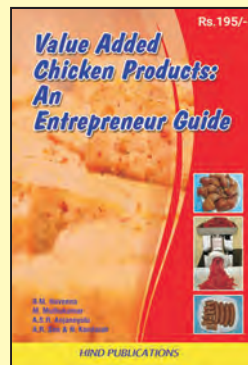
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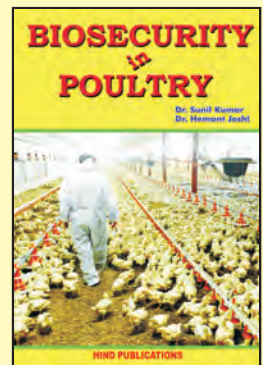
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Feeding Management of Layer



Dr. Rushikesh A. Kantale

Department of Livestock
Products Technology
GADVASU, Punjab

Chick feeding

Starter feed are fed to newly hatched chicks until 8 weeks. Starter diets are formulated to give proper nutrition to fast growing baby chicken. Chicks require a ration that can provide the nutrients needed for rapid growth and feather development. Chick rations are relatively high in energy, protein and the vitamins and minerals required for growth and development.

Grower feeding

After 8 weeks of age, the grower feed is used in place of the starter feed upto 20 weeks. After about 14 weeks of age, the grower feed can be replaced with developer feed if it becomes available for pullets, which prepare young chicken for egg production. Feeding management for growers or pullets aims to maintain a growth rate that would lead the pullets in reaching sexual maturity at the desired age and weight and to avoid obesity.

Grower ration has lower energy and protein levels than chick rations. Sometimes, a pre-lay ration with increased level of calcium is recommended for feeding 2-3 weeks before the bird begins to lay eggs. Once the chicks are fully feathered their energy requirements are reduced.

Restricted feeding is sometimes practiced for growers. The restricted feeding means reduction in feed intake or nutrient intake, particularly energy and protein, below the normal feed intake or nutrients requirements, respectively. This is done during the growing periods of layers (14-20 weeks). The reduction is done either by limiting the total amount of feed at 85-90% level of normal intake or diluting the feed with low nutrient dense feed ingredients so that there is reduction in energy and protein content of feed to 85-90% of normal level. The dilution can be done by adding fibrous materials of low

nutrient density, such as deoiled rice bran, rice polish, wheat bran, etc.

The reasons for restricted feeding are:

1. To avoid fattening of birds as the obesity leads to poor eggproduction.
2. Secondly, the restricted feeding causes 5-10 days delay in sexual maturity and thereby reducing in the number of small eggs laid at the start of production.
3. Restricted feeding is also being done in broiler breeder to check the weight gain of breeder because excess weight of breeder affects the fertility and eggproduction.

Layer feeding

Layer ration is designed to optimize egg production. This can be in terms of egg numbers, egg size or egg mass. The feed intakes of layer birds are lower as compared to broilers because of lower body size and lower growth rate. Once chicken have started laying eggs, layer feed is used. Layer feeds are formulated for chicken that are laying table eggs. Layer feed (BIS, 2007) contain higher energy and protein than grower feed. Compared to grower feed it also contains extra amount of calcium so the chicken can lay eggs with strong shells. This feed is fed from about 20 weeks of age or when the first egg is laid, whichever occurs first. Feeding programme that use only single feed during the entire laying periods is simple and easy to manage but costly. Therefore BIS (2007) recommends phase feeding programme in two phases: phase-I and phase-II. Phase feeding is the

feeding layer birds in different phases to adjust their nutrient intake in accordance with the rate of egg production. Phase-I continues from 21-45 weeks and phase-II from 46-72 weeks. Layer feed for phase-II contains less concentration of nutrients, such as energy, protein and amino acids, compared to that of phase-I, because feed intake increases with the advance of age and increase in body weight. Phase feeding controls the feed intake and body weight of layers and thereby also size of eggs. Thus it minimizes the production cost. The concept of phase feeding was introduced by Dr. G.F. Combs in 1960.

