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HIND P O U L T R Y

Vol. XX November 2021 No. 5



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Great Place to Work® Institute recognized Kemin Animal Nutrition and Health – South Asia, as a **“Great Places to Work”**.

The business unit was also honored for its **“Commitment to Being a Great Place to Work”** because of its **three-year-streak of receiving this honor**, and the President, **R Suresh Kumar** was named one of **“India’s Best Leaders in Times of Crisis 2021”**

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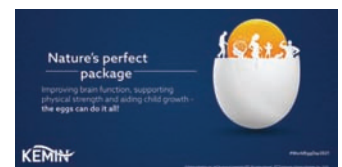
Kemin Animal Nutrition & Health – South Asia Celebrates World Egg Day and Chicken Day

World Egg Day is the second Friday of every October, and Chicken Day in India falls on the second Thursday of the month. To celebrate, Kemin Animal Nutrition and Health – South Asia organized multiple events this year, including:

- Employee webinar on the importance of protein in people’s diets
- “Fastest Fingers” quiz for employees
- Live egg counter
- Eggshell crafts competition
- Facebook campaign

Appreciating protein begins with understanding the importance of it in humans’ daily diets. Kemin South Asia organized a webinar session with Dr. Yamini, a chief dietician, to reiterate the importance of egg and chicken consumption. The virtual quiz, “Fastest Fingers”, invited employees to answer posted questions about eggs, with those answering fastest being rewarded. Kemin set up a food stall on its office lawn where employees could enjoy egg-based dishes, and the business unit offered a menu comprised of six recipes that incorporate eggs: egg roast, egg podimas, egg kalakki, eggs sunny side up, eggs with salt and pepper and half-boiled eggs.

For the eggshell crafts competition, five teams were asked to recreate “work from home episodes” using eggshells. The final products showed thoughtful and funny moments from Kemin South Asia’s work-from-home days. Dr. Tanweer Alam, Dr. Santosh and Dr. Sugumar judged the five entries and prizes were distributed to the winning team. Along with these internal events, Kemin ran a three-day social media campaign that included two videos around the theme, “Eggs for All: Nature’s Perfect Package”. The campaign reached 617,000 users, garnered 408,000 video views, and generated 223,000 engagements. For more information reach us at mail.india@kemin.com 





MONTHLY POULTRY MAGAZINE

VOL. XX No. 5 November 2021

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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

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RNI No. 7030/2002

Subject to Hyderabad Jurisdiction

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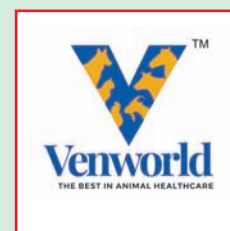
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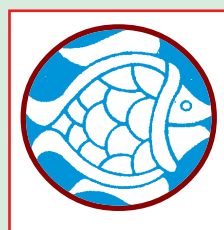
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Trouw Nutrition India and Nutreco India celebrated World Egg Day on October 8 pan-India in six different locations - Jadcherla, Hyderabad, Vijayawada, Coimbatore, Surat and Ludhiana. World Egg Day celebration was a part of the 2-week long campaign being run for World Food Day as we aim to play our part in ensuring “future of food” while fulfilling our purpose of Feeding the Future. Eggs being an economic source of healthy protein are the best solution to the challenge we face today.

Saurabh Shekhar, GM-Nutreco South Asia, on the occasion said, “Despite being the third highest egg


our measures on spreading awareness about animal protein.”

The event included promotions on benefits of eggs and how it is essential for a healthy future. Activities like distribution of eggs to underprivileged children, differently abled and old aged were undertaken. Further, at office and production locations fun activities to engage associates and highlight the superfood were conducted.

The day was celebrated with great enthusiasm in association with our business partners and stakeholders. We had

collaborated with GoodEggs, a premium eggs family-run business that believes in ethical and sustainable production practices; Erode District Egg Poultry Farmers Welfare Association, a local association of poultry farmers; and Eruvaka Technologies, an IOT organization that aims to transform aquaculture practices.

Trouw Nutrition, the animal nutrition division of Nutreco, has a 90-year history of dedication to innovation and deep experience in developing smarter and more sustainable ways of raising healthy farm animals and

companion animals. Our broad portfolio of feed specialties, feed additives, premixes and nutritional models and services, along with our ever-increasing expertise in feed, farm and health make us a one-stop-shop with limitless opportunities to create tailored, integrated solutions suited to each customer’s local situation. 

World Egg Day Celebrations For an Egg-stra Healthy Future by Trouw Nutrition



producing country globally, India faces a major challenge of protein deficiency. 73% of Indian diets are protein deficient and animal protein like eggs can be an easy, economical way to solve this big issue. While promotion on benefit of eggs is not limited to a day but celebrating World Egg Day provides us an occasion to further





Trouw Nutrition India signs Memorandum of Understanding with Guru Angad Dev Veterinary and Animal Science University


Trouw Nutrition India signed a Memorandum of Understanding (MoU) with Guru Angad Dev Veterinary and Animal Science University (GADVASU) on 09.09.2021. The signing ceremony was witnessed by GADVASU management and faculty members and presided by honourable Vice Chancellor - Dr. Inderjeet Singh, Director of Research - Dr. JPS Gill, Head of Animal Nutrition Department - Dr. US Chahal, Dr. HS Banga - Registrar, Dr. SK Uppal - Dean PGS, Dr. Amarjeet Singh - Comptroller and Dr. APS Sethi - Professor Animal Nutrition. Trouw Nutrition India team was represented by Dr. Suyash Vardhan, Regional Technical Manager and Narinder Singh, Area Sales Manager - Dairy. The MoU marks the beginning of a fruitful association of TN India with one of the premium institutes in livestock education with the aim to support farmers and feed millers through dissemination of latest technology and knowledge to support the goal of Feeding the Future. Under the MoU, the two organizations aim to build a knowledge platform to support:

i) Sharing of good global practices in Animal Nutrition with the focus on feed safety, precision nutrition and young animal management.

- ii) Exchange and dissemination of technical know-how via joint activities - seminars, webinar and knowledge sessions for farmers and feed millers.
- iii) Utilise TN India's expertise and reach to groom young talent in the field of animal nutrition through knowledge tours and sessions.
- iv) Collaborate on technical workshops for post-graduate students to help with understanding of the challenges faced by industry while finding innovative solutions for the same.
- v) Conduct trials for validation and testing of TN India products to add value to our portfolio for livestock industry.

GADVASU was established in Ludhiana on August 9, 2005 with the primary aim of promoting livestock production, health and prevention of diseases through integrated teaching, research and extension programme.

Trouw Nutrition, the animal nutrition division of Nutreco, has a 90-year history of dedication to innovation and deep experience in developing smarter and more sustainable ways of raising healthy farm animals and companion animals. Our broad portfolio of feed specialties, feed additives, premixes and

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Use of Protected Benzoic Acid in Sustainable Poultry Production



Dr. Koushik De

Technical Services Director-SCA
Novus International



Feed efficiency is one of the main factors used for the improvement of chicken production. In addition, feed efficiency has an important economic impact on the competitiveness of the poultry sector. Another important feature in modern broiler farms is the correct management of diseases for maintaining productivity and economic viability. The challenge of increased feed efficiency and potential health risks becomes essential to the survival of the intensive broiler production. The ban or limited use of antibiotic growth promoter in some regions of the world has forced the investigation of alternative products which can modulate the intestinal flora beyond the stomach barrier, obtaining comparable growth performance in the animal. Organic acids as well as aromatic compounds have been widely used as antimicrobials in food safety and as feed additives. An

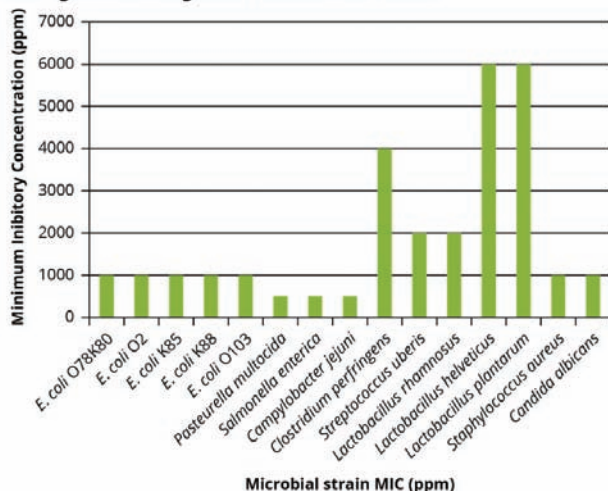
important quantity of studies in which the efficacy of organic acids in improving feed efficiency and growth have been clearly showed (Khan and Iqbal, 2016; Huyghebaert et al., 2011). The limiting factor in the use and efficacy of these compounds is the need to reach the intestine in order to exert their antibacterial activity, without being absorbed too rapidly after leaving the stomach.

Which organic acid to choose?

For feed decontamination, formic acid is given as the best antimicrobial organic acid. It is not the best choice for an intestinal microorganism target. The pKa value of formic acid is lower than 4; it is a small molecule and quickly metabolised. Benzoic acid has a pKa value of 4.2 and the phenolic part is an efficient damaging agent for the bacteria cell. Benzoic acid is a solid molecule and also less corrosive and safer to handle compared to formic, propionic or lactic acids. Figure 1 shows the minimum inhibitory concentrations of benzoic acid on different bacteria (not published data). As it is the general case for organic acids, gram-negative (i.e. E. coli, Salmonella) are much more inhibited than gram-positive bacteria.

Amongst the gram-positive bacteria, the "beneficial bacteria" (i.e. Lactobacillus spp.) is less sensitive to the antibacterial effects of benzoic acid. It has already been reported that benzoic acid plays an important role lowering numbers of many pathogenic bacteria as Campylobacter jejuni, Escherichia coli, Listeria monocytogenes and Salmonella enterica (Giannenaset al, 2010).

Figure 1 – Minimum inhibitory concentrations (MIC in ppm) of benzoic acid against microorganisms isolated from animals.

