

# Poultry Fortune

Estd. 1991

• Production • Nutrition • Management • Marketing

October 2022

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Using non antibiotic  
additives, acidifiers,  
enzymes ...



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Forum brings 'Gut Health  
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**GLOCREST  
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Meet & Get-Together  
at Mysore**

**New Generation Poultry  
Production: Using Blue  
Sky Technologies**

**Effects of Ammonia and  
its Alleviating Measure  
in Poultry House**

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- Editor



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# Using non antibiotic additives, acidifiers, enzymes and protected organic acid can help to control many gut pathogens and improve beneficial microbes in the Gut

One of the biggest complaints currently raised in poultry industry apart from flies that is the smell of the poultry manure. Ammonia is the reason for this smell and it is harmful for both birds and workers inside the farm. I believe in this article you can be able to understand how Ammonia gas formed inside the poultry house and its impact and its alleviating measures for better production. Ammonia control is a complex topic in poultry, but with combination of good ventilation in house and with good management, this issue can be successfully overcome at any time at any cost.

*The advancement in science in every field is fast approaching and specifically its application in poultry production has caught the attention of many learned poultry farmers. The automation has given boost to increase the operational capacity to many folds. A simple example is change over from deep litter to cage system, to present environmentally controlled units and introduction of automated feeding and watering systems.*



Dear Readers,

The October 2022 issue of **Poultry Fortune** is in your hands. In the news section, you may find news about ....

**Mr Rajesh Babu,**  
**Chairman, GLOCREST**  
**Pharmaceutical Pvt**

**Ltd** says that GLOCREST and its peers have more than half a century of combined expertise in the development and manufacturing of nutritional products. Our customers include everyone from small and large farmers to integrators and dealers and we aim to provide them with nutritional solutions that ensure maximum animal health and performance. GLOCREST launched pharma products in poultry division. GLOCREST conducted 'Farmers Meet and Get-Together' at Mysore. Dr Ramdas Kambale, CEO of the company said that its future plans are based on its tagline 'Innovation for a Better Health'. The company has robust pipeline of projects which will be of the highest quality and still an affordable for the farmers and stakeholders.

**Alltech Biotechnology Pvt Ltd** announced its 8<sup>th</sup> annual Art Contest for school children. The Alltech India competition will accept entries from

September 16 to October 14, 2022. To let help young minds imagine the boundless possibilities for a sustainable environment and economy, the Alltech India Art Contest 2022 asks children to create on the theme **India 2050 "Now vs. the Future": Nurturing nature for a better future**. Dr Sayed Aman, Managing Director - India, Regional Director - South Asia said that sustainability is a big concern for the entire planet and to address this there is a need for technological innovations and stringent policies. To achieve energy efficiency, carbon neutrality and sustainable economic growth, India must invest towards the sectors that highlight green initiatives.

**Novus International** hosted a series of forums titled 'Gut Health Optimization in Poultry' in the cities of Coimbatore and Hyderabad on 25 and 26 August 2022. Novus hosted these events to provide insight on how to help support good gut health in poultry. The key note speaker Dr D. Chandrasekaran, a retired professor of animal nutrition at TANUVAS, said about the importance of gut health, emphasizing that maintaining gut health is the first priority for every nutritionist in poultry industry. Linked to better immunity, nutrient utilization, improve digestibility and overall performance of the birds, gut health is the most important factor. Using non antibiotic

*Contd on next page*



## Poultry Fortune

### Our Mission

**Poultry Fortune** will strive to be the reliable source of information to poultry industry in India.

**PF** will give its opinion and suggest the industry what is needed in the interest of the stakeholders of the industry.

**PF** will strive to be The Forum to the Stakeholders of the industry for development and self-regulation.

**PF** will recognize the efforts and contribution of individuals, institutions and organizations for the development of poultry industry in the country through annual Awards presentation.

**PF** will strive to maintain quality and standards at all times.

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additives, acidifiers, enzymes and protected organic acid can help to control many gut pathogens and improve beneficial microbes in the gut.

**Vets In Poultry** in its 4th AGM and Symposium at Lonavala on 27 & 28 August 2022 focused on the theme '*Paradigm of possibilities and passion*' that will foster the growth and development of poultry farming in India. Dr Ajay Deshpande, President, VIP, mentioned the key achievements by the Vets In Poultry team viz amendment in bird flu draft, promotional activities, the step towards opposing misleading advertisement about chicken and eggs and at the same time he dragged attention towards working on issues like re-emerging diseases and providing solutions for it is the prime duty of members of Vets In Poultry. The lifetime achievement award for the Year 2022 was presented to Dr D. Chandrashekar, Retired Prof & Head, Department of Animal Nutrition, TANUVAS, Namakkal.

**Srinivasa Farms Pvt Ltd** informed through a note that it is now a Great Place to Work-Certified. Nearly 500 members of Srinivasa Farms from all locations in India from Supervisor to Senior Management took part in this survey. Srinivasa has earned this recognition based on a rigorous assessment independently conducted by Great Place to Work Institute India. Suresh Rayudu Chitturi, VC & Managing Director, Srinivasa Farms said that This is a super proud moment for us. More importantly I am so grateful to my team who have reposed their trust and endorsed the culture that me and family have been working to build in the last 55+ years.