As per BIS (2007) phase feeding of layers is as follows:

1. Phase-I: This phase is most critical period starting from 20 to 45 week of age. In this phase egg production increases from zero to peak (90-96% production). Egg size is increased from 40g to 56g and the body weight of birds is also increased. So in this phase birds require optimum amount of nutrients.
2. Phase-II: From the age of 46 weeks, when bird's egg productivity comes down to around 90%, the protein level is changed (16% CP) according to the level of production to reduce the cost of production.

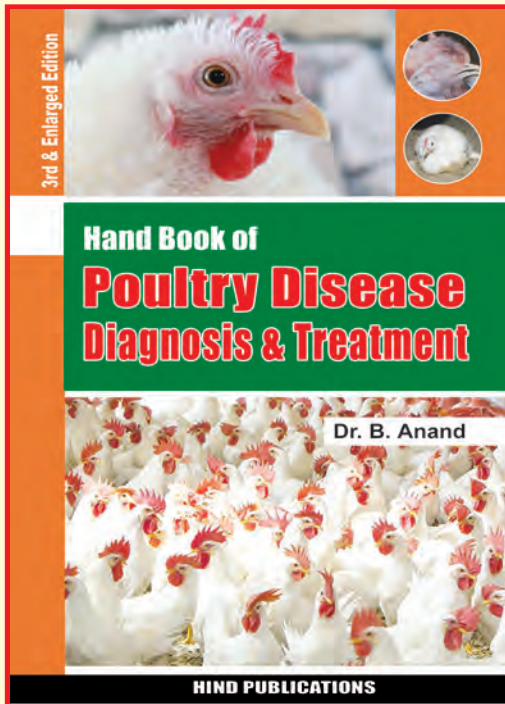
It is also further suggested that after reduction of egg production to 75%, crude protein level may be reduced to 15%.

Phase feeding refers essentially to reduction in the protein and amino acid levels of the diet as the bird progresses through a laying cycle. The concept of phase feeding is based on the fact that as birds get older their feed intake increases, while their egg production decreases. For this reason, it should be economical to reduce the nutrient concentration of the diet. At this time, it is pertinent to consider a conventional egg production curve of a layer, and superimpose both egg weight and daily egg mass output. If nutrient density is to be reduced, this should not occur immediately after peak egg numbers, but rather after peak egg mass has been achieved. There are two reasons for reducing the level of dietary protein and amino acids during the latter stages of egg production, first, to reduce feed costs and secondly, to reduce egg size. The advantages of the first point are readily apparent if protein costs are high, but the advantages of the second point are not so easily defined and will vary depending upon the price of eggs.

When a producer is being paid a premium for extra-large and jumbo eggs, there is no advantage to using a phase feeding programme unless egg shell quality is a problem.

It is difficult to give specific recommendations as to the decrease in dietary protein level that can be made to reduce egg size without decreasing the level of production. The appropriate reduction in protein level will depend on the season of the year (effect of temperature on feed consumption), age and production of the bird, and energy level of the diet. Hence, it is necessary that every flock be considered on an individual basis before a decision is made to reduce the level of dietary protein. As a guide, it is recommended that protein intake be reduced from 17g/day to 16g/day after the birds have dropped to 80% production and to 15g/day after they have dropped to 70% production. With an average feed intake of 100 g/day, this would be equivalent to diets containing 17, 16 and 15% protein. It must be stressed that these values should be used only as a guide after all other factors have been properly considered. If a reduction in the level of protein is made and egg production drops, then the decrease in intake has been too severe and it should be immediately increased. If, on the other hand, production is held constant and egg size is not reduced then the decrease in protein intake has not been severe enough and it can be reduced still further. The amino acid to be considered in this exercise is methionine, since this is the amino acid that has the greatest effect on egg size. Phase feeding of phosphorus has also been recommended as a method of halting the decline in shell quality often seen with older birds. Using this technique, available phosphorus levels may be reduced from approximately 0.4% at peak production to slightly less than 0.3% at the end of lay. Table 10 shows an example of phase feeding of protein, methionine and phosphorus, related to egg production, and independent of feed intake.

A major criticism of phase feeding is that birds do not actually lay "percentages" of an egg. For example, if a flock of birds is producing at 75% production, does this mean that 100% of the flock is laying at 75% or is 75% of the flock laying at 100% production? If the latter is true, then the concept of phase feeding may be harmful. If a bird lays an egg on a specific day, it can be argued that its production is 100% for that day, and so




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its nutrient requirements are the same regardless of the age of bird. Alternatively, it can be argued that many of the nutrients in an egg, and especially the yolk, accumulate over a number of days, and so this concept of 100% production, regardless of age, is misleading.

