



# हिंद पोल्ट्री

# HIND POULTRY

Vol. XXI November 2022 No. 5



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Jakarta concludes on  
high ratings of  
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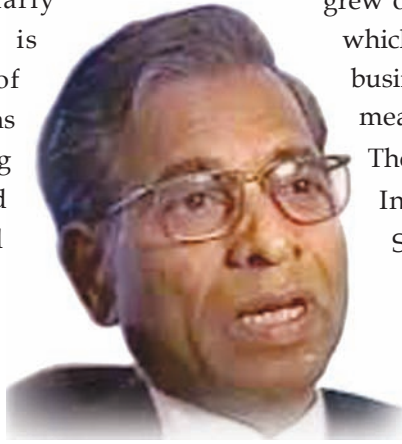
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**B**anda Vasudev Rao popularly known as Dr. B. V. Rao is considered by many as the father of modern poultry farming in India. He was the founder chairman of the National Egg Coordination Committee (NECC) and was a 2004 inductee of the International Poultry Hall of Fame of the World Poultry Science Association. The Government of India also awarded him the fourth highest civilian award of Padma Shri in 1990. Indian Poultry farmers celebrated the 86<sup>th</sup> Birth Anniversary on 6<sup>th</sup> November 2021. People from across the country paid floral tribute and distributed free Eggs and Chicken on the occasion.

Dr. B. V. Rao was born on 6 November, 1935 at Chanchalguda, in Hyderabad, in the undivided south Indian state of Andhra Pradesh (presently in Telangana) Dr. B. V. Rao was married to Uttara Devi and was blessed with three children, being a daughter, Dr. Anuradha Desai, and two sons, Mr. Venkatesh Rao and Mr. Balaji Rao. Dr. Anuradha Desai, who is married to Mr. Jitendra Desai, presently heads the Group and is ably supported by Mr. Venkatesh Rao, Mr. Balaji Rao and Mr. Jitendra Desai.

Dr. B. V. Rao enrolled for a short-length course at Acharya N. G. Ranga Agricultural University, Rajendranagar. He did this in order to see what he could make of his life as an independent farmer. He successfully completed a training program in dairy and poultry farming where he had the opportunity to learn under an American teacher, Moore. His first business venture was with 500 birds entrusted by Moore for tending and, soon, Dr. B. V. Rao started his own venture in 1970, which



## 87th Birth Anniversary of Padmashri Dr. B. V. Rao 1935-2022




**“He was a perfect gentleman in the assembly of men, a highly intelligent person in the world of scholars, an Ideal trainer in the society of trainers and above all a thoughtful, sympathetic and kind guide to the seekers of poultry knowledge. He was an inspired and inspiring teacher in the field of poultry farming. Great philosopher Carlyle said that "A Hero is Hero at all Points" and this is absolutely true for Padma Shree Dr. B. V. Rao.”**

**M.K. Vyas**

grew over the years to the present V H Group which is one of the largest integrated poultry business in Asia having interests in poultry, meat, pharmaceuticals, cattle feed, sports. The V. H. Group has now the presence in India, Bangladesh, United Kingdom, Singapore, Vietnam, Brazil and many more countries.

In the early 1980 When the price of eggs went down Dr. B. V. Rao gathered poultry farmers together from across the India and founded the National Egg Coordination Committee in the year 1982. He was its founder chairman. He was also associated with the World Poultry Science Association (WPSA) and headed its India chapter from 1993 to 1996. He was one of the key figures in the organization of the

World Poultry Conference in New Delhi in 1996. He also founded a higher education institution, Dr B.V. Rao Institute of Poultry Management and Technology near Pune in Maharashtra which conducts higher courses in the subject. The Government of India also awarded him the civilian honor of the Padma Shri in

1990. The World Poultry Science Association inducted him into their Hall of Fame in 2004. I am proud to sum up the man that was Dr. B. V. Rao. He was a perfect gentleman in the assembly of men, a highly intelligent person in the world of scholars, an Ideal trainer in the society of trainers and above all a thoughtful, sympathetic and kind guide to the seekers of poultry knowledge. He was an inspired and inspiring teacher in the field of poultry farming Great philosopher Carlyle said that "A Hero is Hero at all Points" and this is absolutely true for Padma Shree Dr. B. V. Rao. 



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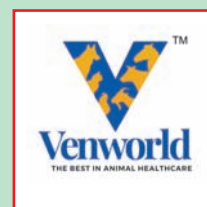
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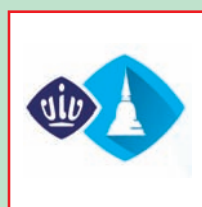
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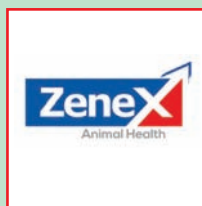
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## World Egg Day Celebrated all Across the Globe

**I**n India World Egg Day was celebrated at Babu Jagjeevan Ram Bhawan in Hyderabad. “World egg day is celebrated on 2nd Friday of October every year to promote the consumption of eggs across the globe.” World egg day was celebrated by NECC and individuals in different parts of the country. “later in the evening HIND POULTRY also celebrated World Egg Day by distributing eggs in government schools and hospitals and holding two competitions. The first was a recipe contest, where participants were asked to submit an original recipe featuring eggs as the main ingredient.

Parsi Times also asked readers to share poems and paintings as part of their egg talent contest, and announced the winner on World Egg Day! The Department of Animal Science, BACA and NAHEP-CAAST Project, Anand Agricultural University, jointly organised lectures on “Goodness of Chicken Egg: Nature’s Perfect Food”.


Dr. Alok Khare, a veterinarian and poultry consultant in Rajasthan, celebrated World Egg Day with the farmers of the villages of Babaicha and Rasoolpura. In both places, lectures were delivered on strategies to maximise egg production and consumption, and boiled eggs were distributed to children and adults.

In Mangaluru, students from the Yenepoya Institute of Arts, Science, Commerce and Management (YIASCM) and the Department of Hospitality Science celebrated World Egg Day with talks from guests on the importance and health benefits of eggs. Second-year students also performed a dance featuring the song ‘Ande ka Funda’, which is all about eggs! Boiled eggs were also sold on the college premises. Trouw Nutrition celebrated World Egg Day with campaigns, seminars, egg painting, an egg cooking competition, and an egg race, all aiming to raise awareness of the egg’s nutritional benefits. Eggs were

also distributed in schools, colleges, hospitals and orphanages to encourage egg consumption.

**Australia :** For World Egg Day 2022, Australian Eggs encouraged country-wide digital engagement by asking Australian farmers to create 10-second films featuring their team members, naming as many egg dishes as possible. In addition, Australian Eggs shared a range of recipes, including low-cost options, on their digital channels, exploring the versatility and affordability of eggs.

**Brazil :** To celebrate World Egg Day 2022, ASGAV – Associação Gaúcha de Avicultura (Poultry Farming Association of Rio Grande do Sul) and Programa Ovos RS (the Rio Grande do Sul’s Egg Program) hosted a week of activities. The program included musical events such as the 3rd Egg Music Festival-Universities, a lecture at the Salvador Sul Egg Festival and promotional activities with the distribution of a kit with gifts from Ovos RS. 10,000 eggs were also donated to several institutions, including Instituto do Câncer Infantil and Casa do Menino Jesus de Praga

**Nepal :** The Nepal Veterinary Association and Nepal Poultry Federation celebrated World Egg Day by promoting the ‘right to protein’. They hosted a seminar for teenage schoolchildren, providing short presentations from health workers on the importance of protein and facts on protein, eggs and myths. The students also received a tasty and simple egg-based dish to try and a recipe to share with their families. 





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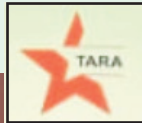
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# Tara Group conducted Telangana Field Officials' Family Get Together at Novotel Hotel, Hyderabad



Mr. Subramaniam's  
Late Father - Shri Dutta Radhakrishna  
& Late Younger Sister -  
Smt. Udayatara  
(on whose name is Tara Group)



Mr. T. Natesan



Mr. S.K. Malhotra



Dr. V. K. Shankar



Dr. Ashok Kumar

The largest Veterinary Pharmaceutical Distribution Company in India - Tara Group had their Telangana Field Officials' Family Get Together on Sunday, the 16th of October 2022 at Novotel Hotel, Hyderabad Airport, Hyderabad. The event started sharp at 10.30 am with Ganesh Vandana and Lamp Lighting by Mr. D. S. Subramaniam's Family members along with his mother. The welcome address to the august gathering by Mr. D. S. Subramaniam was crisp and short. He explained 27 years of his Tara Group's journey with many ups and downs continuing till date and also his 42 years long journey in the Animal Health Sector of India. His golden statement was "After having completed 42 years of service in the animal health industry, I am still not tired". Other prominent and distinguished speakers were Mr. T. Natesan, Managing Director, Virbac India, Dr. V. K. Shankar, CEO, Globion, Dr. Ashok Kumar Commercial Manager, South East Asia and South Asia, Idexx Labs, Dr. Pankaj Lohan, Vice President, Vvaan, Mr. Sudhir Kumar Malhotra, Managing Director, Interface, Mr. Sharath Babu, Additional Commissioner of Police (Retired), Hyderabad, Mr. Davinder Singh Dhanjal- Mr. Subramaniam's college mate from Ladakh, Mr. Surender Nagpal - Mr. Subramaniam's classmate from Delhi.