**In the Articles section – New Generation Poultry Production: Using Blue Sky Technologies**, authored by Dr R.N. Sreenivas Gowda, Former and Founder VC, KVAFSU, Bidar, Karnataka, said that - Globally there is great demand for poultry meat and eggs. This sector needs to evolve and innovate in line with the demand decreasing the production costs. The advancement in science in every field is fast approaching and specifically its application in poultry production has caught the attention of many learned poultry farmers. The automation has given boost to increase the operational capacity to many folds. A simple example is change over from deep litter to cage system, to present environmentally controlled units and introduction of automated feeding and watering systems. Currently application of computer based technologies in feed formulations, egg and meat production has generated a big data on all operations. Automation can be used to replace manual labour on poultry farms when it comes to repetitive tasks like checking bird welfare, vaccinations and managing litter. However, the latest technologies will change the future farming systems if they are used properly looking in to the economic implications in adopting newer technologies. This article enlightens some of the computer based technologies in smart future poultry production.

Another article titled **Use of Bacteriophages in Poultry industry**, authored by Dr Lulu Gonmei and Dr Sophia Inbaraj, Division of Veterinary Bacteriology and Mycology, ICAR – Indian Veterinary Research Institute, Bareilly, Uttar Pradesh, discussed that Bacteriophages, also known as phages, are bacterial viruses that only infect bacterial cells. They are discovered more than a century ago by Frederick Twort and then by Felix D'Herelle. Phages can be found in a wide range of environment including faeces, sludge, sewage, seawater, soil and anywhere where bacteria may grow. A typical bacteriophage structurally composed of head packed with genetic materials, long tail with collar, a based plate with short

spikes and tail fibers. The phages will attach on the receptor present on the surface of susceptible bacterial host and lysed the bacteria, releasing many progeny phages ready to infect new bacterial cells. Phages typically infect specific strain or species of bacteria, but some are polyvalent, meaning they can infect more than one species or strain of bacteria.

The raising emergence of multidrug-resistance (MDR) pathogens and antibiotic resistance accompanied by negligible development of new drugs to combat this issue has raised concerns worldwide. Since MDR can be transmitted from food-producing animals to humans through direct contact or through the food chain and the environment, there is an immediate need for the search of alternatives. Bacteriophage as biocontrol can serve as an additional tool in a multi-hurdle approach to prevent foodborne pathogens from reaching consumers, and this method is especially promising under circumstances when food processors strive to preserve the natural and often beneficial, microbial population of foods and to only remove the bacteria that may cause illness.

Article titled **Effects of Ammonia and its Alleviating Measure in Poultry House**, authored by G. Vignesh, B.Tech (Poultry Production Technology) and MBA, ABIS Exports Private Limited, Karnataka, discussed that India is one of the fast growing nations among the world, at the same time it is expected to reach a total population of 1.5 billion by 2030 and 1.66 billion by 2050, the UN said. The Indian livestock sector currently contributes 25.6 % to the agricultural GDP and 4.11% to the national GDP which is far below the potential it holds. The poultry sector alone contributes Rs 1.3 lakh crore to the GDP. In future there will be increasing demand for high quality protein foods.

Poultry is one of the cheapest protein sources available to every household people in India. So, we are in the zone of producing good quality protein to the people. One of the biggest complaints currently raised in poultry industry apart from flies that is the smell of the poultry manure. Ammonia is the reason for this smell and it is harmful for both birds and workers inside the farm. I believe in this article you can be able to understand how Ammonia gas formed inside the poultry house and its impact and its alleviating measures for better production.

Ammonia control is a complex topic in poultry but with combination of good ventilation in house and with good management, this issue can be successfully overcome at any time at any cost.

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Readers are invited to send their views and comments on the news, special feature and articles published in the magazine which would be published under "Readers Column". Time to time, we shall try to update you on various aspects of Poultry sector. Keep reading the magazine Poultry Fortune regularly and update yourself. Wish you all fruitful results in your efforts.

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## Novus International to Shift from Direct Sales in China

### SAINT CHARLES, MO:

On August 30, 2022, Novus International, Inc., announced plans to change to an indirect business model in the China market. Company leaders said they are working to establish channel partners to continue serving customers in that country.

This change is part of the international feed additive company's drive to better serve those in its core markets through its strategic business plan, Project Destiny.

"This critical business

decision allows us to focus on the expansion of our business in Asia and focus our direct investment where we have tremendous growth potential" says Dan Meagher, Novus CEO and president. "Our investment and focus on our core Asia markets have never been stronger."

While this decision will allow the company to invest in other parts of Asia, Novus leaders recognize the importance of their customers in China and the country's own

vital position in the animal protein industry.

"We are actively working to identify potential partners/distributors to serve our customers in the China market and represent our product portfolio" says Vaibhav Nagpal, Novus managing director for Asia.

Headquartered in the United States, Novus develops, manufactures, and commercializes feed additives for the animal protein market globally. The company entered the Asia market in 2003.

The decision to change business models in China is aligned with Novus's business strategy to simplify operations and invest in markets that are aligned with its core strengths for driving sustainable growth.

"We must continue to transform and position ourselves for further growth and increased success in markets that allow us to stand out with differentiated products and unique offerings" says Meagher.

For more information about Novus and the solutions it offers for poultry, aquaculture, and livestock producers, visit [www.novusint.com](http://www.novusint.com).

## Novus to host Breeder Nutrition and Management Webinar Series

*The free online event for the poultry industry is scheduled for 17-20 October 2022*

### SAINT CHARLES, MO:

Novus International will host a four-day global webinar series called **Breeder Management & Nutrition** from 17-20 October 2022. This live digital event will feature 11 authors from the company's latest publication titled **Breeder Management and Nutrition: Moving the industry forward**, which debuted at the World's Poultry Congress 2022.