Advocates of phase feeding indicate that birds can be successfully managed by reducing protein/amino acid contents of the diet-others suggest that nutrient specifications are too high to start with initially, and that phase feeding merely accomplishes normalization of diet in relation to requirement. The bottom line is that environmental and management conditions vary from flock to flock, and certainly from season to season within a flock. For this reason, the basis of phase feeding must be an accurate assessment of the nutrient intake relative to requirement for production, growth and maintenance.

Molting hen

After 8 to 12 months of egg production, some flocks are molted as a means of extending the period of production. A combination of feed, water, and light restriction is usually used to stop egg production and cause a rest, which may last from 3 to 6 weeks. A rest can also be induced by free-choice feeding of a diet containing a deficiency or excess of a specific nutrient. Examples of nutrients used to induce molt include excess iodine, excess zinc, and sodium chloride deficiency. After the rest, egg production can be initiated by stimulatory lighting. Little research information is available on the nutrient requirements of molted hens; therefore NRC (1994) has assumed that requirements are similar to those of hens during the first cycle of production.

Calcium for layer

The major mineral required for egg shell quality is calcium. Thin egg shells are observed when calcium, phosphorus, zinc and vitamin D₃ are not provided in diets at adequate levels. Layers need 3 - 3.5 gram of calcium per day from first egg throughout the laying period. The recommended strategy is to feed a constant, modest level of calcium in the feed and to use calcium grit (eg. limestone or oyster shell) to provide the additional requirement. After peak production the feed intake is gradually reduced and by increasing the amount of calcium grit, the total amount of calcium per day from feed and grit can be secured. The metabolic requirement for calcium occurs mainly during the night when the egg shell is formed. Feeding the additional

grit in the afternoon can provide the bird with calcium during the night when it is needed most. Laying hens should have some portion of calcium available free-choice while calcium is being added to feed.

Moulting is the physiological process of the bird shedding and re-growing feathers to rejuvenate its body to start laying. Moulting occurs naturally in the wild, as seasonal daylight shortens and females stop laying eggs. Laying hens are generally moulted once or twice during their productive lives.

When laying birds are kept fasting along with reduced amount of daylight and low amount of water birds lose a portion of their body weight, which is called forced moulting. Moulting usually does not affect egg size, but allows for an improved egg laying rate, improved shell quality, and increased albumin height. When daylight length is increased hens begin laying eggs again as normal productivity. Forced moulting increases the laying periods of birds and is practiced when the birds' egg production is low and egg price is also low.

Dietary manipulation for improvement of egg quality

Nutritional quality of eggs is also affected by type of feed consumed by birds. Quality of feed can be enhanced by following dietary manipulation.

1. Egg yolk is considered one of the richest sources of cholesterol in human diet. Normal cholesterol content of eggs (about 200-250 mg) and blood (around 150mg %) in chicken has been found to vary quite considerably. The cholesterol content of chicken egg can be reduced up to 25 % through the use of additives, dietary fibre and polyunsaturated fatty acid supplementation.

2. Omega-3 fatty acids have cardio protective and other beneficial effects. Poultry nutritionists have started research to incorporate more of these fatty acids in the egg and have succeeded in developing such an egg called Omega-3 enriched 'designer egg'. This egg can be called as the 'diet egg' or the 'functionalegg'.

3. Diet eggs can have a high percentage of Vitamin E, an antioxidant, which prevents oxidation of cholesterol and therefore its ill effects. These eggs may also contain 600 mg of Omega-3 fatty acids. Omega-3 fatty acids help to reduce cholesterol triglycerides, clog formation, tumour growth and improved immunity.

4. In order to improve the quality of these eggs further selenium, carotenoid pigments, etc. are also being increased in these eggs.