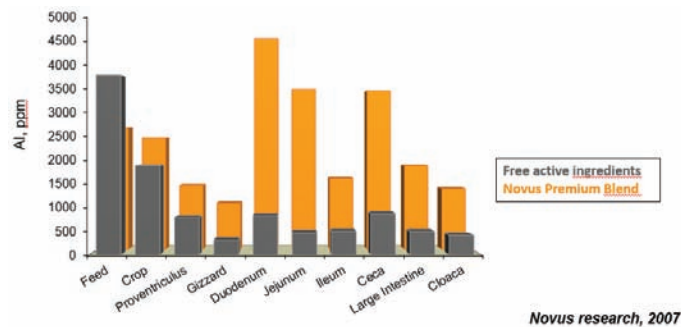
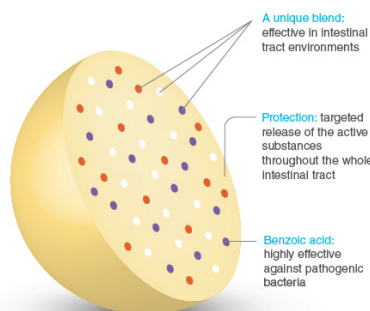


Typically Benzoic acid is an organic acid that modify the intracellular pH of gut bacteria and shifts gut bacterial profile by creating an environment that minimize the proliferation of pathogenic bacteria (Yousaf et al., 2016). Despite benefits of organic acids, a major constraint associated with organic acids is their rapid metabolism and absorption in the proximal parts of the gastrointestinal tract, which results in low concentrations in the distal parts. Thus, the mode of action for the bacteriostatic and bactericidal activities of free organic acids are questionable (Hume et al., 1993; Thompson and Hinton, 1997; Ricke, 2003; Van Immerseel et al., 2006; Goodarzi-Borojeni et al., 2014b).

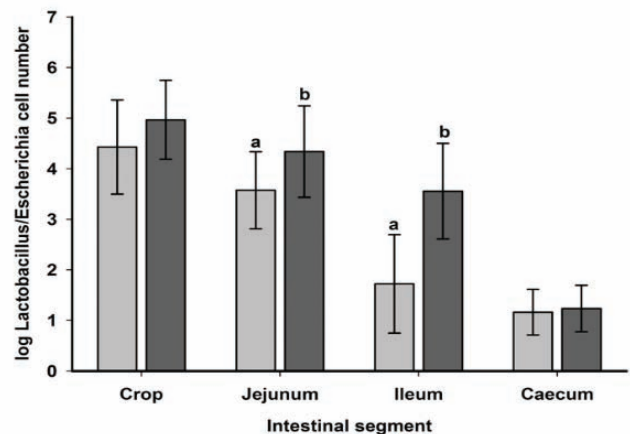
Target release by encapsulation:

To reach antimicrobial concentrations in the distal intestine of poultry, it would be necessary to increase the level of organic acids dramatically in the feed, causing decreased feed intakes. Therefore different attempts have been made to protect organic acids from dissociation and absorption in the proximal intestine by microencapsulating the active compounds in a matrix which would lead to releasing the active compounds in the distal parts of the gut (Yousaf et al., 2016). Novus has used a patented technology called Novus Premium Blend consisting of a protective vegetable fat matrix embedding the active substances which allows benzoic acid to be released slowly throughout the intestinal tract and modulating the gut microbiota.

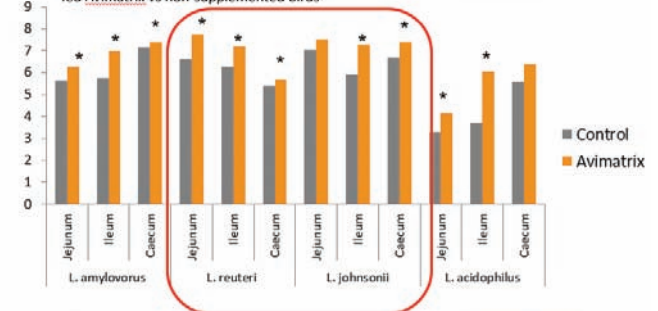
AVIMATRIX® is a blend of nature identical flavoring compounds and preservatives processed by Novus Premium Blend Technology with a high Benzoic acid concentration. It has a stabilizing effect on gut microflora which offers cost effective performance enhancement. This encapsulation through Premium Blend Technology has shown the control release of



Novus research, 2007



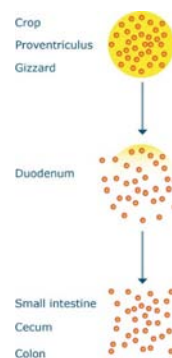
Log CFU/g wet weight, of lactobacillus species in the intestine of broiler chickens fed Avimatrix vs non-supplemented birds



Berlin University, 2012
Poster ESPN, 2013


Active Ingredients (AI) in the intestinal tract when compare with free Benzoic acid.

AVIMATRIX® has been shown to stimulates growth of Lactobacillus in the GIT, which increase lactate production. Lactate, as substrate, promotes growth of Clostridium clusters XIVa and IV. Clostridium cluster XIVa includes many known butyrate-producing bacteria. Butyrate is a preferred energy source for colonic epithelial cells and reported to improve growth performance, intestinal digestive and absorptive capacity. Clostridium cluster XIVa been reported to down-regulate bacteria virulence and gut inflammation.




L. reuteri stimulates the development of longer villi and significantly deeper crypts, specifically in the ileal region of the gut of young chicks. This enhanced ileal mucosal development caused by L. reuteri occurred in turkeys as well, and the effect was retained until the birds reached market age. AVIMATRIX® also has been shown to increase the ratio of Lactobacilli vs Escherichia spp throughout the intestinal tract and thereby positively alters the microbial balance of the GIT.

Conclusion:

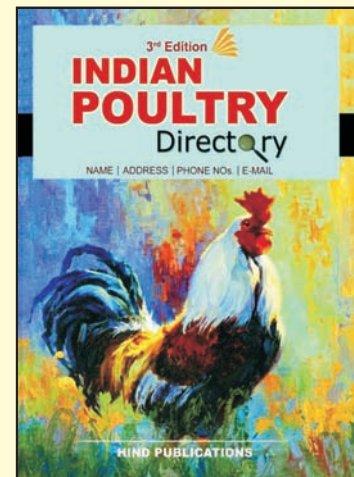
supplementing broiler diets with a protected benzoic acid (AVIMATRIX®) embedded in vegetable fat can positively impact the intestinal microflora by reducing coliform and clostridia counts in the gut and subsequently improve footpad health and litter condition. Because of effectuating an overall better gut health condition, this protected benzoic acid increases final bird weight and feed efficiency resulting in a considerable return on investment. The efficacy and consistency of results showed by the application of this product are related to both the mode of action of the active compound (benzoic acid) against intestinal pathogenic bacteria and its protection technology, which allows the active substances to be released throughout the entire bird's intestinal tract. Thus, together with a proper farm management, this protected benzoic acid can be a powerful, cost-effective solution to manage intestinal health challenges and animal welfare ensuring a profitable poultry production. 

President of India nominates Dr. R. K. Jaiswal - President, IB Group for the board of Management of Central Agricultural University- Imphal

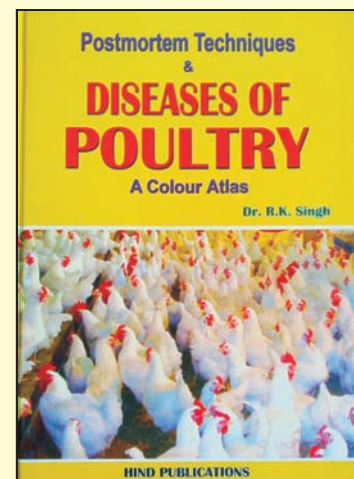


It's a matter of pride for the entire IB Group and people of poultry fraternity that Dr. R. K. Jaiswal, President and Head of Operation (Poultry)- IB Group is nominated for the board of Management of Central Agricultural University- Imphal by the President of India Shri Ramnath Kovind. Dr. R. K. Jaiswal is connected to IB Group for last 2 decades and has been a driving force behind successful joint venture of IB Group with the world's best genetic in poultry company- Aviagen, USA. He is also the member of World Poultry Science Association and the President of Chhattisgarh State Veterinary Council. In his career, he achieved various milestones and has been honored by Venkateshwara Hatcheries Limited, Pune in 2006 for services rendered to the Poultry Farmers of Madhya Pradesh State. In 1989 he was awarded the Young Scientist Award by the Madhya Pradesh Council of Science & Technology in its 4th Young Scientist Congress. Founder and Managing Director of IB Group Mr. Bahadur Ali and its management told that the nomination of Dr. Jaiswal is a moment of pride for entire poultry and agricultural sector. 

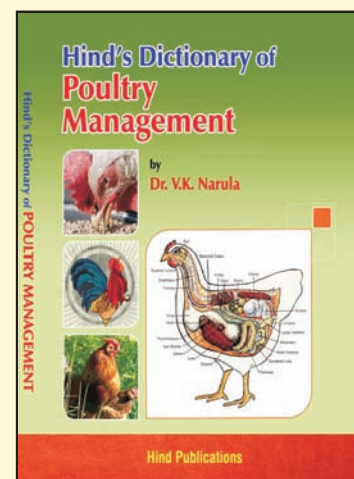
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Bacillus Subtilis can Create a Protective Biofilm on the Intestinal Epithelium

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- John Schleifer, Technical Product Manager North America
- Dorthe Sandvang, Innovation Department Manager

Bacillus-based probiotic products containing bacterial spores seem to be particularly well-suited for use in broiler feeds. In the spore form, they are metabolically dormant and resilient to environmental stresses, including pelleting. There have been years of debate on the mode of action of probiotics in chickens and more broadly in poultry. A cornerstone of the debate centers on the ability of spores to germinate and become viable organisms in the intestine due to the rapid transit time in poultry gastro-intestinal tract (GIT). These aspects were clarified in 2008 by Cartman *et al.* The research showed that orally-administered *Bacillus subtilis* spores germinate in the chicken's GIT (Cartman *et al.* 2008). Continuous administration of an effective *Bacillus subtilis* probiotic is advisable to achieve persistent benefits (Latorre *et al.* 2014).

Another point of discussion has focused on whether spore-forming *Bacillus spp.* are transient organisms in the gut or if they could attach somehow to the intestinal epithelium. This led to two schools of opinion in the scientific community. To answer to this question, the Innovation Department of Chr. Hansen, A/S performed a special fluorescence experiment in collaboration with the Department of Animal Nutrition, of the Kielanowski Institute of Animal Physiology and Nutrition, Polish Academy of Sciences, Jabonna, Poland.

A Recent Study Answers the Debate The most recent study was conducted to investigate the effects of commercially-available spores of Chr. Hansen *Bacillus subtilis* spore-based probiotic in diets at 1.6×10^6 cfu/gram of feed. Performance parameters and microbiota activity in the broilers were assessed. Fluorescence in situ hybridization (FISH) was performed to investigate the spatial organization and the formation of *Bacillus subtilis* biofilms in intestinal samples from various GIT locations in 6 broiler chickens. Tissue sections from each chicken were

analyzed in duplicate and visualized by fluorescence microscopy with a 40x objective.

Do Bacillus Subtilis colonize the gut or are they transient? Both.