"The response to the book was really overwhelming. We had a standing-room-only crowd at WPC in Paris that solidified breeder

nutrition and management information are topics the industry both wants and needs," says Sandrine Durox, Novus poultry solutions manager for EMEA and book co-coordinator. "We want to extend the energy and knowledge sharing with people around the world. A webinar was the perfect answer."

Each day features a different topic from the book presented by the researcher, academic, industry expert, or breeding company representative that wrote the corresponding chapter.

- 17 October: **Breeder management and nutrition** with presentations from Rick Van Emous of Wageningen Livestock Research, Edgar Oviedo of North Carolina State University, Dinabandhu Joardar of Cargill, and Silvia Peris of Novus
- 18 October: **Feed restriction** with presentations from Aitor Arrazola of Purdue University, Rick Van Emous of Wageningen Livestock Research, Henk Enting of Cargill, and Manish Singh of Novus
- 19 October: **Epigenetics** with presentations from Juxing Chen of Novus,

Rebecca Forder of the University of Adelaide, and Johan Buyse of KU Leuven

- 20 October: **Genetics** with presentations from Juan Carlos Abad of Cobb, and David Caverio of H&N

Each session is just an hour and 40 minutes long starting at 7:00 a.m. CDT, making it possible for people around the world to participate. The daily sessions include a live Q & A with presenters. The webinar series will also be available for on-demand viewing for those who register.

For more information and to register for one session or all sessions, visit <https://novusint.co/breederwebseries>.

To learn how to download a digital copy of Novus's book **Breeder Management and Nutrition: Moving the industry forward**, visit [www.novusint.com](http://www.novusint.com).



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# GLOCREST Pharmaceutical conducts Farmers Meet & Get-Together at Mysore



*Dr Ramdas Kambale, CEO and Board Member addressing the gathering*

**Karnataka:** GLOCREST Pharmaceutical Pvt Ltd conducted “**Farmers Meet and Get-Together**” at Hotel Le Ruchi - The Prince on August 25, 2022. Meeting was well organised by Dr Ramdas Kambale, CEO and Board member of GLOCREST and his team. Farmers meet was attended by all key stake holders from poultry industry from and around Mysore which included poultry farmers, Members of breeder farms, integrators and

veterinarians. GLOCREST family welcomes all the delegates.

Dr Ramdas Kambale, CEO and Board Member of GLOCREST has introduced about the specialities of the company and its future plans based on its tagline ‘**INNOVATION FOR A BETTER HEALTH**’. Company has robust pipeline of the projects which will be of the highest quality and still an affordable for the farmers & stake holders. Eventually, it was company’s first regional

get together after its mega launch in June.

Company’s Chairman Mr Rajesh Babu honoured

farmers and addressed gathering related current scenario of poultry industry in India and new challenges in poultry industry and role of GLOCREST Pharmaceutical Pvt Ltd.

GLOCREST is a global animal health venture of Krishna Group – prestigious poultry and agricultural conglomerate. Being an industry pioneer, GLOCREST and its peers, has more than half a century of combined expertise in the development and manufacturing of nutrition products. Our customers include everyone from small and large farmers, to integrators and dealers. We aim to provide them with nutritional solutions that ensure maximum animal health and performance. GLOCREST launch innovative Pharma products in poultry division.



*From left: Rajesh Babu, Chairman, GLOCREST Pharmaceutical Pvt Ltd interacting with farmers.*



*A view of farmers and others participation in the programme.*



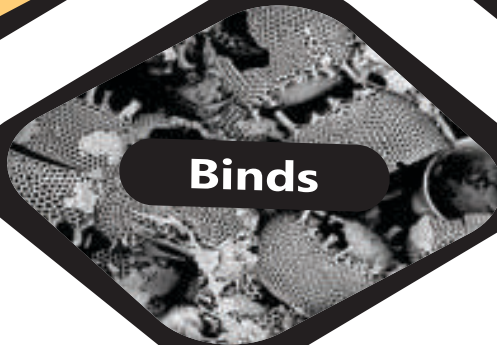
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# Alltech launches 8<sup>th</sup> Annual Art Contest, invites nationwide participation from school children

**Bangalore:** Alltech, a leading global animal health and nutrition company, announces its 8th annual Art Contest for school children. The Alltech India competition will accept entries from September 16 to October 14 2022.

India is an emerging and developing country with one of the fastest-growing economies in the world. It has the fifth-largest GDP globally and the third largest in Asia. However, despite an expected average annual economic growth of 7.4% (22–23), India faces significant challenges, including immense utilization of natural resources, which has prompted it to make great efforts toward a green and decarbonized economy.

To let help young minds imagine the boundless possibilities for a sustainable environment and economy, the Alltech India Art Contest 2022 asks children to create on the theme **India 2050 “Now vs. the Future”: Nurturing nature for a better future.**

Launching the competition, Dr Sayed Aman, Managing Director - India, Regional Director - South Asia, said, “Sustainability is a big concern for the entire planet and to address this there is a need for technological innovations and stringent policies. To



achieve energy efficiency, carbon neutrality and sustainable economic growth, India must invest towards the sectors that highlight green initiatives.”

Requoting the lines of Paul Polman, speaker at the Alltech ONE conference 2022, Dr Aman continued, “We cannot choose between growth and sustainability — we must have both.”

## Who can participate in the Alltech India Art Contest 2022?

Students aged between 5 to 16 years.