Table 1: Expected performance of commercial layer flocks (BIS, 2007)

Sl.No.	Age in weeks	Production %	Egg/HH (Week)	Egg (HH)	Daily Feed intake(g)
1	19	5	0.35	0.35	75
2	20	15	1.05	1.40	62
3	21	38	2.66	4.06	90
4	22	64	4.48	8.54	93
5	23	83	5.81	14.34	96
6	24	80	5.6	20.55	102
7	25	92	6.44	26.99	104
8	26	94	6.58	33.56	106
9	27	94	6.58	40.12	108
10	28	95	6.65	46.75	108
11	29	96	6.72	53.44	109
12	30	97	6.79	60.20	111
13	31	97	6.79	66.96	111
14	32	97	6.79	73.20	115
15	33	96	6.72	80.40	115
16	34	96	6.72	87.07	115
17	35	96	6.72	93.73	114
18	36	96	6.72	100.39	114
19	37	95	6.65	106.98	114
20	38	95	6.65	113.55	113
21	39	95	6.65	120.13	113
22	40	95	6.65	126.69	113
23	41	94	6.58	133.18	113
24	42	94	6.58	139.66	113
25	43	94	6.58	146.13	113
26	44	93	6.51	152.53	113
27	45	93	6.51	158.92	113
28	46	93	6.51	165.31	113
29	47	93	6.51	171.69	113
30	48	93	6.51	178.06	113
31	49	92	6.44	184.36	113
32	50	92	6.44	190.65	112
33	51	91	6.37	196.87	112
34	52	90	6.3	203.01	112
35	53	89	6.23	209.06	112
36	54	89	6.23	215.15	112
37	55	89	6.23	221.21	112
38	56	89	6.23	227.27	112
39	57	89	6.23	233.33	112
40	58	86	6.02	239.31	112
41	59	89	6.23	245.29	112
42	60	60	4.2	251.26	112
43	61	68	4.76	257.22	110
44	62	87	6.09	263.12	110
45	63	87	6.09	269.02	110
46	64	86	6.02	274.84	110
47	65	86	6.02	280.65	110
48	66	86	6.02	285.46	110
49	67	85	5.95	292.20	110
50	68	84	5.88	297.86	110
51	69	84	5.88	303.52	110
52	70	83	5.81	309.11	110
53	71	82	5.74	314.63	110
54	72	81	5.67	320.07	110

Feeding of Breeding Stock

A breeder diet should have proper level of energy and protein. Providing adequate vitamins in a breeding ration is very important. Vitamins may account for about 4% of the cost of a breeder feed. Deficiencies of various trace elements and vitamins may lead to reduced hatchability and poor chick quality. The amount of feed required daily depends on the body size, the rate of production and atmospheric temperature. Breeder stocks must be prevented from becoming fatty to maintain their optimum reproductive performances. Both male and female breeders should be placed on a breeder diet five to six weeks before saving hatchingeggs.

Male weight and body condition are controlled by adjusting feed quantity so that a slow constant increase in weight (30g/week) is achieved as the male grows older. After 30 weeks of age, male's weekly body weight gain should be approximately 30 grams when averaged over a threeweek period. Normally an adult cock consumes 130-160 grams feed daily. Both underfeeding and overfeeding of males are possible, and can cause problems. Underfeeding is more common after 40 weeks of age. Cocks may appear dull and listless, having excess feather loss, reduced mating ability and vent colour may become paler and overall there may be reduced fertility. Overfeeding of cocks leads to excessive breast development and excessive weight which can lead to injury of hen while mating, more stress on the cock's joints and foot pads and reduced sexdrive.

Feeding of Back Yard Poultry

The backyard poultry farming is more beneficial to small, marginal farmers, land less labourers, tribal and backward class peoples. Backyard poultry farming generates small income for house hold requirement. Backyard poultry usually feed on household wastes, farm products and green vegetation, besides free scavenging for waste grains and insects. These birds can perform well with diets high in crude fibre.