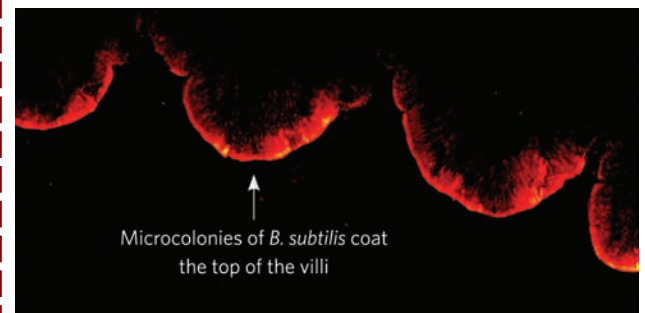


Figure 1. *Bacillus subtilis* biofilm covering caecum villi surface

Indeed, the first picture (Figure 1), describes very well how *B. subtilis* colonize the intestinal epithelium in the intestine. We can see very clearly the red fluorescence on the surface of the villi of the intestine. In the second picture (Figure 2) a different fluorescence is observed. Some luminescence inside the lumen of the intestine is seen, which clearly shows that transient *Bacillus* are in the intestine. The bacteria are alive and multiplying into the lumen of the gut content.

Bacillus are at the right place to act!

This picture is interesting, it clearly depicts that

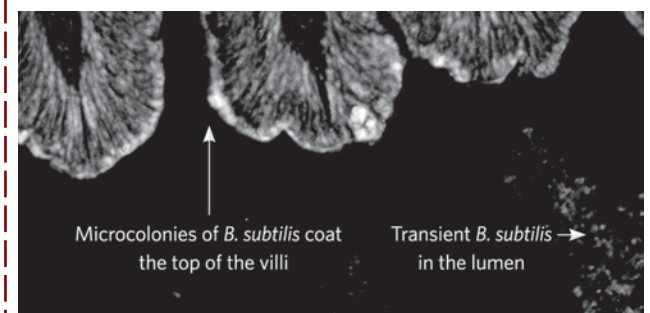


Figure 2. *Bacillus subtilis* on the villi surface and in the digesta

Bacillus are able to colonize the surface of the villi. This is an excellent place to be in the intestine. The top of the villi represents one of the most sensitive

sites of the epithelium. This is the place where a lot of nutrients are absorbed due to the full development of the microvilli. This is also the place where most of the pathogens are acting to destroy the mucosae (*C. perfringens*, *E.coli*, *Salmonella*).

Several advantages can be deduced by coating the epithelium surface.

Presence on the villi equates to improved total intestinal surface

Many different publications have documented that the use of Chr. Hansen probiotics result in an increase in the length of villi and an increase of the very well-known Villi length/Crypt Ratio (Borojeni F.J. *et al*, 2018). This indicator is typical of enhanced intestinal functionality. It is easily understandable that when the surface of absorption is increased, the efficiency of the nutrient absorption through the epithelium correspondingly improves. By coating the surface of the villi, *Bacillus* are able to protect the integrity of the villi and microvilli and subsequently prolong the life cycle of the cells (typically about 4 to 5 days) before their expulsion in the lumen of the intestine.

Presence on the villi results in bacteriocin effectiveness

Some *Bacillus* spp. are specifically strong in bacteriocin production. A bacteriocin can be defined as inhibitory peptide against unfavorable bacteria. For instance, those peptides are known to inhibit the growth of *C. perfringens* but also more recently of *E. coli* and *Salmonella*.

Presence on the villi improve metabolite and enzyme production

Bacillus spp. can produce and release multiple active enzymes in the intestinal tract. The principal

objective of these enzymes is to digest the undigestible part of the feed which may be in the micro-environment surrounding the bacilli colonies. Once these enzymes are released, they continue to act and cut the complex insoluble or indigestible fraction of feed into smaller pieces which are then readily absorbable by the microvilli. The presence of the *Bacillus* on the surface of the epithelium makes these enzymes act exactly as necessary for the bird's absorption. On top of this, a recent paper demonstrated the capacity of increased butyrate production in the intestine (Konieczka P *et al.*, 2018).

Conclusions


This most recent research helps to further understand an important part of the mode of action of effective *Bacillus* probiotics.

Therefore, *Bacillus* probiotics:

- Can germinate in the gut and become an active part of the bacteria microbiome in poultry.
- Can be transient, live organisms in the flow of the intestinal content.
- Can colonize the surface of the intestinal villi resulting in three major benefits for the bird's intestine:
- Protection of the surface of the villi, thus prolonging and protecting this very important part of total nutrient absorption,
- Creating the right place for bacteriocin production, resulting in an unfavorable micro-environment for pathogens such as *C. perfringens*, *Salmonella* and *E. coli*,
- Releasing enzymes and butyrate locally, close to the brush surface epithelium. This enables the digestion of the indigestible part of the feed and improves the digestibility of key elements of the feed.

Over years of controversial debate, the answer from science is showing us again that we are just scratching the surface of the probiotic potential in poultry production. This study confirms there is a bright future for this technology, and it is supported by science-based evidence.

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Layer Manure	10 T & 20 T / Day
Slaughter Waste	250 - 3500 Kg/ Batch
Chicken Fat	1 T - 2 T / Day



Banda 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 Govern-

ment of India also awarded him the fourth highest civilian award of Padma Shri in 1990. Indian Poultry farmers celebrated the 86th Birth Anniversary on 6th November 2021. People from across the country paid floral tribute and distributed free Eggs and Chicken on the occasion.



ment of India also awarded him the fourth highest civilian award of Padma Shri in 1990. Indian Poultry farmers celebrated the 86th Birth Anniversary on 6th 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

pharmaceuticals, cattle feed, sports. The V. H. Group has now the presence in India, Bangladesh, United Kingdom, Singapore, Vietnam, Brazil and many more countries.



**86th Birth Anniversary
of Padmashri Dr. B. V. Rao
1935-2021**

“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


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 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,



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. 



Dr. Vijay Makhija, Dr. Tanweer Alam, Dr. Shirish Nigam and Dr. P. G. Phalke appointed as President, Vice President, General Secretary and Treasurer respectively for INFAH



Indian Federation of Animal Health Companies (INFAH) hosted its 10th Annual General Body Meeting virtually on 27th Sep 2021 and 28th Sep 2021. Members had creative, virtual experience showcasing INFAH's Vision and Mission along with gallery of INFAH's Milestones. The AGM was attended by more than 100 industry colleagues representing Indian animal health and Nutrition industry. On 27th Sep, 2021 at the Inaugural session, Dr Vijay Makhija, General Secretary delivered welcome note. Inaugural address was given by Mr Vijay Teng, President- INFAH, showcasing the 10 years journey of INFAH, releasing the special edition of Annual report 2021 and launching INFAH movie which showcases INFAH's accomplishments and key milestones. Three distinguished stalwarts Dr M.L. Kanchan, Dr S N Singh and Mr Bharat Tandon were conferred with INFAH Award for their contribution towards Animal Health Industry. On 10th Year anniversary special award was presented to Dr. Romila Iyer for bringing the diversity in the Animal Health sector and making significant contribution. The award ceremony was conducted by Dr B.P Manjunatha and Dr Tanweer Alam. Dr Shirish Nigam Resident Secretary New Delhi, delivered welcome note, President address was given by Mr Vijay Teng. Dr. P.G. Phalke Treasurer conducted the AGM proceedings. Dr. Vijay Makhija, General Secretary, INFAH presented the full year activity report for 2020-2021.

The New Managing Committee Members :

- | | |
|--|--------------------------------------|
| 1. Dr. Vijay Makhija (President) | 6. Dr D.K. Dey, Past President |
| 2. Dr. Tanweer Alam (Vice President) | 7. Dr Arun Atray, Past President |
| 3. Dr. Shirish Nigam (General Secretary) | 8. Mr Satish Pasrija, Past President |
| 4. Dr. P.G. Phalke (Treasurer) | 9. Mr Anurag Agarwal |

Executive Members

- | | |
|--|--|
| 5. Mr Vijay Teng, Immediate Past President | 11. Mr Natesan T  |
|--|--|



AgriVision 2021: Focus on sustainability

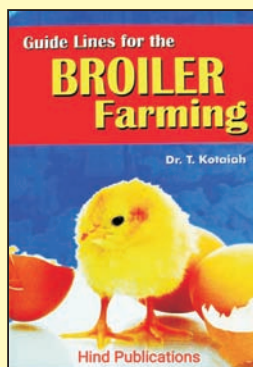
Agriculture's Best and Brightest on the Bill for AgriVision 2021

As sustainability in agriculture has been a hot topic for many years now, it is no surprise that the issue was key at the biennial Agri Vision conference, organized by Trouw Nutrition, part of Nutreco. Where the event normally takes place in the Netherlands, this time the organizers had to make do with a studio and cameras, which worked out well as the event attracted an audience from across the globe. Session started with introductory speech of Fulco van Lede, the new CEO of Nutreco, who set the scene by asking the question as to how it will be possible to sustainably feed 10 billion people by 2050. He summed up challenge after challenge. "The way we farm animals and fish damages ecosystems and causes global warming. The environmental footprint needs to be reduced. Yet customers are unwilling or unable to pay for that. How to share those costs equally?"

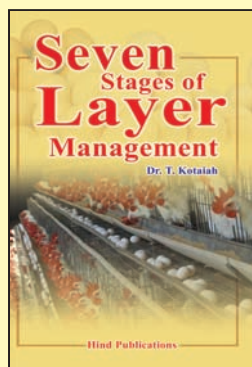
Sustainability in agriculture was the key theme of the biannual event AgriVision, which took place entirely digitally on October 7, 2021. In 2 sessions, various speakers addressed how to make agricultural production more sustainable. Perhaps the most heard message was that working together is essential to being able to meet future sustainability goals.

He pointed into one direction with regard to a solution, one that was also voiced by Saskia Korink, CEO of Trouw Nutrition: "This is a bigger challenge than one company can solve. We have to engage with one another. Once we are done talking, it is time for action." In another insightful roundtable, the future of protein was discussed. Justin Sherrard, global strategist animal protein at Rabobank, painted the picture where the world is with different protein sources like lab-grown meat or non-animal protein sources, as can also be seen in the picture below. In contrast to a steady, calm growth, he pointed to the situation in the alternative protein markets – one that is very dynamic. "The picture is different and exciting when we look at alternative proteins. There is dramatic growth. This industry is drawing in talented people and human resources. It is so interesting because of the growth it represents."