Mr. T. Natesan, Managing Director, Virbac in his speech clearly mentioned as to how he was inspired by Mr. Subramaniam in the year 1988 while working in the field in Namakkal area. Mr. Subramaniam was the Area Manager those days for Glaxo Animal Health for the states of Tamil Nadu and Kerala. Mr. Natesan, those days used to work as a Poultry Feed Representative for Deejay Feeds at Namakkal. One day in the year



1988 when Mr Natesan coincidentally saw Mr Subramaniam and his local Namakkal colleague at a stockist's place, he, then and there itself decided that he will make his career with a Pharmaceutical Company and that is how he joined Glaxo's Poultry Feed and then at a later date got into Glaxo's Veterinary Pharmaceuticals and finally today he is the Managing Director of Virbac India Ltd. (the then Glaxo). Mr T Natesan before taking over as the Managing Director of Virbac was working in various capacities in South East Asia, Taiwan and Korea with Virbac for almost nine and half years. Dr .V. K .Shankar , CEO , GlobionIndia Pvt. Ltd. ( a 100% subsidiary of Suguna Holdings Pvt Ltd. )in his address specifically touched hard work and integrity of Field Officials. He emphasized that all the field officials with their sheer hard work and integrity will be definitely successful in life. He explained all the attendees about his tenure with big multinationals like Pfizer , Bayer etc . Also , he discussed his Bayer , Germany tenure with regard to his launching



**M.K. Vyas & Shashank Purohit  
honouring Mr. D. S. Subramaniam**

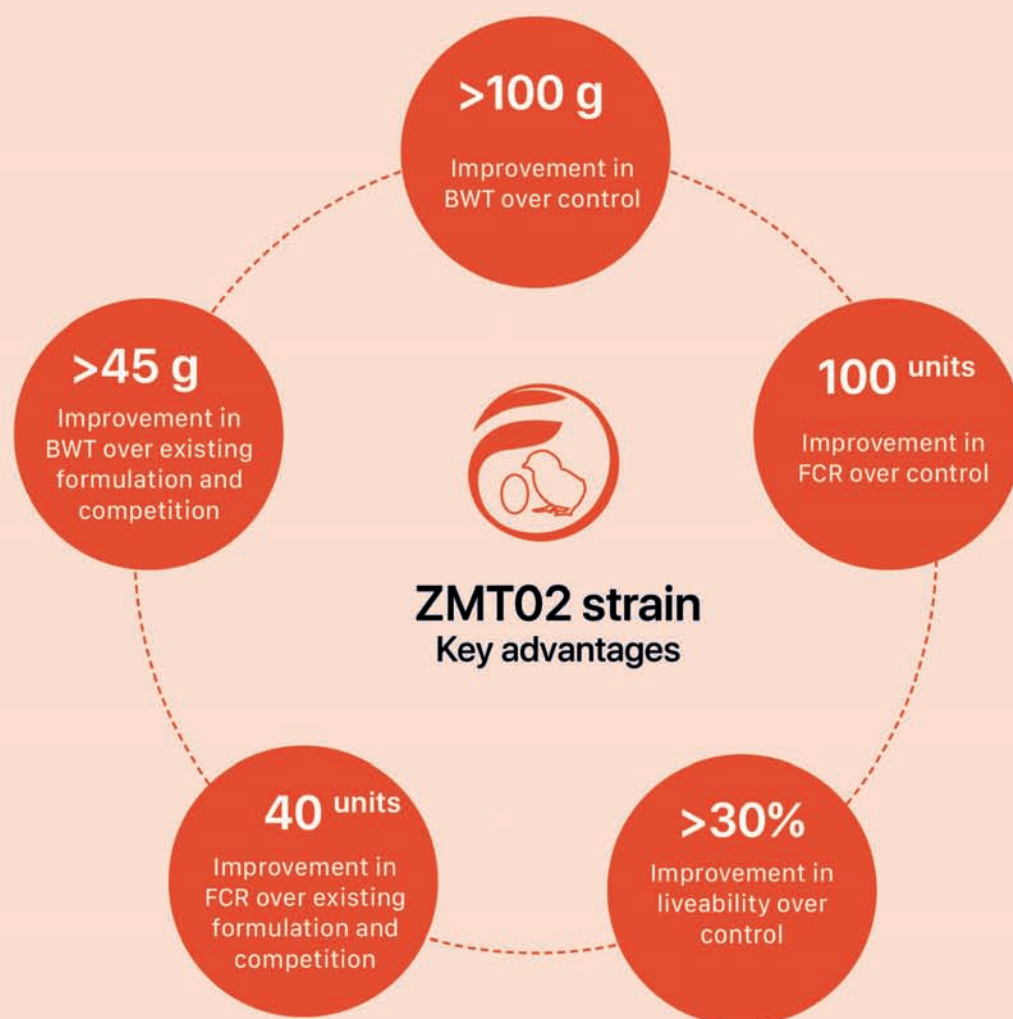
Novel immunostimulants for chicken and beef cattle for US market and how he led the registration for clinical trials in various markets across the globe specially in Asia , Latin America , South Africa and Sub Saharan Africa Dr .V. Ashok Kumar , Regional Commercial Manager , South East Asia and South Asia , IdexxLaboratoies Pvt. Ltd. explained as to how he used to work in deep interior Districts of Telangana on scooters while he was medical representative of SarabhaiChemicals. . He clearly said that there is no substitute for field work . He remembered having met Mr Subramaniam many times as a representative in early 1980s in Telangana Districts. He said that he knows Mr.Subramaniam for 40

years now. He also gave lot of emphasis on field work and integrity. All the Field officials were present in the event from morning till evening along with their wives and children. Mr. Sudhir Kumar Malhotra, Managing Director, Interface, also speakm about Mr. D.S Subramaniam and his passion towards his business. Mr. Malhotra also also remembered about his long term business relation with Mr. Subramaniam and his values with are still unchanged after these strong 27 years of Tara Group. Dr. Malhotra also express his concerned about Moonlighting issue; which is in limelight from last few weeks and explained that in our industry; this practice is very common; thus we have to be very alert while recruiting someone.

Mr. Davinder Singh Dhanjal- Mr. Subramaniam's college mate from Ladakh, with his short speech gave some blissful values for Business. Hotelier by Profession and hicker by passion; Mr. Dhanjal said that teamwork & trust is the most important part of any Business and it will decide the future and level of expansion of any business. He said that running an organization is like



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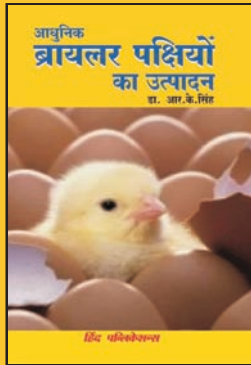
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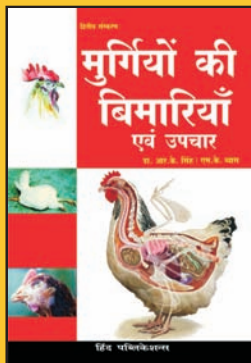
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rock climbing. We all are connected by a rope and if we want to survive or grow; we have to take care of that rope. That's true in any business and organization. He also added that Family is the most important but least appreciated part of the success of any organization.

Mr. Sharath Babu, Additional Commissioner of Police ( Retired ), Hyderabad; also remembers his early days while working with D.S Subramaniam in the 80's, before he opted for Police services . Supreme Court Lawyer and college mate of Mr. D.S Subramaniam; Mr. Surender Nagpal - also remember their college days and memory

cherished together. The gist of most of the speakers was that the erstwhile representatives of respective companies had better growth prospects leading them into managerial positions. This was due to their honesty, sincerity, hard work and dedication towards their profession . However, they expressed their pain and agony

towards today's scenario that the present some of them are running parallel business in the names of their relatives which is very harmful to Veterinary Industry . They have hence advised to curb such practices and stay loyal to their companies and grow within respectfully.

It was a nonstop entertainment for more than 12 hours including classical dances, Tambola Games, Magic Shows, Virtual Games, lot of songs (film



songs) and dances by children, ladies and one and all. The special attraction was the photo booth wherein every family was given photo frames with instant photos, which carried these photo frames back

to their homes. In the evening it was an excellent cocktail and dinner with a musical event. Finally, this wonderful event was ended with gaiety and it was like a big Diwali Carnival and the entire credit goes to Mr. D.S. Subramaniam and his five members team namely Vasantha Lakshmi, Vijaya Durga, Chandra-sekhar , Nagesh and Suresh Kumar. 🇮🇳



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**W-80i**

Weeks Above 90% **7 Weeks** (Still Continuing)

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# Probiotics & Early Microbiota

**Wouter van Der Veken,**

Global Product Manager Probiotics, Huvepharma



**T**he relationship between a healthy gut, the animal's microbiota and optimum performance is undeniable. Especially in the early stages, the microbiota can heavily impact the final outcome of the production process. As such, it is important to manage and support the animal's gut health as early as possible. Probiotics – beneficial micro-organisms that are incorporated into the feed or drinking water with the goal of delivering a health benefit to the host – are a good example of an efficient management tool to do so.