It has better feed efficiency even with diets containing low energy and protein diets. During the process of scavenging on grass fields these birds have an access to insects, white ants, green grass, grass seeds, waste grains etc., thereby the supplemental feed requirement is much less than those reared under intensive poultryfarming. Feed supplementation in the

form of scratch is usually given in the morning and evening to develop habit to reach owner's place for laying eggs and for night shelter. Depending on the availability of free-range area and also the intensity of vegetation growth, the requirement of supplemental feed varies between 25-50 g/bird/day. Backyard birds can also perform well on whole grain feeding under scavenging conditions. For better shell quality, shell grit or limestone needs to be supplemented at the rate of 5-7 g/bird/day during laying period. However, colour of egg yolk or even meat of the birds reared in this system becomes bright yellow or orange as birds can get good amount of carotenoids from scavenging. Birds that get all their nutrients from scavenging may eat an excess of protein, if insects, worms, larvae etc. are available. Hence supplemental feeding of energy in the form of carbohydrate (cereal grains, etc.) is needed. Fenced or backyard poultry fed with household or garden waste may lack both energy and protein for good growth or egg production. In such cases supplementation with energy sources, protein sources and micronutrients are required.

Disease and Condition in Poultry due to Imbalance in Nutrition

Cannibalism

It occurs in flocks due to deficiency of common salt of sodium and also due to deficiency of crude fibre. If fibre free diet which contain less than 3% crude fibre is fed to chicken cannibalism is more observed. Methionine deficiency also result cannibalism. However, overall deficiency of feed or nutrient(s) for some days can produce cannibalism in chicken.



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Fatty liver and kidney syndrome (FLKS)

The deficiency of biotin can lead to this condition in young broilers. This condition is most commonly seen in 2–4-week-old bird fed wheat-based diet because wheat is deficient in biotin. Pyruvate carboxylase enzyme is biotin dependent and due to its deficiency death is caused by hypoglycemia due to failure of hepatic gluconeogenesis. This affects kidneys because kidneys are vital organs having high energy demand and are affected adversely leading to condition called as FLKS.

Fatty liver haemorrhagic syndrome (FLHS)

This condition is accompanied by excessive accumulation of fat in the liver. The main reason is low protein and high energy ration. Amino acid deficiency or their imbalance is also responsible for this condition. Deficiency of lipotropic factors is responsible. Certain mould toxins have also been reported as a cause of this condition. The lesions are excessive fat deposition in the liver with haemorrhage. This condition may be prevented by increasing the level (1-2%) of dietary protein supplementation with 50 g of CuSO₄, 500 g of choline, 3 mg of Vitamin B₁₂, 500 I.U of Vitamin E and 500 g of methionine per 100 kg of ration.

Cage layer fatigue and bone breakage in layer

High producing laying hens maintained in cages, sometimes show paralysis at peak egg production. The condition is caused by breakage of the vertebrae which subsequently affects the spinal cord. The reason is an impaired calcium mobilisation due to high output of Ca through the egg shell. This condition is more common in caged birds and the birds reared on deep litter system are rarely affected. It is because of the deficiency of exercise and the effects which influence the metabolism of Ca. The condition can be cured or prevented by increasing birds' exercise, reducing deposition of fat in the body and improving calcium metabolism by birds.

Salt poisoning


The requirement of salt is very less in poultry as compared to other animals. The excess of salt either in water or in feed is toxic. The symptom of salt poisoning are watery drops, increased water intake, muscular weakness, convulsion and death. On post mortem examination severe congestion and haemorrhages are observed in elementary canal, liver, lungs, kidney and

muscles. The level of salt should not exceed 0.5% in ration and 3000 ppm in drinkingwater.

Stress

When reactive oxygen species (ROS) in the body deforms the lipid layers in cell membranes and decreases the function of membranes. It increases the susceptibility to infection in birds. The condition is called oxidative stress. Commercial broilers are subjected to stress and this stress decreases the lymphocytes number and increase birds' susceptibility to diseases. ROS which are produced in body by normal metabolic process are responsible for distraction of lipid layer in cell membrane thus causes death of the cell. When antioxidants like vitamin E, vitamin C, vitamin A, carotenoids, Se, Cu, Zn and Mn is supplemented the ROS are neutralised by their antioxidant effects that reduce the free radical damage to the cells and help in improving immunity, growth and production. It has been reported that the broilers subjected to stress are benefited by inclusion of vitamin E at higher concentration in diet. Vitamin E level of 20-50 mg/kg feed has been found effective. It also helps in preventing the rancidity of fat in the feed. When poultry feed containing oil, fat, rice polish or rice bran which are rich in unsaturated fatty acids are stored for long period the unsaturated fatty acids (UFA) are oxidized by oxidative rancidity. To protect UFA from destruction vitamin E or other antioxidants are necessary to be added in feed. Thus vitamin E may be used up to protect feed from rancidity; so vitamin E content is reduced in feed which is responsible for deficiency of vitamin E in poultry. To prevent such conditions, optimum level of vitamin E should be included in poultryration.