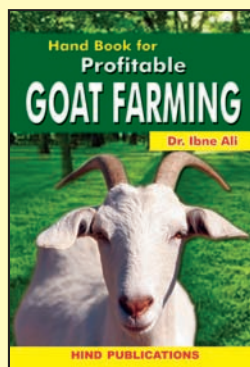
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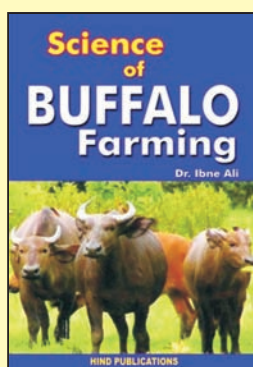
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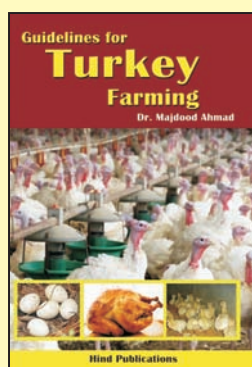
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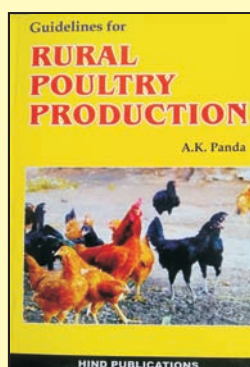
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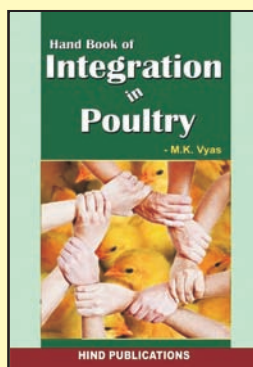
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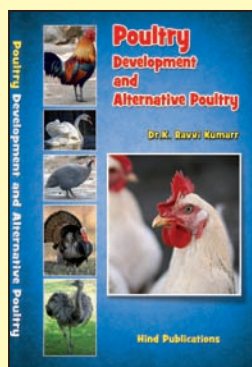
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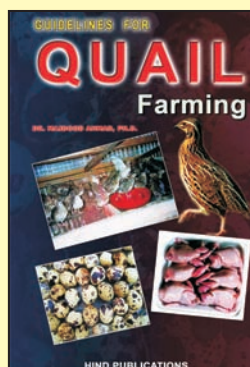
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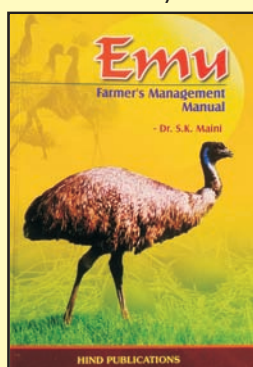
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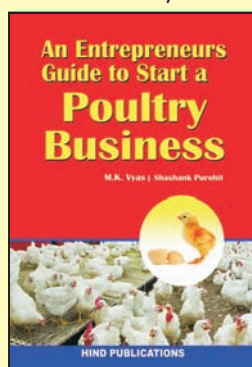
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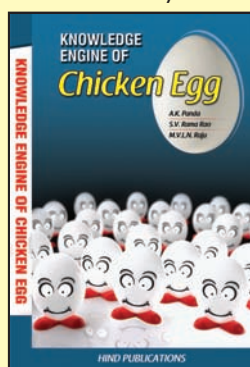
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Asked what the emergence of alternative proteins mean for animal production, Sherrard said that most alternative protein products are now higher priced, offering a better margin. "One option is to make the product available at a large scale and make it more affordable. I think traditional protein is going to be the one that is sought after."

In that same round table, Marcel Sacco participated on behalf of Brasil Foods. Said that "This is not about replacing meat by something else. This is more about offering more choice to consumers. We can combine the existing animal protein offer with new things."

Joost Matthijssen, director of venturing and business development at Nutreco, highlighted that for Nutreco it is important to explore and understand which other protein producing technologies are available. He said, "For these new technologies, new value chains will have to be set up. An infrastructure for alternative proteins will have to be built. It is an exciting area with more emerging technologies, like cell-based, fermentation-based technologies. They all require totally different methods of production. We are exploring what role we can play." Asked when the first cell cultured meat could be consumed in the EU, Matthijssen said it is dependent on various factors, including legislation. "And there needs to be an industrial scale-up. Nobody will buy it if they find a hamburger in a supermarket priced • 100. I would expect a timeline closer to 2030 than to 2025."

One meat processor and food company that is already thinking about the protein transformation and the role it plays is Maple Leaf Foods in Canada. Tim Favero, the company's vice president sustainability and shared value highlighted the company's development in thinking. He took pride in explaining that Maple



Leaf was named the world's first major carbon-neutral food company. He explained that the company started looking to become "purposeful" in 2016-17. "We started to ask ourselves why we exist as a company and what role the company can fulfil in society." The road Maple Leaf took meant that it would have a meaning for every employee. Favero explained, "It cannot just be seen as just another corporate strategy."

One of the steps the company took was to "clean up all ingredients," as Favero put it, by going all natural with its products and take out all preservatives and chemicals. "After the transformation, our tagline was *We're for real*. That resonated with our customers significantly. Now our consumers are eating healthier." Becoming carbon neutral was also achieved by looking into the supply chain, for example. Being named the world's first major carbon-neutral food company had a major impact, he said. "Our customers care about the planet. They do not want to feel guilty about the choices they make. We are working hard for them."

Perhaps the most thought-provoking presentation came from Dr Rogier Schulte, professor farm systems and ecology at Wageningen University & Research, the Netherlands. He said that mankind is at a crossroads of sustainability, illustrating that it is happening all around with floodings all over the world, businessmen literally trying to leave the planet with their race to the universe.

He painted a picture of innovative, future-oriented, nature-inclusive agricultural production and introduced the concept of "lighthouse farmers." A group of farmers with different crops and animals, from different background and cultures, together forming a worldwide group full of innovative ideas. Together they can go beyond thinking solutions, but also get to the stage where things get done. Among the various farm examples highlighted, he also mentioned As Ziedi farm in Latvia, which has 2,000 dairy cows, plus 3,000 ha arable land with a variety of crops. Prof Schulte said, "Milk is the byproduct here. The main product is manure. The manure is put into anaerobic digestors, providing electricity. But

that is also a by-product. The main product is heat, because that allows sturgeon and eels to grow. Within 2 years they can harvest fish, also a by-product. Because caviar is the main product. It is a caviar farm supported by dairy cows." He spoke of nature-inclusive rice farming systems in Indonesia, where also fish and ducks are being kept at the same time. The ecological complexity reinforced each other. Another example came from Brazil, where clever agroforestry brought back the structure of the original Atlantic rainforest, enhancing biodiversity.

Prof Schulte said, "There are no easy solutions. That is one of the lessons we learnt. That is why we cannot leave it at the feet of the farmers alone. We have to work together. The lighthouse farmers offer inspiration."

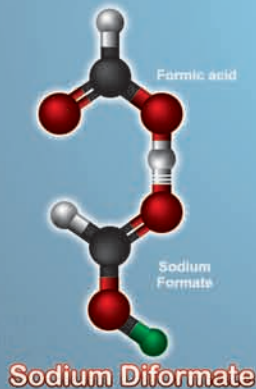
AgriVision 2021 offered a host of different other presentations, which included e.g. Emmanuel Faber, former CEO of Danone; Jason Clay, World Wildlife Foundation; Jeffrey Simmons, president and CEO at Elanco AH; Petra Hissink, Heineken; Dr Sharon L. Deem, St Louis Zoo, MO, USA; and Daan Roosegaarde, artist. 🇳🇱

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Reducing Predisposing Factors Key in Campylobacter Control

Addressing the predisposing factors that allow Campylobacter to flourish can offer broiler producers an additional strategy to improve poultry's food safety profile.

by **Lorran Baeumle Gabardo**

In Brief

- Campylobacter is difficult to control, and prevalence may be increasing.
- Mycotoxin contamination can predispose birds to Campylobacter.
- Controlling predisposing factors is an important tool for Campylobacter control.

Campylobacter has proved more difficult to control than other food borne pathogens leading to gastroenteritis and there is evidence to suggest that campylobacteriosis is on the rise. Given the difficulties in directly reducing Campylobacter incidence, limiting predisposing factors, such as mycotoxins, can form part of a Campylobacter control strategy.

Mycotoxins' impact on the gut

Mycotoxins act as a predisposing factor due to their ability make the chicken's immune system more vulnerable, potentially leading to secondary infections and decreasing overall flock health. Deoxynivalenol (DON) is particularly correlated with this issue since it can have dramatic effects on the poultry gut and immune system. The disruption of intestinal integrity may lead to an increased likelihood of pathogenic bacteria entering the bloodstream and, consequently, increased susceptibility to disease. According to the latest Biomin® Mycotoxin Survey, in 2020, DON was the most widespread trichothecene mycotoxin in feed. It is well documented that DON can negatively impact common problems in animal production, such as increasing Salmonella typhimurium issues and facilitating the entrance of pathogenic Escherichia coli

Worldwide DON contamination - 2020

DON shows high prevalence and contamination levels worldwide

Source: Biomin World Mycotoxin Survey, 2020.

	Contaminated samples (%)	Avg. of positives (ppb)	Max. (ppb)
North America	75	789	43,517
Central & South America	61	736	26,320
Europe	75	531	11,875
MEA & North Africa	78	497	5,170
Africa	78	592	7,254
Asia	81	546	17,550

strains into the bloodstream in pigs, also predisposing broilers to necrotic enteritis. Recent studies have also strengthened the hypothesis that DON can also influence the infection profile of *Campylobacter jejuni* in broilers. The co-exposure of DON in poultry feed and *C. jejuni* showed a considerably increased presence of pathogen loads in the gut as well as an increase in gut permeability. The study found that the co-exposure by *C. jejuni* or DON challenge negatively impacted the gut barrier function, reflecting impairment of the digestive and immune functions. Additionally, the synergistic effect between DON and *C. jejuni* was also found to enhance *C. jejuni* colonization of the broiler gut, as DON destroys the gut structure, providing favorable conditions for *Campylobacter* growth.

Three strategies are considered effective in mitigating the risk of mycotoxins on animals' immune status:

1 ADSORPTION

binding adsorbable mycotoxins, such as aflatoxins, in the gastrointestinal tract

2 BIOTRANSFORMATION

the irreversible degradation of non-adsorbable mycotoxins (including DON, zearalenone and fumonisins) into non-toxic compounds

3 BIOPROTECTION

supporting the functionality of the liver and gut, which are the main organs affected by mycotoxins

Establishing a strategic plan to correctly identify and counteract mycotoxins, specifically DON, can be key in reducing *Campylobacter* risk and improving the food safety profile of poultry meat.

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PERSTORP's global market leader in tributyrins for animal nutrition PROPHORCE– celebrates its 10-year anniversary




This quarter, Global feed additives producer Perstorp, will celebrate 10 years of commercial application of pioneering tributyrins solution ProPhorce™ SR in

animal nutrition. ProPhorce™ SR quickly became one of the company's star products to support gut health and performance. The innovative application of the esterification process ensured odorless butyric acid that is released where it is of most benefit to the animals. To mark the occasion, Perstorp is organizing a series of activities to celebrate and commemorate the product's accomplishments throughout the decade.