## Timeline

The contest is open from September 16 to October 14.

## Submission:

Submission is online. Entrants will upload a scanned image of the artwork to the contest website by filling out all the relevant details requested on the page.

Check out the link below to participate and learn more about the Alltech India Art Contest 2022.

**Website link:** <https://www.alltech.com/en-in/about/events/alltech-india-art-contest-2022>

## Online submission rules:

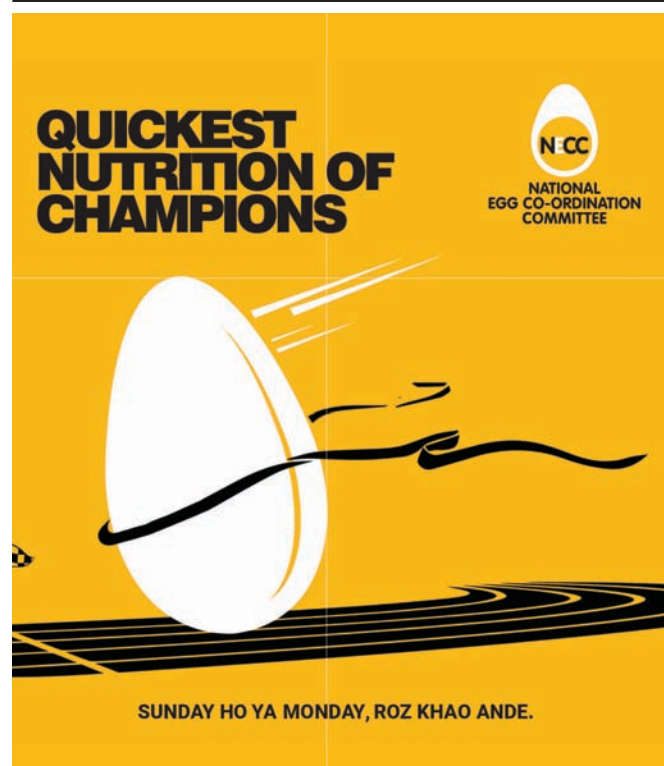
- The artwork must be on drawing paper of A4 size.
- Acceptable media include crayons, watercolours, oil paints, acrylic paints, coloured posters, coloured pencils and pastels.

- The theme, India 2050 “Now vs. the Future”: Nurturing nature for a better future, should be the focus of the artwork.
- Entries should be submitted online. Entrants will upload a scanned image of their artwork to the website, filling in all the relevant details requested on the page. Please do not send your original artwork unless Alltech asks for it.
- The artist must leave the artwork unsigned.

## Prize

Winners are selected by a panel of judges and a Facebook contest and will be rewarded with a cash prize. The winning paintings will also be featured in the Alltech India 2023 calendar.

For more details, please contact your local Alltech Sales Manager or Email: [alltechartcontest@alltech.com](mailto:alltechartcontest@alltech.com)



Courtesy: NECC



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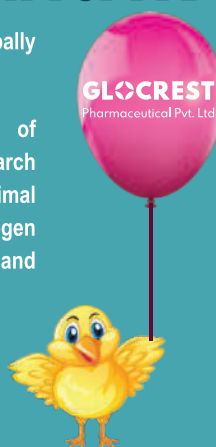
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# Novus Knowledge Forum brings 'Gut Health Optimization in Poultry' to Coimbatore and Hyderabad

*Compelling evidence for science-based nutrition in antibiotic-free conditions*

**Bangalore:** In an effort to share knowledge on how gut health can impact poultry production, Novus International host edits second in a series of forums titled 'Gut Health Optimization in Poultry' in the cities of Coimbatore, Tamil Nadu and Hyderabad, Telangana on 25 and 26 August 2022, respectively.

Coimbatore and Hyderabad are prominent poultry-producing areas in India. Both markets consist of strongly integrated farming, commercial feed mills and a mix of layer farms. With increases in demand for broiler meat and eggs, the challenges of getting good quality raw feed materials at a competitive price are increasing. Due to the use of lower quality feed and other factors, maintaining good gut health is another challenge for poultry producers. Fortunately,



**Dr Manish Kumar Singh,**  
*Director of Strategic Marketing for Asia*

there are certain organic acids and essential oil complexes that have become important tools to help optimize the gut health of birds. Novus hosted these events to provide insight on how to help support good gut health in poultry.

The two Novus Forums received an overwhelming response with over 100 attendees including integrators, feed millers and layer farmers along

with eminent knowledge / thought leaders from the poultry industry. The key note speaker in the seminar was Dr D. Chandrasekaran, a retired professor of animal nutrition at TANUVAS (Tamil Nadu Veterinary and Animal Sciences University). Having published over 75 scientific articles in national and international journals, Dr Chandrasekaran is a renowned thought leader, nutritionist and

researcher in India and the subcontinent.

At the event, Dr Chandrasekaran talked about the importance of gut health, emphasizing that maintaining gut health is the first priority for every nutritionist in the poultry industry. Linked to better immunity, nutrient utilization, improve



**Dr D. Chandrasekaran,**  
*Retired Professor of Animal Nutrition at Tamil Nadu Veterinary and Animal Sciences University*



**Neeraj Kumar Srivastava,** *Managing Director, South & Central Asia*  
welcoming the Speaker, Dr D. Chandrasekaran



*A view of gathering at the Coimbatore meet*





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digestibility and overall performance of the birds, gut health is the most important factor. Using non antibiotic additives, acidifiers, enzymes and protected organic acid can help to control many gut pathogens and improve beneficial microbes in the gut, he said.