Disease and Condition due to Vitamin Deficiency

Vitamin deficiencies are most commonly due to inadvertent omission of a vitamin premix from the birds' diet. Multiple signs are therefore seen, although in general, problems with deficiencies of the B vitamins appear first. Because there are some stores of fat-soluble vitamins in the body, it often takes longer for these deficiencies to affect the bird. Treatment and prevention rely on an adequate dietary supply, usually microencapsulated in gelatin or starch along with an antioxidant. Vitamin destruction in feeds is a factor of time, temperature, and humidity. For most feeds, vitamin efficiency is little affected over 2-month storage within mixed feed. 

Lipids in Poultry Diets

Charles Starkey

Ph.D., Assistant Professor, Poultry Science, Auburn University

Dietary energy has long been misunderstood from a formulation point of view. For decades, we have relied on inefficient energy determination methods such as bomb calorimetry to assess the calorie content of a known feedstuff. We, then, utilize average values and hope for the best when formulating rations for animals. Even today, more modern techniques only get us slightly closer to our desired goals. Tools like cecatomized roosters, while very useful, do not adequately represent broilers growing during early stages of growth. Use of NIR (near infrared) ingredient analyses can have high costs when used inappropriately. Ranges in the digestible energy of carbohydrate sources are often not considered when grains age during storage and their composition changes, or their contents shift due to varietal differences and seasonal weather differences.

Lipid fat

Historically, lipid fat sources have been utilized to aid in the reduction of metabolic heat production during warmer months. However, this impact may be overcome if the fiber fraction of these diets increases, and the lipids are not digested but rather adhere to fiber fractions and are passed through the tract. While high quality lipid sources can be extremely valuable tools for providing energy, oxidized or lower quality lipids (those high in MIU or FFA) may have the opposite effect. Research has demonstrated that oxidized fats can reduce performance, and even more importantly, cause physiological damage to the gastrointestinal enterocytes and tight junction proteins. Intestinal health, physiology, and metabolism all play a significant role in the digestion of nutrients as well as where in the body they are utilized. If the gastrointestinal tract and the liver combined account for approximately 50% of the energy for growth, any insult to these tissues through diseases, parasites, or mycotoxins can divert energy from muscle protein accretion to immunological response and cellular replacement or repair. We must take better account of the costs of poor gastrointestinal health to our production systems and

economic calculations.

Genetic challenges

In addition, we must keep up with genetic changes in modern fast growing, high-yielding broilers. The endocrinological response of satiety has changed in these genetic lines as well. Today's broilers can consume up to 40% more of a low energy diet to achieve similar, if not greater, weight gains. To accomplish this; however, efficiency in conversion of grams of feed to grams of muscle protein gained is negatively impacted. Furthermore, today's broilers do not seem to want to sequester fat into abdominal pads as willingly as previous strains. Between the efficiency in protein accretion and the use of exogenous enzymes, there is a shortage of poultry fat in the current market. While small changes in the energy content of the diet may achieve economic savings on paper, overconsumption of feed by today's fast-growing, high-yielding genetic broiler lines will eliminate, and possibly reverse, any gains achieved.

More research needed


Additional information is still needed to better understand the benefits of different carbohydrate fractions. Research in net energy systems has not been universally accepted by nutritionists in certain areas, especially those who have enjoyed abundant grain supplies at reduced prices.

While a great deal of effort was placed into research during the 1990s to determine non-starch polysaccharide concentrations in feed ingredients, that work is now decades old, and yet, we continue to utilize those original values possessed with the knowledge that the varieties of grains as well as the composition of co-products has changed drastically.