A proud pioneer

ProPhorce™ SR is the pioneering tributyrin solution that revolutionized the market; over the course of a decade, it has become one of the weapons of choice to support gut health and performance, with more than 20 billion broilers treated and used in more than 50 countries worldwide. "I'm happy that we have been able to help so many customers around the world improving their performance thanks to the application of ProPhorce™ SR." says Geert Wielsma, Vice President Sales EMEA & Americas and former development team member for ProPhorce™ SR. "We are about to finalize a new production line in our Dutch feed additives production plant that will facilitate the next decade of growth for our tributyrin solutions."

Looking back and looking forward

This year marks a double celebration for the company as Perstorp is turning 140 years. That's 140 years of thinking about the future and developing smart solutions to advance everyday life in an ever-changing world. One molecule can change everything, and it is under that premise and following focused innovation as its core value, that ProPhorce™ SR was born. "When the concept of ProPhorce™ SR was born and we did our first animal trials, we knew we had something very special in our hands. Feed producers in over 50 countries are using ProPhorce™ SR nowadays with more than 50 trials ran all over the world. Results can be summarized with 2 words, efficacy and reliability. We would like to thank our customers for the loyalty and the trust they have placed in the company and in ProPhorce™ SR during these 10 years, they motivate us to continue providing the market with innovative solutions for the decades to come". says José Maria Ros, Global Technical Manager. 

Indian Poultry Industry comprising of Broiler and Egg is poised for the growth of over 15 percent in next five year

The Indian poultry market, consisting of broilers and eggs reached a value of INR 1,988 Billion in 2020. Looking forward, the Indian poultry market to grow at a CAGR of 15.2% during 2021-2026. India today is one of the world's largest producer of eggs and broiler meat. The poultry industry in India has undergone a major shift in structure and operation during the last two decades transforming from a mere backyard activity into a major industry with the presence of a large number of integrated players. This transformation has involved a sizeable investment in breeding, hatching, rearing and processing activities. Some of the key drivers for the estimated growth of 15 percent for poultry industry in India are: Increasing Incomes Coupled by Changing Food Habits: Broiler meat in the past had been considered to be a delicacy but as a result of increasing levels of urbanization and higher levels of disposable incomes, poultry meat is increasingly seen as less of a luxury product and more as a daily staple. Further with changing food habits and increasing exposure to global cuisines, the Indian population is increasingly converting to a non-vegetarian diet. Poultry meat is preferred over other meat products as it is considered more hygienic and is available throughout the year across the country at relatively lesser prices than fish and mutton. The annual per capita consumption of broiler meat and eggs remains one of the lowest in the world and is significantly lower than many emerging and developed markets. As a result of the low penetration levels and continuously increasing income levels, however it is expected that per capita consumption of both broiler meat and eggs to increase continuously during the next five years. 

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PFI all set to organize its AGM on 23rd December 2021 in Hotel Pullman-Delhi



Poultry Federation of India (PFI), an apex and renowned association of poultry farmers, breeders, equipment manufacturers, pharmaceutical companies and all allied industries, is organizing its 32nd Annual General Body Meeting (AGM) at Hotel Pullman, Aero City, New Delhi on December 23, 2021. The Delegates registration fee is Rs.3,000 per person till December 15, 2021 and Rs.4,000 for on Spot Registration at the AGM Venue. This includes Lunch, High Tea, Cocktail, Networking Dinner and attending Musical Entertainment Program on December 23, 2021. There is also the opportunity for sponsoring the events in 7 different categories with number of branding opportunities for sponsors. All sponsoring companies will be honored by presenting the mementos during the AGM.

For more details about the event, participation and accommodation on special price at hotel PULLMAN one can contact PFI :

Mr. Ramesh Chander Khatri, President, Mobile Number: 9215944454 and 9416015834. Mr. Sanjeev Gupta, Vice President (HQ), Mobile Number: 9810016290 and 8860631632. Mr. Ranpal Dhanda alias Bittu, Secretary, 9215700133 and 9416035827. Mr. Ricky Thaper, Treasurer, Mobile Number: 9810016293 and 9910016293.

e mail at info@poultryfederation.org and poultryfederation@gmail.com 

World Egg Day Celebrated by Huvepharma SEA & ABTL on 8th October 2021



World Egg Day 2021

Huvepharma SEA (Pune) Pvt. Ltd. celebrated World Egg Day on 8th October 2021 to promote and popularize egg consumption as part of a balanced diet. Considered a superfood, an egg is one of the most popular sources of protein. On this occasion of 25th anniversary of World Egg Day, Huvepharma SEA team distributed boiled eggs amongst people to spread awareness about the benefits of eating eggs daily & to make people aware of the nutrients present in eggs and informed them about the benefits of its consumption.

Malnutrition is a global problem and the consumption of eggs could prove to be a solution to the issue. Owing to their broad range of nutrients, eggs are a healthy, nutritious & affordable part of the diet for people at all stages of life, including growing teenagers, pregnant and lactating women, the elderly, and infants, particularly those in nutritionally vulnerable areas.

Along with their nutritional value, eggs are the most environmentally sustainable & affordable animal-source protein available, helping support families around the world as well as the planet itself. Thanks to new efficiencies and significant productivity gains, eggs have a low environmental footprint.

The egg industry is a significant source of income for rural populations around the world. In low & middle-income countries, women represent a large proportion of egg farmers & rely on their farms to feed their children.

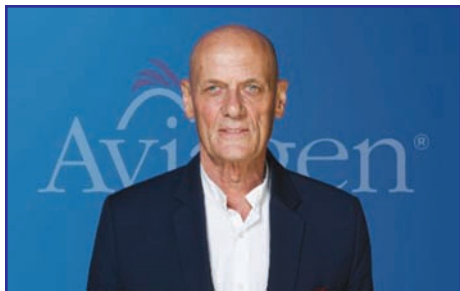
Mr. O. P. Singh, Managing Director of Huvepharma SEA also acknowledged and thanked to all the egg producers for their valuable inputs in supporting the Health & Nutrition as well as encouraged the nation to celebrate the highly nutritious and brilliantly versatile egg.

ABTL took an initiative & organized an awareness activity at Maher Ashram in Pune. On the special occasion of World Egg Day, Team ABTL went to Maher Ashram & celebrated the World Egg Day along with the children & the staff present there by distributing eggs and the pamphlets - showing the benefits of egg, also educated them the importance of having an egg in their diet. Maher means "mother home" - a heaven of hope, belonging and understanding. Our mission is to help destitute women, children, and men from all over India exercise their right to a higher quality of life, growth, education & happiness irrespective of gender, caste, creed, or religion.



Retirement of a True Aviagen and Industry Champion

“Industry pioneer, great colleague, patient mentor, humble gentleman and customer champion” have all been used to describe Paul Gittins, Senior Adviser to




After 50 years in the poultry business and 25 years with Aviagen, Paul Gittins retires at the end of September

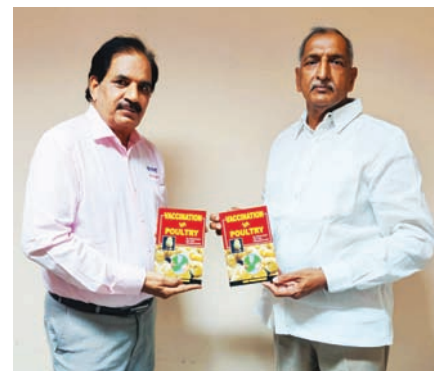
Aviagen® India, who retired at the end of September. Joining Aviagen in 1996, in 2007 Paul moved to India, where he started and worked relentlessly to build up Aviagen India, promoting the growth of the Ross® brand and success of chicken growers throughout the country. He fulfilled the role of General Manager until 2019, when he became Senior Advisor to Marc Scott, Business Manager for Aviagen India.

Paul graduated from the West of Scotland Agricultural College, followed by 20 years in chicken and turkey processing, planning and marketing for Golden Produce and Buxted Poultry in the United Kingdom, and producing poultry for major British retail chains. In 1988, he traversed the Atlantic to Canada with Maple Leaf Foods, starting the first air-chilled processing plant in North America and launching Maple Leaf Prime, which remains a leading Canadian brand. Eight years later in 1996, he moved back to Europe to join Aviagen Scotland as Marketing Manager, and then expanded into sales and key accounts. However, blazing new pathways is in Paul's blood. In 1999 he began an intense decade of

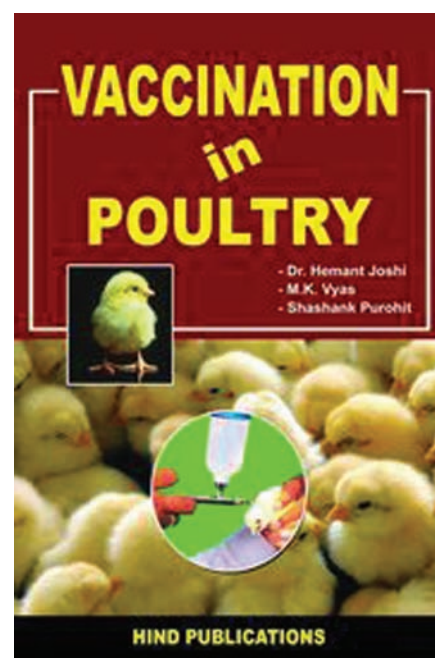
helping to build new operations for Aviagen, starting in Turkey with Ross Anadolu (now Aviagen Anadolu), and then in 2003 furthering the company's reach

in Asia, setting up the Bangkok office and Ross Siam JV, and also playing a role in establishing Aviagen Australia and New Zealand. “I always wanted to join the merchant navy and see the world. Instead I sold chickens, and saw the world and much more of it,” quipped Paul. “It has been a great adventure, and I am grateful to Aviagen, our customers and my colleagues throughout the industry for the opportunity to work alongside them, break new ground, help our customers grow their businesses, and have a lot of fun in the process.” “Despite his abundant accomplishments and contributions, Paul remains humble, always the gentleman and always willing to help others,” commented Marc. “Having the great pleasure of working alongside him through many Aviagen milestones, it is evident that, for Paul, it has always been about people – whether they are colleagues, customers, suppliers or acquaintances – and many around the world will retain fond memories long after his career ends. I thank Paul for the hard work, dedication and fun he has brought to us all and wish him every happiness in his retirement.” 

Vaccination in Poultry book Released by Mr. Chakradhar Rao



Book "Vaccination in Poultry" Published by Hind Publications and Authored by Dr. Hemant Joshi , Mr. Makrand Kumar Vyas and Mr. Shashank Purohit, has been released by Mr. Chakradhar Rao Potluri , President: IPEMA (Indian Poultry Equipment Manufacturers Association) and M.D ; Chakra Group of Companies. This book is an attempt to meet the needs of poultry farmers, practicing Veterinarians, consultants, Poultry entrepreneurs, students and faculty members of various veterinary University. This book is now available on www.hindpoultry.com





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Black Soldier Fly Larvae: A sustainable feed source for chicken

Shanmugam M and M.V.L.N. Raju

ICAR-Directorate of Poultry Research,
Rajendranagar, Hyderabad-30,
Telangana.