It is no longer surprising that the preferred probiotic of choice should be a stable spore former with a proven and researched mode of action. Spore forming bacteria ensure product stability, as spores

are robust and able to withstand environmental influences. These include, but are not limited to, high temperatures during feed processing, different pH values within the animal itself, as well as fluctuating storage conditions. Spore formers thus enhance ease of use, while ensuring product efficacy. A good example is B-Act which contains viable spores of


*Bacillus licheniformis* (DSM 28710). This probiotic strain supports the birds' gut microflora both directly and indirectly, as its mode of action is diverse. First of all, the unique strain is part of the wider *Bacillus* genus and, as such, is a strong contender for nutrients and space relative to unwanted bacteria (competitive exclusion). Secondly, *B. licheniformis* DSM 28710 is capable of producing potent bio active substances aimed at pathogen control. *Clostridium perfringens* in particular, the key pathogen in production diseases such as necrotic enteritis (NE) and dysbacteriosis, can be actively and efficiently controlled with B-Act.

**Proven efficacy :** The described mode of action and effects has been extensively researched. A recent study showed that *B. licheniformis* DSM 28710 exerts a strong inhibitory effect on nine *C. perfringens* strains that were isolated from NE outbreaks on commercial farms. The importance of the early microbiota cannot be underestimated in mitigating such NE outbreaks, even though these outbreaks may occur at a later stage.

Ensuring a healthy microbiota from the start, and maintaining it, decreases the opportunity for *C. perfringens* to take hold and proliferate in the next stages of

production. General gut health and the related microbiota further drive performance. Laying the proper groundwork as early as possible thus equals a good start for the animal, setting it up for a high-yielding production period.

**Early application :** To support the idea of influencing the microbiota as early as possible, the first question that needs to be answered is: how can a probiotic be used in these early stages? To put this to the test, B-Act was applied in newly-hatched chicks by gel spraying, followed by faecal spore content analysis. The trial used 160 day-old Ross broilers that were sprayed with a coloured gel solution containing the probiotic. Faecal samples were collected at two time intervals (5 and 10 hours after spraying) and analysed for the presence of probiotic *B. licheniformis* DSM 28710.

All faecal samples had a blue-green colour due to the colouring agent in the gel, indicating that the gel had been ingested properly. CFU results at both time intervals showed that the birds ingested considerable amounts of probiotic B-Act via the gel, thus confirming that the probiotic can be applied via gel spraying to supplement animals from an early age. The study confirmed that probiotic supplementation is possible even before the first feed is introduced. As such, B-Act allows producers to support their birds as early as possible, setting them up for a successful production period, from start to finish. The *Bacillus licheniformis* (DSM 28710) probiotic strain supports the birds' gut microflora both directly and indirectly, as its mode of action is diverse. 

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## Ravioza launches Phytogold & Fortibac in Indian Market



### RAVIOZA BIOTECH

held its technical seminar cum product launch program in Jind at Hotel Lakshya and in Hyderabad at Hotel ELLA in the presence of Dr. Chitwan Kawatra, Dr. Jeetendra Verma, Dr. Jayaraman Krishnarajan, large number of poultry farmers, veterinarians, breeders, poultry experts and other members of poultry fraternity on 10<sup>th</sup> and 15<sup>th</sup> October 2022 respectively.



The event started with a welcome address by Mr. Chitwan Kawatra, General Manager of Ravioza Biotech. In this welcome address, while welcoming the gathering, he briefed about the Ravioza Biotech and said that we are imbibed with professionals, having an aim to contribute in the development of animal health industry by providing latest knowledge, new technologies and world class manufacturing support to its stakeholders and customers to improve their business output. He further said that Ravioza aims to be partner with nation in providing affordable and choice of animal protein to its youth for building a strong nation.

Mr. Chitwan Kawatra said that the journey of Ravioza Biotech began with his founders who have experience of more than 25 years in poultry industry since 1988. Their objective is to bring forth the best of technologies and services available globally to Indian farmers. He further added that the feed additives and enzymes are basic feed supplements for poultry industry and to identify and analyze the critical inputs required for implementation of new

technologies. Ravioza biotech has envisaged and analyzed the importance of new technologies for poultry industry.

The first speaker to this technical seminar was Dr. Jeetendra Verma, Consultant Addicoo, CZ. Dr. Verma in his

characteristic style, started his presentation by announcing that we should not treat ourselves in poultry industry rather we are in food industry. When we say that we are in food industry, we will have to shoulder a larger responsibility to provide affordable and nutritional foods to human population.

While speaking on his subject ANIMAL GUT HEALTH IMPROVEMENT he said that our food industry is facing a major challenge of uses of Antibiotic in poultry and this is creating lot of nuisance and it is our responsibility to minimize the uses of antibiotic in poultry.

He said that the product FORTIBAC produced by ADDICOO and marketed by Ravioza has a great effect on the gut health of the bird. He said that the product FORTIBAC has a great Microbiological, Immunological and Epithelial effect on animals including poultry birds. It reduces FCR and improves the body weight and also decreases mortality and medication cost. He also provided the technical information about product like dosages level during preventive care, High risk of health problem and Health problem on the farms.

Next speaker (in Hyderabad meet) was Dr. Jayaraman Krishnarajan who spoke on the challenges




in poultry industry. He said that productivity is a major challenge, although, we have seen that some time we get better productivity and sometime don't. He said that it is desirable to give better attention to get good productivity. He said that challenges are different in Layer, Broiler and Breeders and as such needed to be tackled differently. To understand, it is better to give attention to challenges, It is tough to experts also to understand the problem.

He said that bird health status must be normal and the disease should be a minimum level. If it is abnormal or disease level is more then we will lose the productivity and performance of the birds. So it is utmost important to regularly observe the health status of the birds and if any thing abnormal is noticed; it must be tackled immediately. Any delay in attending the problem may result in heavy mortality and ultimately economic losses to farmer. He spoke in detail about the procedure to tackle the challenges.

Before the launch of the product PHYTOGOLD, Dr. Chitwan Kawatra General Manager, RAVIOZA BIOTECH introduced the product and its usefulness in poultry farming.

He said that PHYTOGOLD has four-dimensional benefit of poultry that is Antimicrobial effect, Promoting the gut health, Relieving the stress and Immunomodulation. He also informed about the benefit of its effect on immune organs. While talking about the mode of action he also informed the PHYTOGOLD's supremacy over antibiotic based growth promoters. He also put some data on the results of trials where the use of the PHYTOGOLD showed the better broiler performance and enhanced feed conversion ratio in layers.

At the end of the technical seminar, RAVIOZA Biotech launched their new next generation advanced phytogenic product the **PHYTO GOLD** in the presence of large number of poultry farmers, veterinarians, breeders, poultry experts.

The seminar and product launch program were concluded with cocktail and dinner. 





## ILDEX INDONESIA at Jakarta concludes on high ratings of it's success



**ILDEX INDONESIA** at Jakarta concludes on high ratings of it's success. "Hind Poultry and PDF News point also put up a very strong presence in this ildex Indonesia 2022. Despite the local language being bahasa it was astonishing to see the interest in books published by HIND publications. Visitors were visiting the exhibition even after closing hours to make last minute deals and contacts." "Hind Poultry and PDF News point also distributed the copies of its magazine free of cost to targeted visitors." "M. K. Vyas from hind Poultry in his interview at ILDEX INDONESIA expressed his complete satisfaction on the outcome of this show with a reminder to organizers that there is always a scope for improvement and as the situations improve ILDEX INDONESIA will surely be in position to put a bigger show in 2023.



ILDEX Indonesia was held on November 9, 2022, with an opening ceremony on the exhibition floor at the ICE (Indonesia Convention Exhibition) in Jakarta at Hall 3a. The opening speech has been given by Mr. WidiyantoDwi Surya, President Director of PT. Permata Kreasi Media, Mr. Igor Palka, Managing Director of VNU Asia Pacific, Mr. Nasrullah, Directorate General of Livestock and Animal Health, the Ministry of Agriculture, RI, and Mr. Ahmad Zaki Iskandar, Regent of Tangerang City. The shows welcomed 8000+ trade participants from 28+ countries. Apart from that, the conference sessions were a hit with over 1,665+ delegates which were presented by 75+ speakers from 11+ countries during the 3-days of the show. ILDEX Indonesia has proved to be the key platform for match-making and deal-making in the livestock and aquaculture industry in Indonesia. This year, ILDEX Indonesia marks the fifth edition of the trade exhibition for the livestock and aquaculture industries in the Indonesian





market, neighbouring countries, and also the Asia region, and is organized by VNU Asia Pacific and Permata Kreasi Media, the local partner. The show opens its doors from 9-11 November 2022 at Indonesia Convention Exhibition (ICE), Jakarta, Indonesia. At ILDEX Indonesia 2022, more than 135 companies from 25 countries has showcase their products and services, with over 55% being international companies from Asia, Europe, America, and South America.