During the event, Dr Manish Kumar Singh, Director of strategic marketing for Asia briefed the audience about Novus International and its strong presence and foundation in feed additive products



**Reena Rani L C, Novus Senior Marketing Communication Specialist – South Central Asia**

based on science and research.

The sessions were moderated by Reena Rani L C, Novus Senior Marketing Communication Specialist – South Central Asia.



**Dr Rajesh Kharvi, Novus category marketing manager in APEC**

Dr Rajesh Kharvi, Novus category marketing manager in APEC, explained how Novus gut health solutions are unique and help poultry producers to maximize their profit by reducing the pathogen load in the intestine. He talked about the various trials Novus has conducted, showing the efficacy of



**Neeraj Kumar Srivastava, Managing Director, South & Central Asia interacting with customers**

Novus solutions – particularly eubiotic solutions AVIMATRIX feed supplement and NEXT ENHANCE 150 feed additive – in controlling pathogens and increasing beneficial bacteria in the gut. “Novus believes in providing to our customers solutions with demonstrable value. With our unique eubiotic solutions for optimizing gut health and farm profitability, we are strategically well-positioned to serve our customers and increase their profits,” he told the group.

AVIMATRIX is created with Novus premium blend technology, utilizing a high concentration of benzoic acid embedded in a matrix that helps with homogeneous dispersion and the slow and continuous release of active ingredients along the entire intestinal tract of the bird. Due to its composition, AVIMATRIX® is dustless, free-flowing and non-corrosive, which allows the active antibacterial ingredients to be delivered in the lower part of the intestinal tract.



**A view of gathering at the Hyderabad meet**



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**Dr Krishnamurthy, Sales Director, Novus India**



**Rakshith T S, National Sales Manager, Novus India**



of active ingredients at the right site in the gut. This structure and active ingredients is shown to reduce pathogenic bacteria, improve gut morphology, help to control Eimeria species and increase beneficial bacteria in the gut, all of which helps to improve the overall performance of the bird.

The event was supported by the Novus India team: Dr Krishnamurthy, Sales Director; Rakshith T S, National Sales Manager and Sridhar Jakkani, Sales Manager.



**Sridhar Jakkani, Sales Manager, Novus India**

## Indian Poultry Professional visit NTPB research associate, Kasetsart University, Bangkok

**Gujarat:** Qper India and Numega Nutrition Singapore has arranged visit of Kasetsart University on 9 September 2022 for Indian poultry nutritionist, aqua doctors, broiler integrator and broiler breeders. Dr Theerawit has given presentation on NTPB “The new mile stone in poultry nutrition”.

Mr Phon also explained about “The new hope for reducing energy cost & increasing more muscle mass” by NTPB (active GAA & transferase enzyme complex). Mr Samir Patel, Managing Director, Qper India Pvt Ltd has also explained about Indian trials.



From left to right: Kuna, Phon, Ms Keya, Dr Theerawit, Samir, Dr Vijay, Ashok, Sahoo, Omkar, Dr Atul, Dr Rais, Dr Sanjeev and Dr Hariharan

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## Vets In Poultry has organized its 4<sup>th</sup> AGM and Symposium at Lonavala



**Pune:** Vets In Poultry, an association based in Pune, has more than 1000 members actively working in Poultry Farming. Vets In Poultry association always put relentless efforts towards the betterment of Poultry farming in India and as a part of this journey team Vets In Poultry has organized its 4th AGM and Symposium at Lonavala on 27 & 28 August 2022 at Hotel Rhythm, Lonavala.

The event focused on the theme **“Paradigm of possibilities and passion”** that will foster the growth and development of poultry farming in India.

AGM started with an address by Dr Santosh Ire, Secretary, Vets In Poultry on August 27th afternoon with key highlights of activities done by Vets In Poultry during the last financial year. Dr Prasad Kulkarni, Treasurer, Vets In Poultry presented a book of accounts for the last financial year.

This was followed by a Presidential address by Dr Ajay Deshpande. On this occasion he recognized the immense potential of the poultry sector for employment generation and doubling farmer's income. During



his speech he mentioned key achievements by the Vets In Poultry team viz amendment in bird flu draft, promotional activities, the step towards opposing misleading advertisement about chicken and eggs and at the same time he dragged attention towards working on issues like re-emerging diseases and providing solutions for it is the prime duty of members of Vets In Poultry.



AGM was followed by creative group discussions hosted by Dr Jeevan Sonawane. He set the platform for group discussions. He instigated few points such as active promotion of Chicken and eggs, removing common myths about eggs and chicken, and tie-ups with various national and international institutes to achieve objectives of Vets In Poultry.

During this event, all dignitaries on the dais and participants actively participated and came up with innovative suggestions and proposals for the betterment of the poultry farming community.







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On behalf of the Managing Committee, Dr. Ajit Ranade, Technical Advisor, VIP, and Dr. Ajay Deshpande, President, VIP assured participants to work on agreed proposals in the coming days.

Vets In Poultry is expanding its wing to all India and on the occasion of AGM, members of executive committee welcomed newly appointed regional heads like:

- Dr. Badal Singh, Chandigarh and Haryana
- Dr. Rais Rajpura, Gujarat
- Dr. Sachin Ingewar, Vidarbha, Maharashtra
- Dr. Sahebrao Rathod, North Maharashtra
- Dr. Mahendra Singh, Madhya Pradesh
- Dr. Shitan Singh Rathore, Punjab
- Dr. Banibrata Maity, West Bengal



- Dr. Bimal Kumar Chaudhari, Odisha and Jharkhand
- Dr. Ravindra Reddy, Telangana
- Major Dr. Vinod Kumar, Karnataka
- Dr. S. Rukmangadhan, Tamil Nadu

Day one was concluded with the vote of thanks by Dr. G. Gopal Reddy.