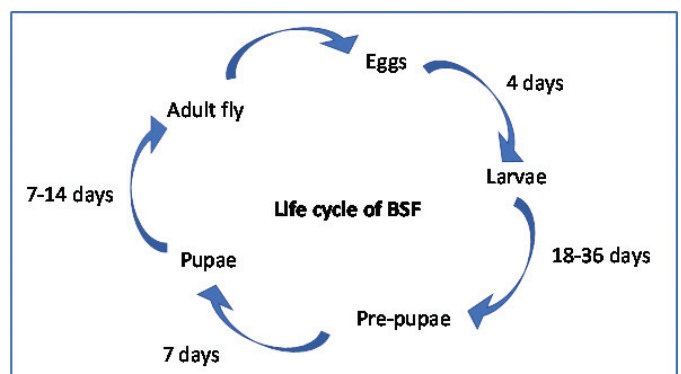
Insect rearing on human-inedible wastes and animal wastes is more environment friendly and efficient than growing fields of grains or other feeds. By this way, use of land and other resources is conserved and the same can be used to grow food for humans. There is increasing availability of organic waste from agricultural food chains, livestock production and households, which can be exploited for insect rearing. Insects reproduce quickly and grow fast resulting in higher biomass in a shorter period of time. Insects can be bred and reared in low-cost infrastructural facilities. Substituting soybean and fishmeal based protein components in chicken feed with insect biomass that is produced through efficient bioconversion of agricultural waste, provides a cost-mitigation strategy and facilitates sustainable nutrient-recycling. Insects have protein content of 40–60% on dry matter basis that is similar to that of soybean and fishmeal, besides great amount of fat (30-40%). Reports on supplementing insect meal in chicken diet replacing soybean meal (partially) or fish meal (fully) have not only indicated no-negative effects, but even higher growth rates in some studies compared to soybean and fishmeal. From the human consumption point of view, the insect fed chicken meat palatability and quality was not altered. Considering all the above information it is beneficial to rear and feed insects to poultry.

Black Soldier Fly (*Hermetia illucens*) (BSF) belongs to the family *Stratiomyidae*. The BSF is indigenous to the American continent, but presently it is widely distributed across the tropical, subtropical and temperate regions of the world. BSF larvae feed voraciously on a wide variety of organic matter that is of both plant and animal origin. The larvae grow well and consume food

at environmental temperature of 35°C and pupation occurs between 25-30°C. The BSF larvae develop rapidly at 70% humidity. The larvae do not survive well under direct light or in extreme dry or wet conditions. They prefer to be 8-9 inches deep in their food source. The female flies lay their eggs at sites that are aerobically maintained. The BSF larvae while maturing grow into ½-inch-long grubs. During this point of time they climb out of their food source and turn into pupae. The pupae can immediately be fed to chickens or can be dried and processed into feed for use at a later time.

Life cycle

A mature female BSF lays up to 600 eggs at a time in crevices or adjacent to decaying materials. The life cycle of BSF is divided into five stages, namely egg, larva, prepupa, pupa and adult. The eggs hatch in about four days and the larvae feed on a wide range of organic materials. The larval stage depending on the available feed, lasts for 18-36 days that then shifts to prepupal stage. This stage persists for about 7 days and pupae emerges. The prepupae migrates to a dry suitable pupation site and converts into pupae. The pupal stage lasts for 7-14 days and adult flies emerge. The adult is



Nutrient composition of BSF larva and pupa

Dry matter (%)	35-45
Crude protein (%)	39-43
Crude fat (%)	15-49
Crude fibre (%)	7
Ash (%)	14.6-28.4
Gross energy on DM basis (kcal/kg)	5278

Khan (2018);

Liu et al (2017)

black in colour and wings are smoky black in colour. Adult flies may resemble wasps, but are harmless due to absence of stinger. The adults do not have digestive organs, consume only water and rely on stores of body fat from the larval stage.

Nutrient composition

BSF larvae have valuable nutrient profiles that are highly suitable for partially replacing soybean and fully replacing fishmeal in diets of poultry.

The level of protein and fat content in BSF larva and pupa varies depending on the feed type and rate of feeding. In mature larval and prepupal stage, the crude fat content accounted for about 28%. There is alteration of saturated and

unsaturated fatty acids in the dry mass of individual BSF during development. The unsaturated fatty acid content progressively decreases during the development. At every stage of BSF life cycle, there is satisfactory high level of essential FAs, including linoleic and γ -linolenic acid. The appropriate levels of fatty acids in BSF have good application potential and make it a desirable supplement in animal diets. The dry matter rises from larval stage to pupal stage and then declines in the adult stage.

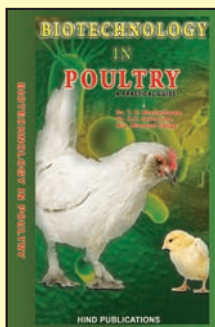
The prepupae are rich source of calcium and phosphorus. However, the levels of sodium, iron and zinc were higher in larval stage. The vitamin E level is high in larval and prepupal stages of

development. The larva and prepupa are reported to be the ideal stages for feeding chicken. The mature pupae have chitin, a polysaccharide that contains N, present in the exoskeleton. This chitin is indigestible in monogastric animals and therefore may affect the protein digestibility. Chitin may have some positive effect on the functioning of immune system in poultry.

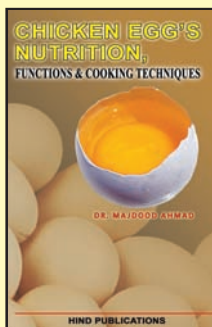
Supplementation in chicken feed

The BSF larvae meal nutrient composition is comparable to fish meal and can be replaced in broiler diets (Oluokun, 2000). When compared with soyabean meal (SBM), the larvae meal is better in some aspects and it can be supplemented along with SBM without affecting the growth performance of broilers. A recent report also suggested inclusion of BSF larvae meal up to 15% in broilers without affecting the performance and higher level of inclusion (30%) resulted in impaired performance (Hartinger et al. 2021). At inclusion

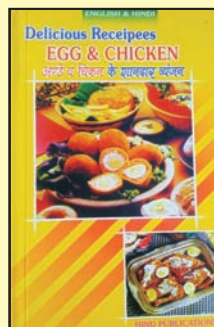
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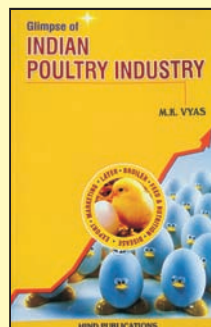
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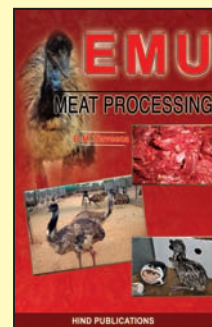
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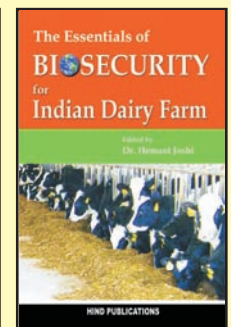
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Whole dried BSF larvae



BSF larval meal

level of 15% in the diet, there was no alteration in intestinal morphometry and caecal microbial metabolites. The partly defatted meal of dried BSF larvae supplementation upto 24% of diet for three weeks in laying hens had no adverse effect on egg production, feed intake, egg weight and feed efficiency (Maurer et al., 2016). In addition, there was no mortality and any health problems in the supplemented hens. There was higher faecal dry matter and increased black firm faecal pads.


In a study involving total replacement of soyabean meal with defatted SBF larvae meal in laying hens during 24-45 weeks of age, it was observed that in the larvae meal supplemented group there were higher percentage of eggs in most of the egg size groups, and levels of globulin and calcium in blood

(Marono et al., 2017). BSF larvae oil could be substituted for soybean oil in commercial layers (43 to 47 weeks and from 51 to 55 weeks of age) at inclusion levels up to 4.5% without affecting the feed intake, body weight, egg production, FCR, and egg weight (Patterson et al., 2021). The BSF larvae oil supplemented hens produced eggs with higher yolk color. In the same report it was mentioned that BSF larvae meal inclusion at levels of 8 and 16% in hens' diet did not affect production and was similar to soyabean meal control diet. The BSF larvae meal contained higher levels of true metabolizable energy and digestible amino acids when compared with commonly used feed ingredients (Matin et al., 2021).

In conclusion, BSF larvae meal can be a suitable alternative energy

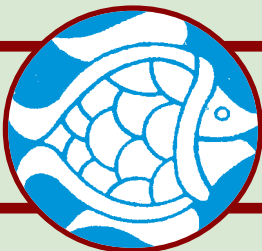
and protein source for commercial broilers and laying hens.

Advantages:

- The adult BSF will not be considered a nuisance as it is not attracted to human habitats or foods.
- BSF is neither considered a pest nor a vector for any disease-causing organisms.
- Colonization of poultry manure by BSF can reduce housefly populations by 94-100 percent. BSF make manure more liquid and modifies its pH, and thereby makes it less suitable for housefly larvae to grow. The presence of BSF in the manure or decaying material inhibits oviposition by the housefly. Thus, it can be used to manage the chicken manure in poultry farms and the housefly problem can be controlled.
- Larval digestion of decaying material or manure reduces the foul odour and harmful bacteria due to production of antimicrobial peptides.
- BSF larval protein could reduce oxidative damage and improve gut health of birds. 

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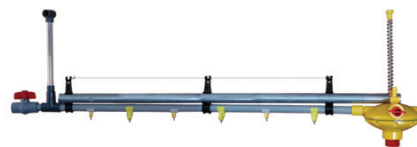
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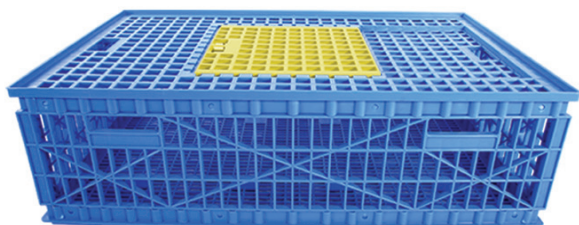
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Backyard poultry is an important source of supplementary income and nutritional security for poor households across the country. An improved variety for back yard poultry namely *Pratapdhan* birds were distributed to rural families of Scheduled Caste (SC) community to improve their livelihood and entrepreneurship in the year 2019-2020, in Jodhpur district of western Rajasthan. A total of 1200 chicks were distributed to 60 identified SC families free of cost. Each unit comprised of sixteen females and four male birds. The results revealed that the improved poultry strain *Pratapdhan* has an immense production potential in arid region under back yard system. The average expenditure on rearing of birds was calculated ¹ 31,635. The benefit cost ratio was recorded

areas (Sihag *et al.*, 2021). Backyard poultry widely accepted by the rural people is characterized by small flock size consisting of 5-20 birds predominantly non-descript birds maintained in extensive system (Joshi *et al.*, 2019). Rural poultry farming (RPF) provides high quality protein and supplemental income to the local population. Adapting the RPF in backyards of rural households can ensure the availability of eggs and meat in rural and underdeveloped areas; which will help in alleviating the incidence of protein deficiency in the vulnerable group (Women, Children, expectant mothers etc.). The native chicken varieties adopted in free-range backyard conditions for centuries about 11% of total egg production in our country (Rao *et al.*, 2005). The growing demand for indigenous poultry products and low



Effective way to enhance farmer income through rural Poultry farming - A success story

Pankaj Lavania¹ and Kailash Chand Bairwa²

¹ College of Agriculture, Jodhpur, Agriculture University, Jodhpur, Rajasthan.