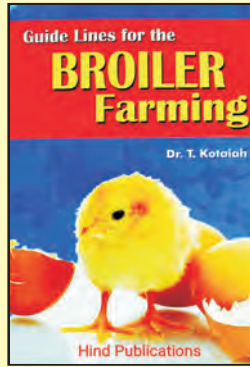
Additionally, knowledge regarding the fermentability of specific fiber fractions and how nutritionists can utilize this information to drive production is currently in its infancy. Energy expended during both consumption of a meal as well as during digestion is still not well understood. While we continually stress pellet quality, the throughput demands require our feed manufacturing personnel to produce what would be considered inadequate pellets. When we have 60% fines in a feeder pan, the time and metabolic energy required for each broiler to consume a meal is dramatically increased, a fact that has been well established in prior research comparing meal form and pelleted diets. If we are losing feed efficiency due to

physical energy output from the birds, we are still losing performance. Perhaps it is time we develop more research using environmental chambers and revisit the net energy concept. At a minimum, we can use this data as a springboard to better understand the overall energy supplied by new derivations of ingredients (i.e. DDGS, restaurant grease) to our growing birds. Additionally, we can use this information to better understand the fermentative capabilities of fiber sources that can supply energy to the intestinal tract while sparing dietary energy from lipids and starch for muscle protein accretion. Finally, this methodology can allow us to make better decisions on complete diet formulations when we do not understand how much particle size, feed form, or lipid to starch to fiber fraction ratios impact the true digestibility of the diet.

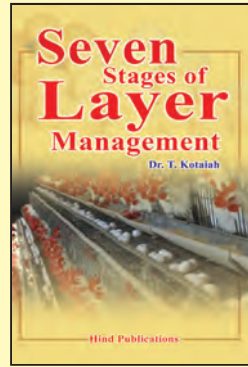
Complex answers needed

Complex diet formulations require complex answers. We should strive to obtain better more up to date information to allow us to continue to grow in knowledge. A better understanding of the energy delivered by a complete feed versus a value measured with a calorimeter can improve decision making. Understanding the complexities of energy digested versus energy utilization as a percentage of muscle accretion allows for more efficient production. Finally, understanding the complexities of the endocrinological triggers for satiety and well as growth axis hormonal signaling for fat accretion as opposed to protein will demonstrate the most appropriate energy concentrations needed to achieve the desired productivity parameters. 