The second-day symposium started with lighting up the lamp & Souvenir inauguration by dignitaries and Chief guests.

Dr. Prasanna Padgaonkar delivered a very insightful presentation on Poultry Outlook. He has thrown light on various aspects of poultry farming in India. He also highlighted future concerns and probable solutions to poultry farming.

Dr. Shripad Bhat, a renowned cardiologist



from Pune in his speech highlighted the importance of protein in human life and also guided the audience regarding maintaining a healthy lifestyle and cardiovascular health. His deeper insights on protein requirement at various stages of ailments for the patients were quite interesting.

This was followed by a very interesting brain



storming session Dr. D. Chandrasekaran, Dr. Prasanna Padgaonkar, Dr. Anil Phadke, Dr. Jayant Deshpande, Dr. C. R. Behl, and Dr. Sunil Nadgauda were panelists for this session.

Dr. Ajit Ranade moderated the session. He initiated discussions around some important topics such as cage ban, animal welfare, pollution control and re-



Award winner Dr. D. Chandrasekaran with Award Certificate and its office bearers.





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emerging disease control. He concluded the session with his few take-home messages for the audience.

**Vets In Poultry Award Ceremony:** The lifetime achievement award for Year 2022 was given to Dr D. Chandrasekaran, Retired Prof & Head, Department of Animal Nutrition, Namakkal. Management Committee

of Vets In Poultry conducted Life Time Achievement, Ceremony. Life time achievement award was presented to Dr D. Chandrasekaran for his finest contribution to the field of Animal Nutrition and poultry farming.

The program was concluded with the vote of thanks was proposed by Dr Prasad Kulkarni.



*A view of participants in the 4th AGM and Symposium of Vets in Poultry.*

## Orissa High Court asks Centre to expedite relocation of poultry farm

*According to case records the CPDO was planned to be shifted from Nayapalli to Baranga in Cuttack.*

**Cuttack:** The Orissa High Court has directed the Centre to expedite shifting of the Central Poultry Development Organisation (CPDO), eastern region located at Nayapalli in Bhubaneswar. The court was hearing on Monday a PIL seeking relocation of the CPDO, which is posing threat to the environment. The HC felt it was not clear from the affidavits whether any steps have been taken in the last five years to shift the poultry breeding farm to an identified location.

Accordingly, the division bench of Chief Justice S Muralidhar and Justice



SK Panigrahi said, "The Secretary to Government of India (GOI)'s Department of Animal Husbandry and Dairying under Ministry of Fisheries, Animal Husbandry & Dairying is directed to convene a meeting in the next two weeks, which will be attended by the Chairman and Secretary of the State

Pollution Control Board, State department of Forest and Environment as well as the Director, CPDO to chalk out a time bound plan for shifting of the CPDO to a location that has already been identified." The bench further directed the Secretary to Government of India (GOI)'s Department of Animal

Husbandry and Dairying to file affidavit placing on record the minutes of those proceedings within three weeks, while fixing November 17 as the next date for further consideration of the matter.

One Laxman Kumar Behera, a resident of the city had filed the petition. According to case records the CPDO was planned to be shifted from Nayapalli to Baranga in Cuttack. After the Centre gave its nod to the State government's proposal to relocate the poultry breeding farm, for which 25 acre of land has been identified at Talagada near Baranga and land acquisition for the same has been completed. A budget of `12 crore has been estimated for construction and relocation of the CPDO.



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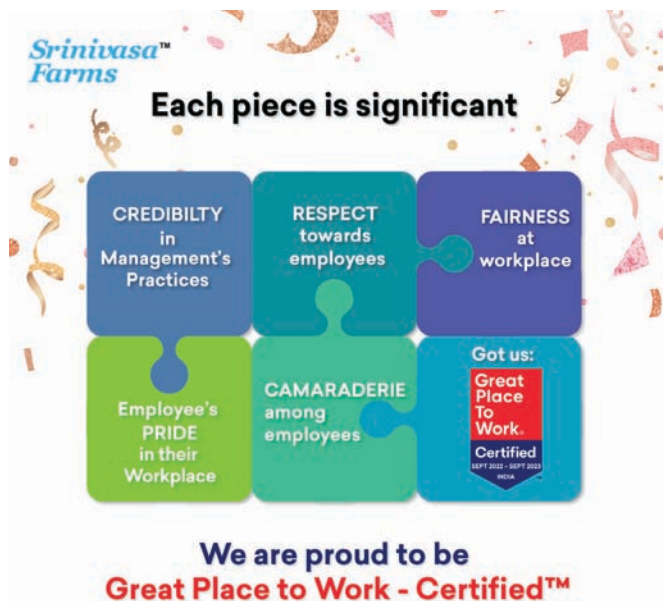


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# "Srinivasa Farms India's First Poultry Company" is now a Great Place to Work-Certified



**Hyderabad:** Suresh Rayudu Chitturi, Vice Chairman & Managing Director, Srinivasa Farms said that "This a super proud moment for us. More importantly I am so grateful to my team who having reposed they trust and endorsed the culture that me & family have been working to build the last 55+ years."