² College of Agriculture, Baytu-Barmer, Agriculture University, Jodhpur, Rajasthan.

at 2.53:1 which appears to be very much economical and viable for rearing of birds under backyard system. It is a profitable and economic venture for resource poor families in terms of livelihood and entrepreneurship.

Keywords: Backyard farming, Poultry, Economic venture, Entrepreneurship, *Pratapdhan*

Introduction

Back yard poultry, a traditional system of poultry keeping is a part of livestock rearing practiced by rural folk since time immemorial. It is type of organic farming with no harmful residue in egg and meat and advantageous and provides supplementary income in shortest possible time with very minimum capital investment. Poultry rearing is simple in operation and ensures availability of egg and meat even in remote rural

investment in back yard poultry sector provides opportunity for the rural farmers (Regula *et al.*, 2021).

Therefore, it is necessary to test suitable chicken variety, which can thrive and survive in backyard free-range conditions without demanding expensive inputs like feed, disease management, predator menace, harsh and arid climatic conditions and consumer preference etc. Keeping these facts in view, an attempt was made to evaluate the performance of *pratapdhan* birds in backyard poultry farming in arid eco-system of Jodhpur district of Western Rajasthan.

Materials and methods:

The locale of the study is characterized by scanty and erratic annual precipitation (100-400mm), high evaporation rate (1500-2000mm), high temperature and

poor fertility of the soil. In addition to this frequent draught, extreme events triggered by climatic change may pose serious threat to survival of living being in arid region (Patidar *et al.*, 2014). College of Agriculture, Jodhpur has purchased faster weight gain and higher egg producing strain-*Pratapdhan* birds (6-8 weeks old) from MPUAT, Udaipur under ICAR, New-Delhi sponsored SC-SP project for entrepreneurship and to strengthen their livelihood and economic improvement of Schedule cast youth through backyard poultry farming. The strain-*Pratapdhan* birds are demonstrated for replacing the non-descript poor egg producing birds in rural households of Keru village of Jodhpur District. The participants were trained on all aspects of rural poultry farming before the distribution of 20 birds (Comprising 16 females and 4 males) to each selected respondent. Close monitoring were also follow-up by regular field visits of project staff member for technical backstopping. The performance of birds at household level was assessed by collecting the data on the basis of egg production up to 72 weeks of age were recorded. Egg production 'Data Card' was distributed to all selected respondents for maintaining records of daily egg production. At the age of 28 and 40 weeks, egg's weight were recorded by the Mettlor and Toledo balance (nearest to 0.01 gram accuracy). Further, egg mass was calculated using North's egg mass formula. A partial budgeting analysis measures were used for computation of expenditure and income generated from the demonstrated poultry units.

Results and discussion:

Sh. Deva Ram S/o Suntha Ram is non-metric Scheduled Cast farmer from Keru village of Jodhpur district of Western Rajasthan. He is traditional farmer engaged in agriculture also reared some non-descript poultry birds for domestic consumption and could not succeed due to lack of scientific knowledge on backyard poultry farming. He has participated in residential training programme organized at the college campus. He received one unit of 20 *Pratapdhan* birds comprised of (16 females and 4 males) and begun new journey of semi intensive poultry unit with technical input of SC-SP project, College of Agriculture, Jodhpur. These trainings instilled in his mind to do something that earns his bred and also give a message to the mass particular the youth. He constructed a poultry unit shed with using of locally available bamboo, thatch grass and pearl millet

straw as litter material for night shelter. He reported that hens laid 1869 eggs in 72 weeks of age. He reported that even the hens stop egg laying than after some selected fertilized eggs were placed for natural hatching blending with scientific practices. According to him 245 chicks were born, baby chicks were raised up to marketing the same. He reared the birds under backyard system supplemented with locally available some concentrate feed including crushed maize, rice, wheat, marble grit and supplement with *Azolla* (5%) and followed prophylactic measurement to reduce mortality and morbidity among the birds.

The means of body weight and other economic parameters of *pratapdhan* chicks showed better performance over the non-descript birds; in respect of average body weight of male ($2452.62 \pm 65.43\text{g}$) and female ($2150.45 \pm 84.34\text{g}$) at 21 weeks of age, average age at first egg lying (158.63 ± 1.12 days) in arid climatic condition. The results of present study are in accordance with the findings of Tailor (2017). A partial budgeting analysis measures was used in those items of expenditure and incomes. Therefore, the cost of feeds, medicines and equipment's has been considered. The recurring cost i.e. cost of feeding, prophylactic measurement, miscellaneous expenditure and income from sale of eggs and chickens are presented in Table-1. The total gross and net income earned from sale of eggs and birds for rearing of *pratapdhan* chickens were $1\ 79,920$ and $1\ 31635$ respectively. The benefit cost ratio (2.53:1) was revealed that poultry farming beneficial and viable under backyard farming system in the western part of Rajasthan. Rajbongshi *et al.* (2020) reported in their study that backyard poultry farming have the potency to improve the economic status of a large majority of tribal rural families in the study area. Because the selected progressive farmer was able to earn an annual net profit of $1\ 1,17600$ from poultry rearing as it is a low input or no input venture in the selected study area. Presently Sh. Deva Ram is a champion farmer in the field of backyard poultry farming in selected study area i.e. Keru. Now, he became a free launcher for advocating the importance of backyard poultry farming in the rural communities of adjoining areas. The meat and egg of *Pratapdhan* bird were highly accepted by the public and his success has motivated to the fellow villagers especially by the rural folk. Pioneering efforts would go a long way in driving their sistren towards sustainable growth.

Table 1: Economics performance of Pratapdhan birds in arid climatic condition.

Particulars	Cost involved
Cost of chicks (¹)	Free of cost(16+4)
Cost of feeding (¹)	26,500
Cost of medicines and miscellaneous (¹)	5,135
Total cost of rearing (¹)	31,635
No. of eggs produced	1887
No. of eggs consumed at home	410
Eggs sold@ ¹ 10/- egg	10,320
No. of birds died	27
Female birds culled & sold @ ¹ 200/-	25,600
Male birds sold @ ¹ 400/-	44,000
Total Eggs hatched by hen	445
Gross income (¹)	79,920
Net income	50,785
B:C Ratio	2.53:1

Source: Author's own computation

Conclusion:

Based on the facts, it could be concluded that Pratapdhan bird has an immense potential for rural poultry farming in arid climatic conditions. Moreover, it is not only viable to meet the nutritional security but also economic venture for resource poor farm families in terms of livelihood and economic security. It is also helped in checking the people migration to urban/semi-urban areas. The Government is making concerted efforts to create an ecosystem to support their hard work so that the farmers get optimum returns on a sustainable basis. It would go a long way encourage farmer across India to follow the recommended backyard poultry farming practices and enhance their income. Thus, paving




a way of sustainable livestock production for doubling of farmers' income in arid eco system.

ACKNOWLEDGEMENT:

The authors are thankful to the Dean and Faculty Chairman & Principal Investigator SC-SP project, Agriculture University, Jodhpur, for encouragement and providing facilities and are also thankful to Division Head, Animal Production, Rajasthan College of Agriculture, MPUAT, Udaipur for concrete suggestion and comments in this article.

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Indian Poultry Science Association (IPSA) held its elections to elect the new Executive Committee



The Indian Poultry Science Association (IPSA) held its elections to elect the new Executive Committee of the Association.

Dr. A. S. Ranade, Dean, Mumbai Veterinary College, MAFSU, Nagpur is elected as President unopposed. Four Vice Presidents elected are Dr. D. Kannan, VCRI, Udumalpet, Dr. Deben Sapkota, CVSC, Guwahati, Dr. Sanjeev Kumar, ICAR-CARI, Izatnagar and Dr. Jeetendra Verma, Bangalore. Dr. Jagbir Singh Tyagi, ICAR-CARI, Izatnagar and Dr. Avishek Biswas, ICAR-CARI, Izatnagar were elected as General Secretary and Treasurer respectively unopposed.

The General body also elected following 11 executive members:

Dr. S. C. Edwin, VCRI, Tirunelveli, Dr. Mukund Kadam, Nagpur Vety College, Nagpur, Dr. Surya Kanta Mishra, ICAR-CARI-RC, Bhubaneswar, Dr. M. Hanumanta Rao, College of Vety Sci., Hyderabad, Dr. Krishnamurthy T. N., Vety College, Shivaaamogga, Dr. T. Sujatha, ICAR-CIARI, Port Blair, Dr. Amitav Bhattacharyya, DUVASU, Mathura, Dr. K Nagaraja Kumari, NTR College of Vety Sci., Gannavaram, Dr. Chandra Deo, ICAR-CARI, Izatnagar, Dr. Om Prakash Dinani, College of Vety Sci., Anjora, Durg and Dr. Giriraj Goyal, College of Vety Sci., Rewa.

In India, the winter season follows the rainy season and can be marked with cold weather. Winter season in India lasts between November to February. Northern India experiences the most severe cold season, where environment temperatures can drop below 15°C with nighttime temperatures as low as 5°C. Southern India usually experiences milder winter weather and low temperatures are not a major concern. Winter season brings unique challenges for brooding chicks. Cooler environmental temperatures can affect nutrition programs because of the bird's higher energy requirement to maintain body temperature. The effects of decreasing photoperiod and light intensity during the winter can affect sexual maturity, resulting in delays in egg production. Poor air quality can occur as farmers close curtains to maintain house temperature. Cool air slows down the drying of manure, leading to increased ammonia levels within the shed and can increase the fly menace. Poor air quality and cooler temperatures can increase the disease threat during the winter season.