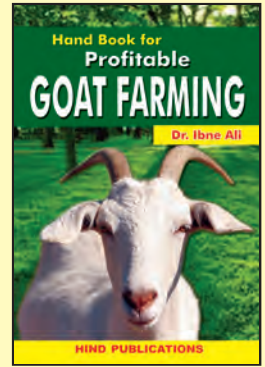
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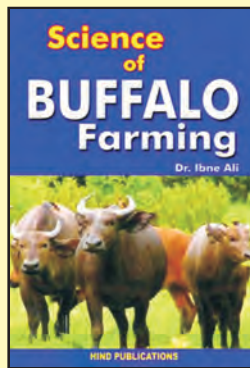
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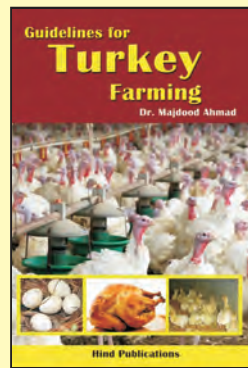
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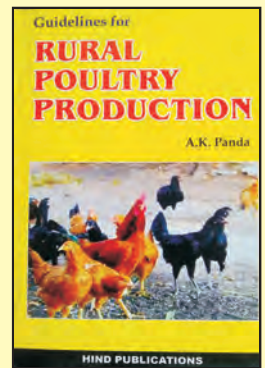
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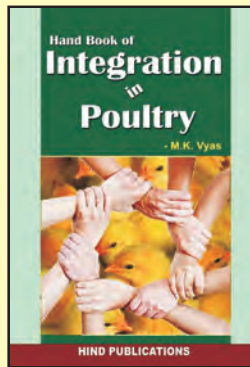
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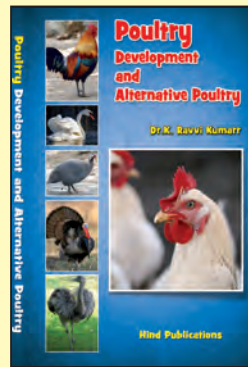
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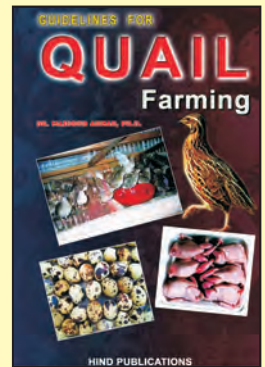
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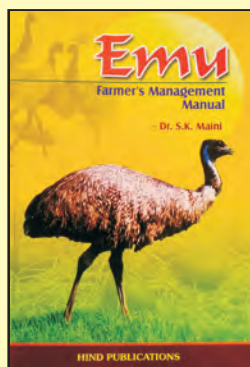
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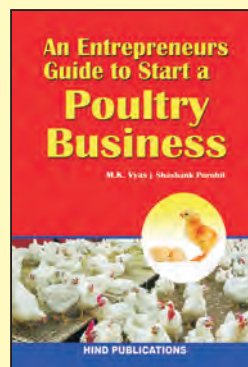
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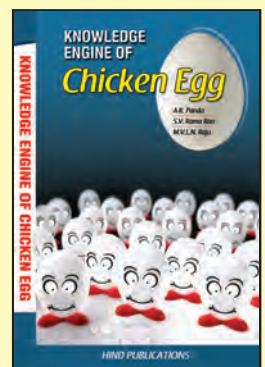
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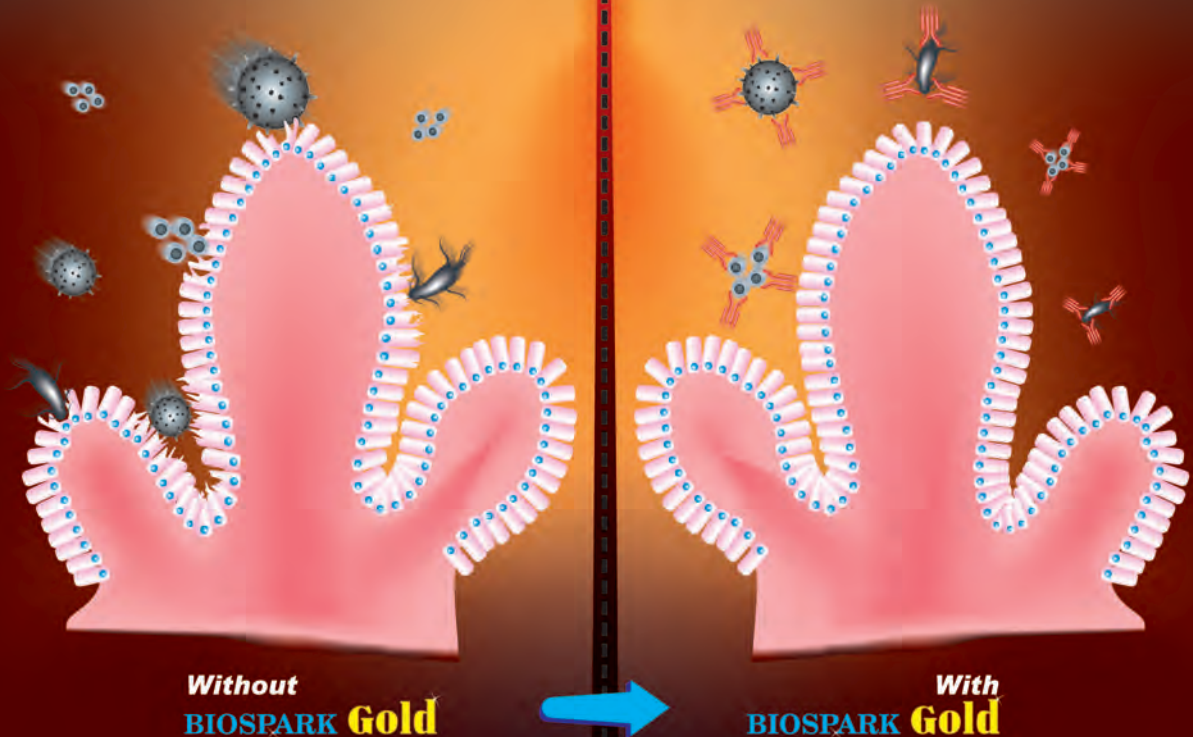
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