Srinivasa has earned this recognition based on a rigorous assessment independently conducted by Great Place to Work Institute India.

Nearly 500 members of Srinivasa Farms from all locations in India from Supervisor to Senior Management took part in this survey.

The Great Place to Work Assessment is considered

a 'Gold Standard' in workplace Culture assessment and no jury or individual can influence the results of the assessment. Great Place to Work is the global authority on workplace culture. Since 1992, they have surveyed more than 100 million employees worldwide and used those deep insights

to define what makes a great workplace: trust. Their employee survey platform empowers leaders with the feedback, real-time reporting, and insights they need to make strategic people decisions. The Institute serves businesses, non-profits, and government agencies in more than 60 countries and has conducted pioneering research on the characteristics of great workplaces for over three decades.

In India, the institute partners with more than 1100 organizations annually across over 22 industries to help them build High-Trust, High-Performance Cultures designed to deliver sustained business results. Hundreds of CEOs and CXOs from India Inc. are part of the great place community that is committed to the vision of



making India a great place to work FOR ALL.

The Institute's research shows that great workplaces are characterized by great leadership, consistent employee experience, and sustainable financial performance. These organizations can deliver a consistent experience to all their employees irrespective of their role, gender, tenure, or level. Their leaders believe in the vision of creating and sustaining a Great Place to Work FOR ALL and role models being 'FOR ALL' Leaders.

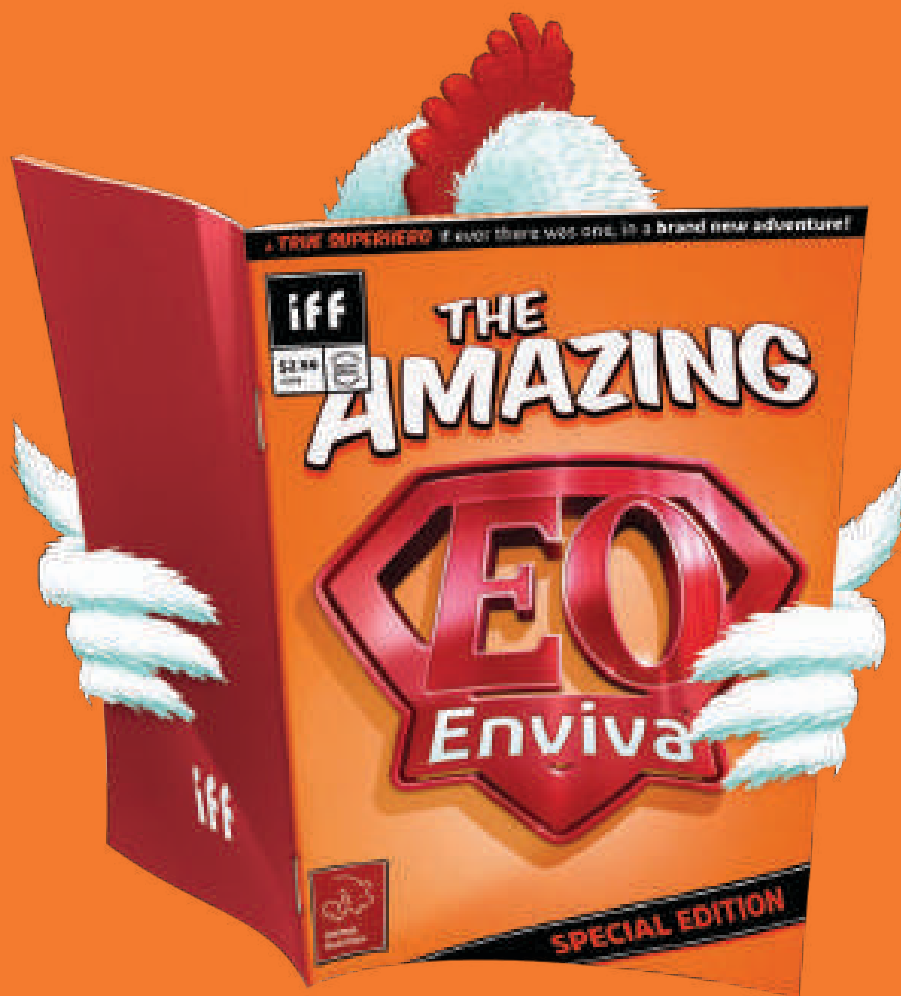




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# HIGAIN FEEDS has big target for 2026

*Dr G. Ranjith Reddy urged Higain team to take a valiant target of at least a lakh tonnes of feed sale and become one of the flag bearers of Poultry Industry*



**Major (Dr) Vinod Kumar,**  
COO, Higain Feeds & Farms Pvt Ltd

**Higain Feeds & Farms Pvt Ltd completed its major milestone of 15 years of Trust & Excellence in the Livestock business, mostly in the Poultry Industry. The event was conducted in Bengaluru and was celebrated & rejoiced in a lively enthusiastic tone.**

**Poultry Fortune Editor, M.A. Nazeer had an exclusive interview with Major (Dr) Vinod Kumar, COO, Higain Feeds & Farms Pvt Ltd. Excerpts:**

**Poultry Fortune: When was Higain Feeds established and how was the growth in business ?**

**Dr Vinod Kumar:** Our Company, Higain Feeds & Farms Pvt Ltd, started with humble beginning in the year 2007 with an aim to provide Precision Nutrition Solutions. The operations were based out of Mandya district in Karnataka. Largely, the growth and the success were attributed to the Quality of the feed provided and made the farmers come to us. This trust relationship has since been the core business driver and it continues to do so with minimal marketing activities, as word-by-mouth feedback is a major catalyst to our feed quality testimonials and has assisted a sustained growth and expansion.