Day 2 of ILDEX Indonesia was another eventful day as the exhibition was abuzz with activity and on-site demonstrations and presentations on the latest smart farming solutions, high technology for livestock and Aquaculture businesses both in the exhibition booth and also the knowledge - knowhow sharing from the technical seminars sessions. Potential buyers from the ASEAN countries are visiting the show and running the business matching with our exhibitors. More than 40+ international buyers from Malaysia, Thailand, Vietnam, Brunei, India, and more, and the rest are local buyers. Additionally, the group of visitors from academic institutes, associations, and the owners of big farms from nearby provinces also

visit the show to stimulate investment in this region. Day 3 was the concluding day of this great show which was conducted in very difficult situations when prices of feed and feed ingredients in this reason was a matter of great challenge for poultry industry in Indonesia and it's surrounding. Visitors from the veterinary University and research institutes as also the local people of Poultry fraternity was the main attraction of concluding days. Apart for the exhibition area, the conference and seminar programs was the other highlights of ILDEX Indonesia. ILDEX provided 34 sessions with leading professional guest speakers to share their insights, knowledge and know-how, technical presentations on important topics such as breeding programs, animal health, medical challenges for poultry farmers and veterinarians, tackling antimicrobial resistance and more. The sessions conducted in Bahasa [the local language] and English. The technical conference program organized by leading companies such as Kubota, Jefe, Progressus, Munters, FCE, Aviagen, HY-LINE, JAPFA, Emtech, Farmsco Feed Indonesia, SKOV, Progressus, USLGE, F A V A - I V M A , Agromed, BEC Feed and FAO. Ms. Panadda Kongma, Director of Agribusiness and

visit the show to stimulate investment in this region.

Day 3 was the concluding day of this great show which was conducted in very difficult situations

Operations said that "To make the show complete and to meet the expectations of our exhibitors, a 'buyer program' was hosted with potential buyers from many countries in Asia. The total number is 40+ buyers, who are 60% local and 40% international. Many top buyers have visited our show, such as Charoen Pokphand Jaya Farm, Viya Crab Products Co.,Ltd., Ayamas Integrated Poultry Industry S/B, Green Hut Farming Sdn. Bhd., Cargill, PT. Great Giant, PT. Malindo, PT. Gold Coin Indonesia, PT. Sierad Produce, PT. Super Unggas Jaya and more onsite."

Hind Poultry and PDF News point magazines from India also put up a very strong presence in this ildex Indonesia 2022. Despite local language being bahasa it was astonishing to see the interest in books published by HIND publications. Visitors were visiting the exhibition even after closing hours to make last minute deals and contacts.

The first edition of "ILDEX Philippines", in co-location with the "Philippine Poultry Show", is scheduled 7-9 June 2023 at SMX Convention Center Manila, Philippines. 🇵🇭





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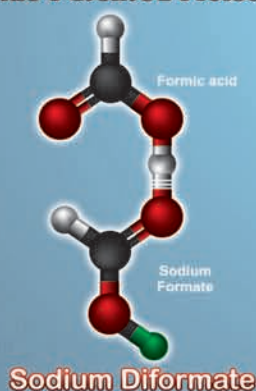


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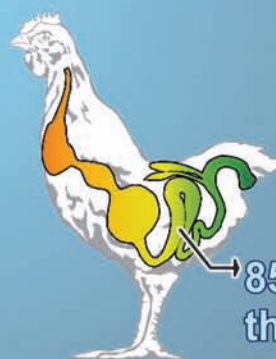
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# Embracing the changing digital landscape of India

## Digital solutions in Livestock and Animal Husbandry

By **Dr. Chandani Parihar**  
Marketing Head, Nutreco India



As India rose as a primary ground for IT hub, it facilitated the landscape change for digital innovations and transformations across businesses over the past decade. Digital transformations and IoT (Internet of Things) enablers have all become a critical stepping stone for organizations in achieving long-term goals and providing solutions for long-standing challenges. Ushering on the phenomenon of startups and venture capitalists, many tech-based services have started surfacing that aim to provide more solution-based and customer-friendly environment.

Livestock and animal husbandry sector has also not remained untouched from the changing tides. The digitalization wave has penetrated across the species and the value chain whether it is related to precision nutrition or better farm management. With the increasing penetration of digitalization into animal production and the advancement of IoT technology, a new frontier has opened in which science and technology have combined to increase automation and bring more rapid real-time decision-making options. In this article, we look at three core areas where digital solutions have become an enabler for the industry.

### IoT solutions to address the challenges in value chain

Over the last few years, there has been a rise in tech-startups who have brought in innovative solutions especially for dairy and aqua value chain. They aim to simplify farm and feed management, bring in better efficiencies while ensuring quality throughout the value chain. Given the huge

opportunity India presents with a growing animal protein consuming population, these solutions have also garnered the attention of investors.

Nutreco too has invested into two such companies via its investment arm, Nufrontiers. One such company is Stellapps, an IoT based startup, which aims to digitalize the entire dairy value chain. The organization presents a unique integrated model that works at all intervention points from farms to processors that monitors the milk quality throughout to ensure that end consumers have a certified milk quality. At the same time, farmers are benefitted from a one-stop solution model wherein all their requirements from feed, health supplements to AI (Artificial Insemination) and extension services are provided. All of this is backed by cloud-based data monitoring and insight generation services that help to predict any existing diseases, other challenges and provide remedial action on immediate basis.

Another such IoT startup, that is successfully changing the lives of aqua farmers is Eruvaka Technologies. Their unique cloud-based aquaculture pond management solutions help to monitor ponds with intelligent control of aerators and feeders real-time, to reduce the production cost and risk of farmers while ensuring an increase in yield and improved FCR. Such remote monitoring technologies with right insights has helped farmers in Ecuador to become a leader in global shrimp farming.

### Animal Nutrition Models and Services for Precision Nutrition:

In today's uncertain environment, farmers are facing the difficult challenge of reconciling resources

management, animal health & welfare, reduced ecological footprint, output quality with animal performance and sustainable income. When every decision impact animal and business performance, one wants to build on more than intuition alone.

Trouw Nutrition also provides an integrated digital solution and service under its NutriOpt platform that provides right insights and supports decision-making with the belief that Knowledge Feeds Success. Tools like NutriOpt On-Site Adviser (NOA) and Mycomaster under the platform are aimed to bring lab to the sample for quick on-farm analysis of nutrients and mycotoxins respectively.


Another comprehensive solution to enable precision nutrition are the animal nutrition models. It has been demonstrated over the last 5 decades that integrated nutrition models based on a sound biological framework will continue to help producers, integrators, and animal nutrition companies to remain profitable in a sustainable way.

As our understanding of animal biology and nutritional metabolism continues to grow so too does the accuracy and applicability of models improve. Advancements in science now give us the ability to accurately predict growth at various stages and respective feed intake, as well as incorporate feed additives into mechanistic animal models. This has led to the role of models increasing beyond only providing nutrition solutions but also providing practical day-to-day management advice to improve efficiency and profitability.

### Increasing reach to customers:

Digital solutions also enable the businesses to reach directly to customers whether it is via utilization of various social media platforms that provide a medium to directly connect with consumers or through app-based services that eliminate middlemen and increase the product reach. New age digital platforms and solutions have opened several channels through which information is being communicated to stakeholders. Businesses are becoming more aware of the power of these platforms in communicating about their brand and developing brand stories. While one must be careful in choosing the platforms, the effectiveness cannot be doubted in today's age where everybody accesses information through mobile phones.

### Conclusion:

The impact of digital transformation on livestock and animal husbandry sector cannot be ignored and many more future innovations can be expected. The current challenge for the animal nutrition industry is where to wisely invest and how to extract value for customers and company with the advancement of resource-demanding technologies. Sensible assimilation of data and biology rather than blindly embracing a technology driven agenda could provide huge opportunities for innovation in the animal nutrition industry. Embracing the changing technology landscape in the industry does not mean accepting every digital solution offered but rather understanding what the commercial and technical risks are and then developing the appropriate mitigation strategies that can optimize both mechanistic and machine learning models to improve the welfare of people, planet and profit. 



The advertisement features a laptop on the left displaying the 'HIND POULTRY' logo. The background is blue with a yellow horizontal band. Text on the right reads: 'Our WEBSITE Got a New Makeover', 'Visit Today', and 'www.hindpoultry.com'.