Table 1. Weather Conditions in Different Regions of India during Winter

December Month Average	North India (New Delhi)	Central India (Mumbai)	South India (Hyderabad)
Maximum temperature °C	23°C	32°C	28°C
Minimum temperature °C	9°C	19°C	15°C
Average humidity %	62%	58%	57%
Average hours of sunshine per day	7 hours	8 hours	8.5 hours
Management attention	High priority	Medium priority	Low priority

Source: <https://www.currentresults.com/Weather/India/temperature-december.php>

The following intervention strategies should be considered during winter season:

Brooding and Growing Management:

1. Chick brooding requires special attention during winter. Brooding shed arrangements should be ready before 48 hours of chick placement. This is important because it will take a longer time to preheat the chick's environment during the winter season. Ensure the shed and equipment is heated to 35°C environmental temperature. Relative humidity should be maintained between 40–60%.
2. Be aware of low nighttime temperatures during the winter season. Cold stress usually occurs during the night and early morning. Maintaining proper chick brooding temperatures throughout the night can be challenging in the winter season. This is especially difficult for farmers using charcoal heaters or other sources of heat without thermostatic control. Thermostatic control of brooding shed temperatures is highly recommended to avoid cold stress during the night time. Low nighttime temperatures can chill chicks, which can impair their growth and organ development. Cold stressed chicks are more susceptible to infectious diseases. Use a thermometer that is capable of recording nighttime temperatures in the brooding shed.



Figure 1. Brooding management.

3. Frequently observe the activity of chicks and adjust temperatures to the comfort of the chicks. Chicks should be distributed evenly inside the cage. Under cold stress the chicks are huddled in groups, not eating and drinking and with less activity. For more information on W-80 brooding management, refer to the "[Growing Management of Commercial Pullets](#)" technical update at www.hyline.com.
4. An infant ear thermometer can be used to measure the vent temperature of chicks. This gives a good indication of the comfort of the chicks and correlates well with the chick's core body temperature. The normal vent temperature in chicks should be 39.4–40.5°C.



Figure 2. Monitoring chick temperature using an infant ear thermometer.

5. During the brooding period, place starter crumble feed on the cage paper for first 3 days to encourage feed consumption. Cage paper blocks cold drafts of air. For infrared beak treated (IRBT) chicks, place starter crumble on the cage paper for first 7 days. Checking chicks for the presence of feed in the crop helps understand feed consumption. The presence of feed in the crop is a good indication of a proper chick start (see Figure 3).
6. During peak winter where environment temperature drops below 10°C, the drinking water temperature drops close to freezing. Drinking water temperature has a direct effect on the bird's feed and water consumption and slows body weight gains in growing chicks. Poor water consumption can also increase mortality related to dehydration and gout. The ideal water temperature to maintain good feed intake is 18–21°C.

CROP FILL – ARE THE CHICKS EATING?	
Hours after chick placement	Chicks with feed in crop
6	75%
12	85%
24	100%

Chick with starter feed in crop Chick without starter feed in crop

Figure 3. Desired crop fill percentages.

7. The shortest daylength of the year falls on December 21st. The shortest daylength in India ranges from 10–11 hours, with North India having the shortest among all regions (see Table 1). The ideal hours of light during the rearing period for the W-80 is 11–12 hours. Rearing lighting hours need to be maintained at recommended levels for pullets in order to achieve ideal body weight gain and sexual maturity. This will be done by following the Hy-Line International / Srinivasa Farms Lighting Program Generator. This is an Excel tool which creates lighting programs appropriate for the farm location and shed style (open or EC shed). These customized lighting programs can be provided to commercial customers with their chick placements. For further information, see <https://www.hyline.com/ViewFile?id=d14081e1-8af8-49f1-a752-71720d4b5680> or contact Srinivasa Farms' technical service team or Hy-Line India's technical service team.
8. Provide adequate ventilation in brooding house for 24 hours in the winter. Do not close the brooding area too tightly while maintaining brooding temperatures during the winter. Always provide a continuous supply of fresh air to the birds by maintaining some opening of the curtains. The minimum ventilation rate during the winter must be sufficient to remove moisture and prevent the build-up of noxious gases in the brooding area. Ammonia greater than 25 ppm is harmful to chicks and can promote respiratory disease outbreaks. Coal heaters are commonly used in India as a heat source in brooding sheds and they produce large amounts of carbon dioxide (CO₂), carbon monoxide (CO), and other undesirable gases inside the house. It is recommended to have a minimum opening (one foot) at the top level of the curtains to provide minimum ventilation even during nighttime. During the middle of the day, the side curtains can be adjusted according to temperature and chick comfort.
9. Allowable levels of gases at the bird level in the shed are: ammonia (NH₃) <25 ppm; carbon dioxide (CO₂) <5000 ppm; carbon monoxide (CO) <50 ppm.
10. Bird transfers from brooding to rearing sheds and rearing laying sheds should be completed no later than 7 weeks and 16 weeks, respectively. Timely transfers give the birds enough space to continue proper growth and development and enough time to adjust to the new environment. During the peak winter season, schedule transfers to occur during mid-day when the temperature is more comfortable for the birds.

Layer Management:

1. Feed intake is generally higher in winter months as a result of increased demand for energy to maintain body temperature. Protein and amino acids should be balanced based on the actual flock feed consumption. Overconsumption of energy, protein and amino acids beyond the recommended level can lead to deposition of extra fat which predisposes bird to fatty liver / hemorrhagic syndrome (FLHS), as well as increases egg weight. Energy requirements tend to be slightly higher during winter, so it is important not to decrease the energy levels at the same proportion of the feed intake increase. See the W-80 flock book provided by Srinivasa Farms for the nutritional recommendations of the W-80.
2. Increased feed intakes during winter could lead to increased egg weights. Overconsumption of energy, methionine + cystine, other digestible amino acids, linoleic acid, and total fat can directly increase egg size. Egg weights should be monitored every week during winter and appropriate adjustments to the diet made to control egg weight.
3. Stone grit management may help in controlling feed intake and maintains eggshell quality if egg weights increase. Vitamin D supplementation during winter may be needed due to poor brightness of sunlight. Follow the W-80 recommended levels of vitamin D3 (3,300,000 IU per ton of feed – Rearing and laying phases).
4. Decreasing the feed particle size of less than 700 microns and including fibrous ingredients to the feed formulation is the best way to control feed intake.
5. In addition to shorter daylength, foggy conditions with lower light intensity are common in winter. Average hours of sunshine are less during winter months (November to February). North India records the lowest hours of sunshine compared to other regions (see Table 1). Increased use of curtains during the winter to protect birds from cold stress blocks sunlight and further reduces the light intensity inside the shed. With lower brightness inside the shed, it is good practice to use the house lights to maintain recommended light intensity (30 lux) inside the layer shed.
6. Keep light intensity optimum by cleaning dirty bulbs and replacing faulty bulbs. This work should be done before the arrival of winter.
7. Adult laying birds are also susceptible to cold stress. In open-sided laying houses, it is recommended to use side curtains to protect birds from direct exposure to cold stress. The side curtains are managed in such a way to protect birds from cold stress as well as to provide minimum ventilation to remove excess ammonia buildup. Curtains should be allowed minimum opening (one feet) at the top level of the shed even during nighttime, and during the middle of the day, partial opening at the side can be practiced based on bird comfort (see Figure 4).
8. Decreasing day length during the winter may delay pullets from coming into egg production. Timely shifting of the flock to the laying shed and on-time light stimulation at the correct body weight (1100g with 85% uniformity) prevents a delayed start of egg production. A timely transition from the developer or pre-lay diets to the peaking diet ensures that egg production begins properly, avoiding egg production delays.
9. Cold air slows down the drying of manure and removal of moisture from the shed. This can cause excess ammonia gas build-up in laying sheds in the winter. High ammonia is also caused by nipple leakage and lack of ventilation due to closed side curtains. This problem will be more pronounced in farms where the height of the manure is close to bird level. Remove manure and replace faulty nipples prior onset of winter to avoid conditions of high ammonia.



Figure 4. Lowering the curtain at the top creates better ventilation.

10. Cold weather and reduced air quality favors multiplication of pathogens, especially respiratory pathogens. Incidences of avian influenza, Newcastle disease, Gumboro (IBD), fowl pox, colibacillosis (E. coli), infectious coryza, gangrenous dermatitis, salmonellosis, and coccidiosis are more common in winter. Following good winter management with good biosecurity and timely vaccinations to control disease outbreaks.
11. Vaccinations should be carried out in the daytime during peak winter (December and January) when the temperature is ideal. In case of water vaccination, water holding time before vaccination should be increased from 30 minutes to 1 hour since water consumption is normally lower during winter. Water volume used for water vaccination should be matched with actual water consumption.

Management Chart:


Management Practices	North India Farms	Central India Farms	South India Farms
Brooding management	High attention	Medium attention	Medium attention
Water management	High attention	Medium attention	Low attention
Feed management	High attention	Medium attention	Medium attention
Lighting program	High attention	Medium attention	Low attention
Ventilation	High attention	Medium attention	Low attention
Manure management	High attention	Medium attention	Medium attention
Disease control	High attention	High attention	High attention
Bird transfer	High attention	Medium attention	Medium attention

Hy-Line International announces the joining of Dr. Marimuthu Ravindran as the Senior Technical Service Manager for team Hy-Line India.

Hy-Line International, the world leader in layer poultry genetics, has announced that Dr. Marimuthu Ravindran will join the Hy-Line India team as the Senior Technical Service Manager. In this role, he will provide technical service to customer farms, gather field data, and support improved layer performance of the Hy-Line W-80 variety customized to India. “Dr. M. Ravindran’s 25 years of layer experience and multilingual skills will support Hy-Line India distributors and technical teams to reach the maximum genetic potential of Hy-Line varieties,” said Ramakrishna Balasubramanian, Hy-Line India Business Manager. “We will continue to uphold Hy-Line’s global, yet local initiatives by driving commercial and parent stock sales with additional technical resources and dedication to our customers.”



Prior to joining Hy-Line International, Dr. M. Ravindran has worked in all generational levels of the poultry industry in India for over two decades. His management experience extends to commercial, parent stock and grandparent farms, while providing technical, marketing, and sales support. Founded in 1936 by Henry A. Wallace, Hy-Line was the first poultry

breeding company to apply the principles of hybridization to commercial layer breeding. Today, Hy-Line International continues to be a pioneer as the first company with its own in-house molecular genetics team leading the industry in application of DNA-based technology to its breeding and genetics program. Hy-Line produces and sells both brown, tint and white egg stock to more than 120 countries worldwide and is the largest selling layer around the world. 

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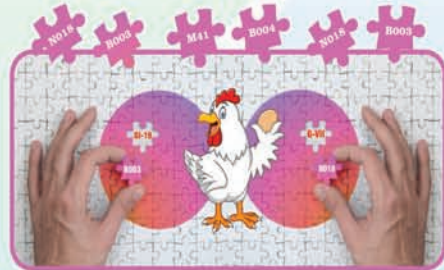


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