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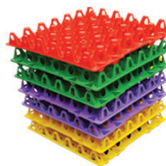
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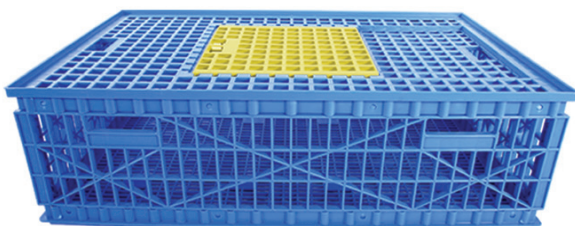
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# Mr. Joginder Singh Uppal takes charge as Regional Business Director ISC Proteon Pharmaceuticals



**In line** with its expansion plans, Proteon Pharmaceuticals India, a subsidiary of Proteon Pharmaceuticals S.A. Poland, announced the appointment of Mr. Joginder Singh Uppal as the Regional Business Director for the Indian subcontinent and South-East Asia Region. Mr. Uppal will

drive growth and acquisition strategies across the regions to support the poultry, aquaculture and dairy industries in achieving safe and sustainable production. Over the decades, antibiotics have become a norm used in animal feed in multiple countries to promote the well-being and growth of animals. At the present juncture of time, this practice has now raised a lot of apprehensions. A priority concern has been that continuous exposure to antibiotics can contribute to antimicrobial resistance. Proteon Pharmaceuticals focuses on precision biology for microbiome protection to improve animal and human health, increasing environmental sustainability and eliminating the unnecessary use of antibiotics. Diseases caused by *Salmonella* and *E. Coli* are the major challenges faced by poultry producers. The infections caused by these bacteria not only impact poultry's health but also the profitability of the producers as well as human health. Mr. Uppal has a rich and recognized track record of more than 30+ years in sales and marketing in the Poultry and Livestock sector and has worked in varied markets across India, South Asia, Middle East and Africa. He has strong technical knowledge on the subject and with expertise in sales, corporate strategy, and trade management, Mr. Uppal will focus on improving organizational performance and unlocking new business opportunities through strategic alliances with key decision-makers. Elaborating on his new role at Proteon Pharmaceuticals, Mr. Uppal commented "Phage therapy mainly utilizes lytic phages to kill their respective bacterial hosts and can be an attractive solution to combating the emergence of AMR in livestock. With an aim to provide an innovative antibacterial solutions to the animal health industry; Proteon's mission is to eliminate unnecessary antibiotic usage, reduce the risk of AMR and at the same time, increase the sustainability of protein production through the reduction of waste and in the improvement of on-farm efficiency." Commenting on Mr. Uppal's appointment, Dr. Paolo Doncecchi, Global Sales Director Proteon Pharmaceuticals, said, "We are proud to induct Mr. Joginder Singh Uppal from the industry and we wish him the very best as he takes on the mantle of a challenging position of Regional Business Director. I am particularly thrilled about this critical role being fulfilled

by a reputed veteran like Mr. Uppal. With his vast experience across diverse industries and work cultures, he will spearhead the next levels of growth and reinforce Proteon Pharmaceuticals as a forerunner in the bacteriophage revolution in the region. His appointment is a reinforcement of the Proteon vision to be a leader in bacteriophage research and technology with customer empowerment at the helm of it.

Mr. Nipun Gupta, CCO at Pharmaceuticals adds "We have already launched BAFASAL+G(R) and BAFACOL(R) for poultry to control *Salmonella* and *E. Coli* respectively. We have also introduced BAFADOR(R) for Aquaculture to control *Pseudomonas* and *Aeromonas*, and very soon we will be launching BAFACAM for dairy to control mastitis. There are also many other products in the pipeline to target the pathogenic bacteria prevalent in the poultry, dairy, and aqua industry to enhance the profitability of the farm owners. With Mr. Uppal now taking charge, he already has his hands full to ensure that our products can benefit the vast number of poultry and dairy farmers as well as the growing food industry with solutions that are sustainable, non-GMO, and drive financial viability. 

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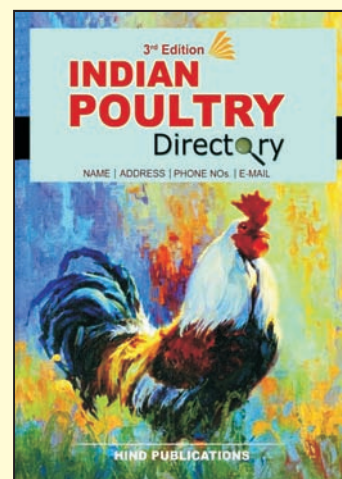
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# PCG Completes Acquisition of Perstorp

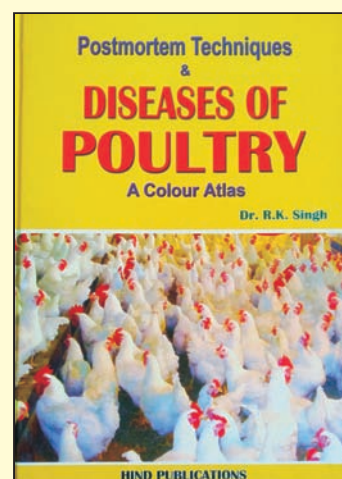
**P**erstorp announced that it has been acquired by PETRONAS Chemicals Group Berhad (PCG), Malaysia's leading integrated chemicals provider and part of PETRONAS Group. In May this year, PCG signed a Securities Purchase Agreement with Financière Forêt S.à.r.l, a company under PAI Partners, a European private equity firm, to acquire the entire equity interest in Perstorp, a leading sustainability-driven global specialty chemicals company based in Sweden. With the completion of the acquisition, Perstorp is now PCG's wholly-owned subsidiary. "This day marks a new beginning and exciting future for Perstorp as part of the PCG family. We are thrilled to explore the opportunities that can be unlocked by working closely with PCG. This will accelerate the next phase of growth and further strengthen us as a leading specialty chemicals company. Perstorp and PCG form a stronger business together," said Perstorp's President and CEO Jan Secher. "We are delighted to have completed this acquisition. The acquisition is part of our stepping-out strategy, creating a new platform for our growth in the specialty chemicals industry. It also goes beyond earnings potential; Perstorp is a strategic fit with similar values and talented workforce who are experts in the industry. We are excited to welcome the Perstorp team to the PCG family," said PCG Managing Director/ Chief Executive Officer, Ir. Mohd Yusri Mohamed Yusof. Moving forward post-acquisition, PCG intends to continue preserving and growing the value of Perstorp, as the next few years will be a crucial chapter for both companies. Among the major development plans include the expansion of Perstorp's global presence by strengthening its position in the Asia Pacific markets through PCG's industrial know-how and tapping into its substantial customer base.

"The combined technology and innovation power, as well as a complementing market positioning, create a new foundation upon which we, together with PCG, can leverage. We are proud of our frontrunner position in sustainability and will continue to lead the sustainable transformation in the chemical industry. I truly look forward to start this exiting journey with PCG together with our employees, partners and customers. Together we will lead change towards chemistry that advances everyday life for the better," Jan Secher adds. Open 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 1,500 employees and manufacturing units in Asia, Europe and North America. Sales in 2021 amounted to 13.5 billion SEK. 

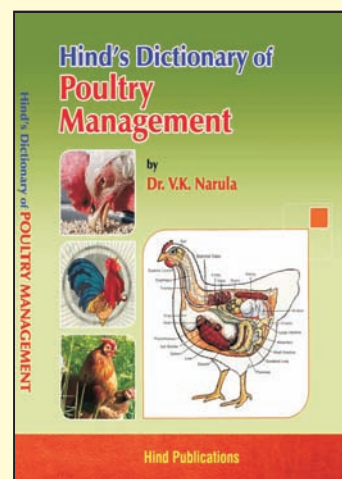
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Denis Wellstead Award for International Egg Person of the Year



Jim Sumner, United States



Clive Frampton Egg Products Company of the Year Award  
Global Food Group B.V.



Golden Egg Award for Marketing Eggsellence  
Mahmood Group, Pakistan

The IEC's prestigious awards made a triumphant return at the IEC Global Leadership Conference Rotterdam 2022, honouring the success of the international egg industry. Following a two-year break, the awards recognised the commitment and contribution of individuals and organisations to deliver a thriving future for the industry. Commenting on the awards, outgoing IEC Chairman Suresh Chitturi said: "The IEC awards are a highlight of the Global Leadership Conference, and it has been fantastic to re-connect egg industry leaders from across the world, and honour some truly worthy recipients at IEC Rotterdam. "We work in an incredible industry, with hugely passionate and committed individuals and organisations who deserve to be honoured for their enthusiasm and determination to ensuring it continues to thrive. In a break from tradition, the IEC Office Holders named two winners of the Denis Wellstead Award for International Egg Person of the Year, recognising the exceptional circumstances which had led to a break in the awards.

## Global Egg Industry Celebrates Return of Prestigious Awards

*Ben Dellaert, The Netherlands* - "Ben has been a powerful force within the Dutch Poultry and Egg industry, championing sustainability, food safety and animal welfare, resulting in the Dutch Egg Industry being recognised as one of the most modern in the world," said Suresh Chitturi. "But it is not just at a country level that Ben has had a huge impact. His incredible determination to champion the egg industry has seen him involved in the leadership of the IEC for over 20 years. We will be forever grateful for his leadership in implementing biosecurity at an international level and for his continued support in representing the IEC on animal health matters, particularly Avian Influenza."


*Jim Sumner, United States* - "Jim has had an incredible career in the poultry industry, dedicating himself to developing the USAPEEC organisation. Under his leadership over 30 years, the organisation has grown to 16 offices in 4 continents – a huge testament to his knowledge and direction." said Greg Hinton, incoming IEC Chairman. "He was involved in the leadership of

the International Egg Commission, as Chair of IEC Trade Committee and as an Executive Board member from 2004-2011, further supporting the growth of our industry. I am delighted to be awarding this accolade to a very dear friend."

#### Clive Frampton Egg Products Company of the Year Award

Global Food Group B.V. - "This family-owned business has made significant investment to transform from a whole egg producer to a producer of high-quality liquid and dried egg products over the last 10 years," said Henrik Pedersen, IEC's Egg Processor International (EPI) Chairman. "They have embraced sustainability, utilising the eggshells from their egg processing to produce high-quality animal feed. Innovation and change are paramount to their business, and they have exciting plans for growth expansion. For these reasons, I am delighted to be awarding them the Clive Frampton Egg Products Company of the Year Award."

#### Golden Egg Award for Marketing Eggsellence

Mahmood Group, Pakistan - "I am delighted to be awarding the Golden Egg Award for Marketing Eggsellence to Mahmood Group in Pakistan. They have developed a unique new premium brand proposition, having found a gap in the market for a national egg brand based on the qualities which are most important to consumers," said Suresh Chitturi. "Egg Box has witnessed 300% growth in volume within a few months of launching the brand, and I am sure that their investment in the development of the brand and its patented packaging will bring a significant return on investment in the future." 



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# Navigating to the Future of Animal Agriculture in India Highlights of CLFMA's 63<sup>rd</sup> National Symposium 2022

The Compound Livestock Feed Manufacturers Association of India (CLFMA) conducted its 55<sup>th</sup> Annual General meeting and 63<sup>rd</sup> national symposium in Mumbai on September 30 and October 1 at Hotel Leela, Mumbai. The theme of the event was 'Changing Dynamics of Indian Animal Agriculture' which aimed to capture and assess industry trends, identify key challenges and plan the future for the sector.

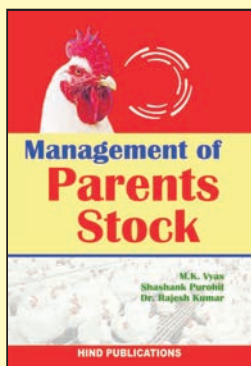
Over 450 participants representing all stakeholders in the animal value chain - academicians, feed manufacturers, aqua farmers, animal health and nutrition experts - attended the forum.

Welcoming dignitaries, speakers and members, Suresh Deora, Convenor & Secretary, CLFMA, said, "I would like to extend a warm welcome to our chief guest Shri Purshottam Rupala to the inaugural of our 63<sup>rd</sup> symposium. He has been a guiding force for welfare schemes for the betterment of farmers across India. I welcome Shri Jatindra Nath Swain who has been spearheading the Blue Revolution project, a central government scheme to help aqua farmers in the country; and Balram Singh Yadav of Godrej Agrovet - a veteran of the industry. I would also like to welcome Shri Tarun Shridhar, Former Secretary AHD, a great supporter of the animal industry."

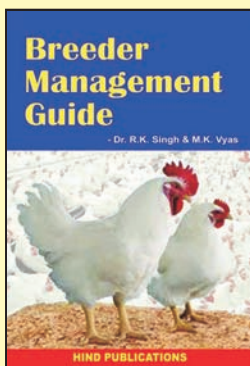
Introducing the session, Neeraj Kumar Srivastava, Chairman, CLFMA, said, "Change is the only constant. India's livestock industry is undergoing a transformation, in tandem with positive macroeconomic and demographic trends. Our current focus is the adoption of modern solutions to overcome existing and upcoming challenges. We appreciate the government's approachability, which is allowing for faster growth of the industry."



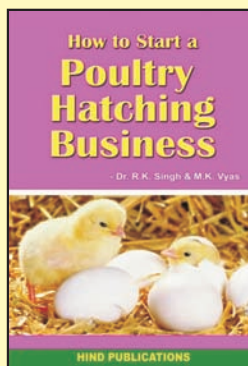
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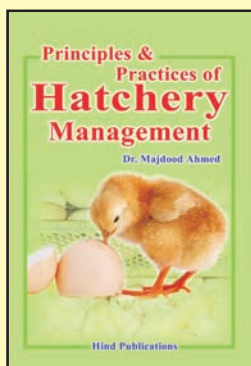
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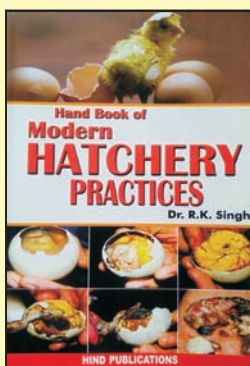
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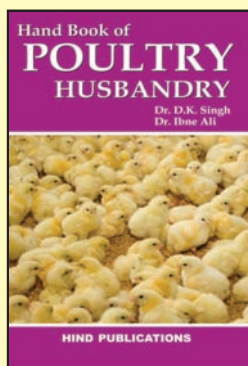
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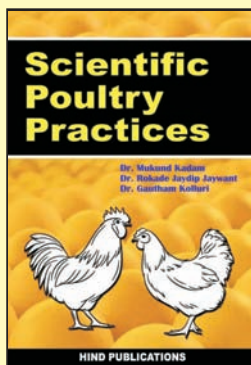
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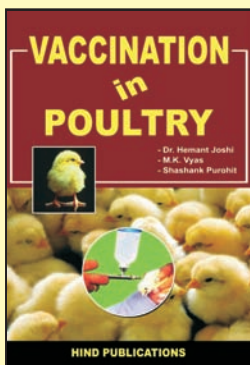
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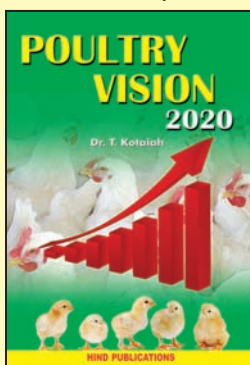
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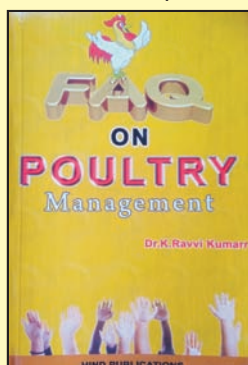
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"India is heading down a new path to success and we are glad to be collaborating closely with the industry. The government will take cognizance of all innovations highlighted by technical experts. The achievements of this industry are building up the nation," said Parshottam Rupala, Minister of Fisheries, Animal Husbandry and Dairying (AHD) department, Govt. of India, in his address as the Chief Guest at the Symposium. He recommended implementing waste-to-wealth strategies for the disposal of dead animals. He added that the government is considering PPP (public-private-partnership) models for animal health in alignment with India's One Health vision.

This was followed by the CLFMA Award Ceremony. The Famous CLFMA awards were given to two leaders, who had diligently worked and contributed to the development of the livestock sector. The Life Time Achievement awards were presented to Er. Anand Menon, FIE, who had contributed a lot to the livestock sector, during his glorious forty years of service as CGM, KSEL, Kerala & CLFMA Award was presented to Dr. Rudra Nath Chatterjee, Director ICAR-Directorate of Poultry Research, Hyderabad for their marvelous contribution to the Indian Livestock Sector. CLFMA Chairman congratulated all the CLFMA award winners.

Balram Singh Yadav, Managing Director of Godrej Agrovet, presented the journey of the industry, highlighting data on growth in production and efficiency over the last two decades. He shared



the optimism of the industry, reflected in a CAGR of 7.5% this year. “The next decade is going to be explosive. Investments in animal husbandry will outstrip any industry. Our contribution to agriculture GDP will grow from 37% to 50% in the next 5-6 years,” he said.

Jatindra Nath Swain (SecretaryFy.) said consumer demand is shifting to animal proteins, with a projected 4x rise in consumption by 2047. He urged the participants to adopt sustainable solutions to water and electricity consumption. An industry survey report was also released on the occasion, followed by a vote of thanks by Divya Kumar Gulati, Deputy Chairman, CLFMA of India.

Day two of the Symposium began with the Welcome Address by Mr. Neeraj Kumar Srivastava, Chairman, CLFMA OF INDIA. The first session brought up technology solutions with a focus on data and analytics. “Mitigating the challenges of price escalations of feed ingredients” was moderated by Amit Saraogi, Managing Director of Sarawagi Agrovet. “Our industry has seen unprecedented price hikes for crops like soybean and corn. There is a strong need for unbiased and robust data to prevent unfavourable situations from repeating.”

RMSI Cropalytics’ Kumarjit Mazumder shared a glimpse of the methodologies of their digital crop map tool. It uses satellite images to capture plots of standing crops. A price outlook on relevant commodities like soymeal, mustard cake, cottonseed oil cake, bajra and maize was revealed by Prerana Desai, head of research at Samunnati Agri. She shared observations on the impact of feed substitution, margin pressures and global macroeconomic trends. Kevin M Roepke from USSECTalked about ‘Chickenomics’ with a comparison of India and Sri Lanka. He brought out the increase in USA crush capacity driven by the adoption of renewable fuel policies. Hemant Bansal of Patanjali Foods, representing the Indian Vegetable Oil Producers Association, maintained that prices of crop feed need to be at a reasonable range to guarantee the sustainability of the ecosystem. Building customer experiences, adopting innovation in branding and hyper-localizing for the domestic market were key call-outs from industry leaders participating in a panel discussion on go-to-market strategies for the livestock industry. The session was moderated by Balram Singh Yadav, Managing Director of Godrej Agrovet.





Dan Meagher, President and CEO of Novus International, said, "The power of branding is very important. Processing of animal products is going to create a new customer experience. Brands are going to differentiate at the customer level." Suguna Group's Soundararajan and entrepreneur Dr. Manoj Sharma of Mayank Aquaculture shared their respective learnings from the poultry and shrimp sectors for the benefit of participants of the forum. Bhupendra Suri of Creamline Dairy said, "The idea of private players in value-added categories like ghee, paneer and curd is rising fast, with opportunities for new categories like whey drinks."

In the final session, Dr. Parminder Singh, Professor of Animal Nutrition at Guru Angad Dev Veterinary And Animal Sciences University, brought up the lacunae in the system. He spoke about technical challenges faced by livestock breeders in implementing standards. Government representatives Dr. Amit Sharma of the Food Safety and Standards Authority of India (FSSAI) and Amit Choudhary of the Bureau of Indian Standards (BIS) invited participants to liaise and get involved in developing and amending standards. Highlighting the challenges with verification of reports of milk contamination, Dr. Raghavendra Bhatta, Director of the National Institute of Animal Nutrition and Physiology, said, "There is a need for scientific sampling with state-of-the-art laboratories set up to prevent non-compliance."


The session was moderated by Dr. P.S. Mahesh, Joint Commissioner and Director of Central Poultry Development Organisation and Training Institute, Govt. of India. He encouraged members to approach and engage with the government's representatives for a

better future. Concluding the symposium, Shri. Tarun Shridhar, former Secretary, AHD, advised, "Rather than offering subsidies, an enabling policy environment and infrastructure support will nurture entrepreneurs and promote growth. We need to capitalize on our vast land resources, address our productivity issues and plan for changing consumer demands. We must also guard against misleading advertisements. Digitalizing, and having a consolidated voice for the industry will be vital going forward."

CLFMA offered Mementos, to Sponsors, Government Officials, Special Invitees, Moderators, Speakers, Associations, Press, Event Management Company, etc. as a token of appreciation for their continual support as always.

Mr. Suresh Deora proposed the vote of thanks, sharing gratitude to the government representatives, speakers, sponsors, industry stakeholders, special invitees and attendees for their active participation.

The networking Dinner was enjoyed by all participants.

Overall, CLFMA interacted with various stakeholders in the industry and government on the topic Changing Dynamics of Animal Agriculture in India. The association has diverse membership from across the animal protein value chain including feed manufacturing; poultry, dairy, and aquaculture business; animal nutrition and health, veterinary services, machinery and equipment; processing, distribution, and retailing of meat. The program was well appreciated by all the participants 





# Role of Vitamin D in Poultry Nutrition

K. R. Harini<sup>1\*</sup>, K. R. Sriranga<sup>2</sup> and Tejeshwari Satpute<sup>2</sup>

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Vitamin D plays an important role in the poultry nutrition as it involves in the calcium absorption and other biological process. Vitamin D is a steroid compound that includes provitamin D, previtamin D, vitamin D and Vitamin D metabolite. Vitamin D is a fat-soluble prohormone that has an anti-rachitic properties. Vit. D is generally available in two forms, ergocalciferol (Vit. D<sub>2</sub>) synthesized in the plant leaves; and cholecalciferol (Vit. D<sub>3</sub>) synthesized in the skin of animals. The most active form of vitamin D is vitamin D<sub>3</sub>. The Vitamin D<sub>3</sub> in circulation is synthesized from precursors such as 7-dehydrocholesterol in skin, cholecalciferol and/or ergocalciferol (D<sub>2</sub>) supplementation in diet and also 7-dehydrocholesterol content of preen gland secretion, which spread to the feather and converted into precholecalciferol and cholecalciferol which is ingested by the bird. The vitamin D<sub>3</sub> is synthesized from its precursor in the skin under the effect of UV irradiation. The modern poultry rearing system is intensive and are kept totally inside the shed without access to sunlight which altered their nutritional requirements for vitamin D and made it most essential component of the poultry nutrition.

Vitamin D<sub>3</sub> attains the biologically active form after metabolic alteration which mainly occurs in liver and kidney. Vitamin D<sub>3</sub> is converted to 25-hydroxycholecalciferol (25-OH-D<sub>3</sub>) in liver and then in kidney it is converted to 1,25-dihydroxycholecalciferol (1,25-(OH)<sub>2</sub>-D<sub>3</sub>) and 24,25-dihydroxycholecalciferol [24,25-(OH)<sub>2</sub>D] (DeLuca, 1988). Further these are converted to 30 or more metabolites out of which 1,25-(OH)<sub>2</sub>-D<sub>3</sub> is the active form. The vitamin D is transported through Vitamin D binding protein (DBP) which is in the form of apoprotein in plasma. The relative affinity of binding protein to Vitamin D compounds is 25-(OH)D<sub>3</sub> = 24,25-(OH)<sub>2</sub>D<sub>3</sub> = 25,26-(OH)<sub>2</sub>D<sub>3</sub> > 25-(OH)D<sub>2</sub> > 1,25-(OH)<sub>2</sub>D<sub>3</sub> > vitamin D<sub>3</sub> (Drescher *et al.*, 1969).

The binding capacity of Vitamin D<sub>2</sub> with DBP is very poor that restricts the efficient utilization of vitamin D<sub>2</sub> from birds. Vitamin D intracellular receptor (VDR), a steroid receptor gene superfamily assists in functionality of vitamin D. The VDRs have more affinity and specificity to 1, 25-(OH)<sub>2</sub>D<sub>3</sub>.

The target tissues for 1, 25-(OH)<sub>2</sub>D<sub>3</sub> are intestine, bone, parathyroid gland and kidney. The main biological role of 1, 25-(OH)<sub>2</sub>D<sub>3</sub> is to maintain the homeostasis of calcium and phosphorous by calcium and phosphorous absorption in intestine, bone homeostasis, calcium mobilisation in the bone, calcium reabsorption in the kidney and enhanced utilization of phytophosphates. Hence, vitamin D plays an important role in bone and egg shell mineralization. The deficiency of vitamin D may leads to rickets, dyschondroplasia and leg problems in addition to deterioration of egg quality. Besides bone mineralization, vitamin D also increases the immunity of poultry and possesses antioxidant properties. Vitamin D supplementation to poultry not only improves the production performance and health of poultry, but also provides vitamin D rich poultry products to humans.

## Effect of Vitamin D on broilers

The NRC requirement of vitamin D<sub>3</sub> for broiler is 200 IU/kg from 0-3 week and from 6-8 week and 300 IU/kg from 3-6 week. BIS specification of Vitamin D<sub>3</sub> is 600 IU/kg for broiler chicken, in turkey 1100 IU/kg, in ducks 400 IU/Kg, Japanese quail 750 IU/kg. Vitamin D<sub>3</sub> supplementation in poultry helps to improve the growth performances

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by increasing feed intake, feed efficiency, feed conversion ratio, body weight gain. In addition, vitamin D supplementation helps to improve bone mineralisation and reduces bone abnormality, lameness, tibialdyschondroplasia (TD), hock dermatitis and footpad abnormalities. Furthermore, it helps in muscle growth and improves meat quality by increase in theyellowness and lightness of breast and thigh muscle, decreases in the shearing force of meat, meat colour, juiciness and tenderness. In recent studies, supplementation of the 25-OH-D<sub>3</sub> (0.2 kg/1000 litresolution) in drinking water has shown increased body weight gain and decreased incidence of lameness by reducing tibialdyschondroplasia and other leg abnormalities in the broilers.

Supplementation of more vitamin D than NRC requirement i.e., upto 2000- 4000 IU/kg has shown increased growth performance, bone quality, walking ability and reduced the incidence of tibialdyschondroplasia. It improves the dressing percentage, breast meat yield and meat quality by increasing juiciness, tenderness and flavour of the aged meat. However, some authors have reported no additional effect on growth performances when cholecalciferol supplementation was above 3500 IU/kg. The 25-OH-D<sub>3</sub> is the most active form of vitamin D compare to other forms. It has been reported that the replacement of cholecalciferol by 25-OH-D<sub>3</sub> has shown twice improved in body weight gain and bone mineralization of femur, tibia, and metatarsus. The complete or partial replacemet of cholecalciferol by 25-OH-D<sub>3</sub> increased the breast and pectoralis muscle growth, muscle protein synthesis and decreased the

inflammatory immune response, intensity of footpad and hock dermatitis and incidence of tibialdyschondroplasia.

### Effect of vitamin D on layers

NRC requirement of vitamin D<sub>3</sub> for white egg laying chicken is 200 IU till 18 week, 300 IU from 18 week onwards till first egg lay. Vitamin D has an effect on Body weight gain and feed intake and feed efficiency. According to the researchers the vitamin D supplementation above the NRC specification had shown improved layer performance and egg quality. Upto 4000 IU/kg shown increase in body weight gain, tibial ash concentration, decreased incidence of tibialdyschondroplasia and rickets. But the supplementation upto 6000 IU/kg has shown increase in egg weight and egg shell quality without having additional effect on laying performance and the bone mineralization.

In old age birds the active vitamin D<sub>3</sub> metabolites decreased due to reduced activity of renal 25-hydroxylase leading to increased eggshell cracks in layers. Hence the substitution of cholecalciferol by 25-OH-D<sub>3</sub> partially or completely in layers diet improved feed conversion ratio, body weight gain, increased eggshell percentage and thickness, increase in hatchability and decrease in early embryonic mortality.

Maternal supplementation of cholecalciferol and 25-(OH)D<sub>3</sub> improves the progeny skeletal development, growth, body weight gain, morphological maturation, intestinal function and decreases the incidence of TD and rickets in offspring. The effect was more in the chicks of young birds (30-37weeks)

than the chicks of older birds (more than 45 weeks).

### Antioxidant property of vitamin D

Vitamin D plays an important role in antioxidant properties of egg similar to other fat soluble vitamins viz., Vitamin A and Vitamin E. It acts as a membrane antioxidant by inhibiting iron-dependent liposomal lipid peroxidation. Among theseveral metabolites of vitamin D, the 7-dehydrocholesterol has more antioxidant property.


### Immunomodulation property of vitamin D

Vitamin D has the effect on the innate and adaptive immune response by enhancing the growth of T and B lymphocytes. The vitamin D receptors (VDR) and the metabolizing enzymes are present on many cells including antigen-presenting-cells, T cells, B cells, monocytes/macrophages and dendritic cells (DC). The 25-hydroxyvitamin-D<sub>3</sub> 1-alpha-hydroxylase also known as (CYP27B1) converts 25-D to 1,25-D (calcitriol) locally in cells which express the antibacterial property in monocytes/macrophages. The 1,25-D inhibits the maturation of the dendritic cells leading to altered functionality of helper T-cell (Th). In the cells that lack CYP27B1 like neutrophils, epithelial cells, trophoblasts and decidual cells, the circulating systemic 1, 25-D synthesized in kidney have the antibacterial effect. Moreover, 25-D has the antibacterial effect on the cells like epithelial cells, trophoblasts and decidual cells. Vitamin D<sub>3</sub> supplementation at 2.5mg/kg body weight causes immunomodulation, therefore the inflammatory response is not expressed during acute endotoxic shock in broiler chicks.

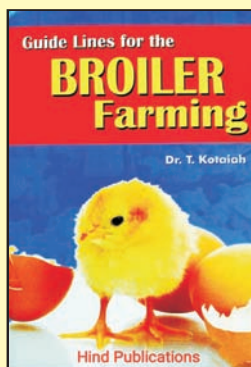
## Fortification of eggs with vitamin D

The fortification of egg with vitamin D can be made in three ways: dietary supplement of vitamin  $D_3$ /25-(OH) $D_3$  to the hens, UVB exposure to hen, and exposing liquid egg products to UVB. The dietary Vitamin  $D_3$  increased the vitamin D content of egg yolk compared to vitamin  $D_2$  supplementation. Feed supplementation can provide higher levels of vitamin D in eggs than UVB exposure of the hens. High level of cholecalciferol supplementation upto 24,700 IU/kg can be used for the fortification of egg with vitamin D without any change in the physical and sensory property of egg, the lipid concentration and effect on the egg quality. The association between vitamin  $D_3$  in feed and vitamin  $D_3$  in eggs was found to be linear between trials. With feed containing 617.5 g/kg feed, a maximum of 20 g/100 g yolk was produced within the linear range.

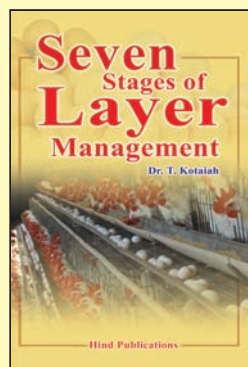
## Conclusion

The vitamin D is essential for many functions in the body like calcium and phosphorous homeostasis, bone mineralization, hormonal regulation. Vitamin D has effect on body weight gain, feed intake, feed conversion efficiency, muscle growth, fortification of egg, egg production and egg quality and also on immunity. The vitamin D requirement varies with the concentration of the dietary calcium and phosphorus level. The vitamin D level should be more than the present NRC requirement i.e. around 3,000 IU/kg. 1, 25-hydroxycholecalciferol is more efficient in commercial poultry nutrition. In addition, it is possible to create value added eggs, which are higher in vitamin D and therefore beneficial to human consumers. 

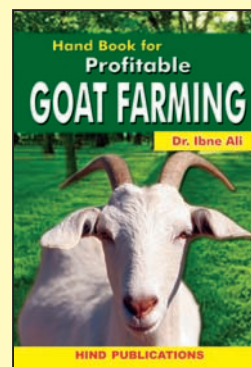
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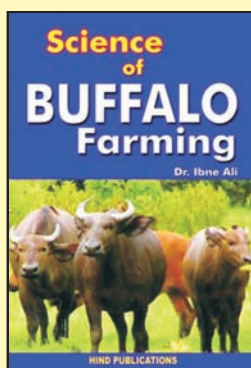
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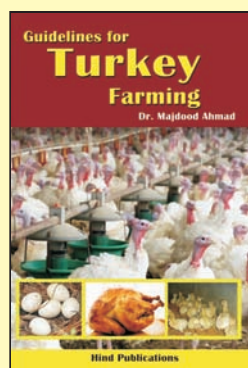
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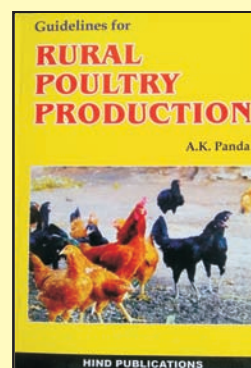
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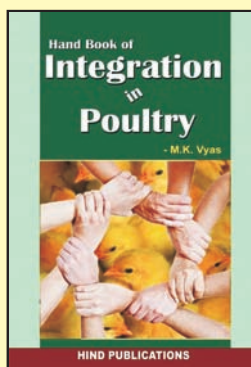
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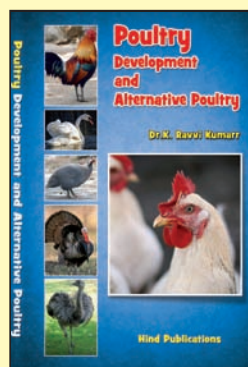
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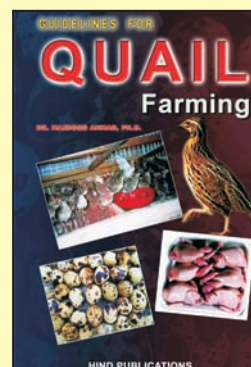
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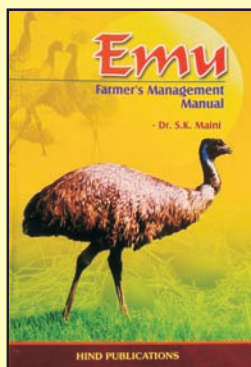
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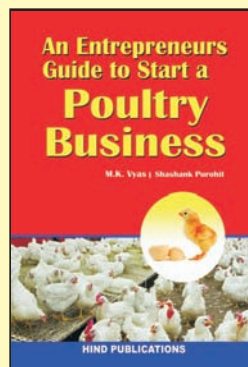
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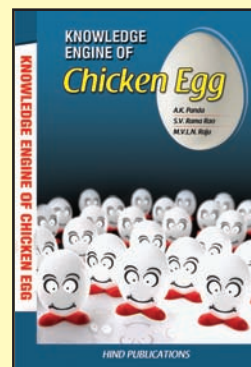
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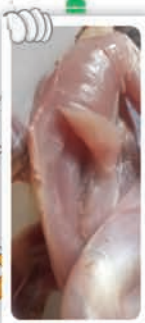




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