We are the manufacturers of Quality Poultry & Animal Feed as well as Concentrate feed for all growth stages of the livestock. We are also the feed

manufacturers for Cattle, Swine (Pig), Sheep, Goat and Lab Animal feed.

Initially, we had our presence in the Karnataka markets. In the last 3 years, we have grown organically and



**Dr H.B. Nataraja,**  
Chairman & Managing Director,  
Higain Feeds & Farms Pvt Ltd

expanded our footprints in the South India region, mostly Kerala and Andhra Pradesh markets. We have our dedicated Feed Manufacturing plant at Mandya and collaborated third-party production facility at Dabaspote & Hubballi. These units take care of our feed requirement for the Karnataka and Kerala markets. We also cater to the South Andhra markets through the production facilities at Hosur and North Andhra markets through Vijayawada Production Unit. Both of these have collaborated facilities of high volume feed production outputs.

Our core manufacturing operations involve around making of high-quality Premixes through our Feed Premix Plant at Dabaspote located about 40 kms north of Bangalore city. This is our dedicated premix manufacturing setup which acts as a nerve centre unit to cater to all the precision premix needs of feed production units across South India.





**PF: Where is the head quarter of your company ?**

**Vinod:** The Company's Corporate Head Office is based out of Bangalore in the Rajajinagar area. The location is easily accessible via the Google Map link for HIGAIN FEEDS.

**PF: Who is the administrative head of the company ?**

**Vinod:** Dr Nataraja H.B., Founder & Managing Director of Higain Feeds & Farms Pvt Ltd is an alumnus of Bengaluru Veterinary College. An animal nutritionist by profession, his approach has been the scientific application of Applied Nutrition in all our feed formulations which promises the health and safety of all livestock through precision nutrition.

**PF: Who are the key individuals of the company in India ?**

**Vinod:** We are a lean organisation with only 25 people as of now. We have a flat organogram with every member having a unique skill set and hence I

think everyone is a key employee. Our organisational culture keeps each one committed and motivated true to our company's motto – Feed, Perform & Prosper !

**PF: Where do you have your production units ? Do you have tie-up / collaboration with any international company ?**

**Vinod:** Like I said before, we have five Feed Production facilities located at Mandya, Hubballi, Dabaspote, Hosur & Vijayawada. Except for Mandya all are third-party processing plants. We also have our own Premix production facility at Dabaspote. We believe in teamwork and good work ethics and are fortunate to get great support from these processors as their support too plays a great deal in our success and day to day operations. We don't have an international presence yet.

**PF: What are the different brands of feed products and other products you have ?**

**Vinod:** Feed being our core business, we can formulate & manufacture all types of feed products for Commercial Broiler and Layer. 90% of our products are Poultry Feed in both categories. We provide Full feed as well as concentrates, 7.5% concentrates as our signature product.

**PF: What is your present volume of commercial layer / broiler feed production and supply in the country ?**

**Vinod:** Our dedicated Feed mill plant is at Mandya. Others, like I said are 3rd party processing engagements. We have an ambitious plan to have state of art Feed Mill in near future. I would like the information under wraps as of now. As they say 'Don't count your chickens before they hatch' will be an apt proverb here. However, I can assure you it is our Greenfield project with a lot of promise to implement field trials to practice.



**PF: Do you have branches in the country ?**

**Vinod:** No branches yet. In fact, I would like to take this opportunity to address



*A view of Higain Feeds production facilities*





the avid readers of your great magazine to be wary of the fact that we operate only out of our Bangalore HO and that they can drop in a mail at [higainfeeds@gmail.com](mailto:higainfeeds@gmail.com) any query which will be promptly answered.

**PF: How is your Sales & Technical Services network in India? How many Dealers & Distributors you have in the country?**

**Vinod:** The whole idea to have multiple production units is aligned with the fact that we want to cover the maximum landscape and reach out to the last-mile customer. We believe in providing a great option and sharing the shelf space with other players in the market through our quality benchmark in every product we have. We give a great emphasis on the outbound logistics, sales & marketing



and services that strengthen our value chain.

A great deal of our Technical service comes from our strong technical team, as well as having collaboration with the best-in-class poultry consultants. The trust relationship with farmers, some of whom have been associated with us since inception, has been built stronger only through the regular feedback mechanism, farm visits, and by addressing the matter which affects the bird's health, promptly and swiftly.

**PF: In which states your company is more stronger with feed and other products supply in the country?**

**Vinod:** In Karnataka, we have mostly Broiler products while we focus more in Layer feeds in Andhra markets.



**PF: Do you have Integration activity in India? If so, what is the size of your Broiler Integration?**

**Vinod:** Not yet. However, that domain of business has not been on our cards.

**PF: How is the acceptance level of your feed products from the customers? How do you compare your feed quality and services with others or under the present trends?**

**Vinod:** As I said earlier, there are few farmers who have patronised Higain feeds, these are our loyal customers. Our competition is with self – to engage constantly to improve in terms of Quality & Service!

**PF: What are the best aspects of your company for the benefit of your customers?**

**Vinod:** I can put that in 3 heads, Our Formulations: Updated, Scientific and Precision nutrition. Our Quality: Consistent. Our Service: Timely & Technical.

**PF: Besides feed, what are your other activities in poultry?**

**Vinod:** None, the focus is laser sharp!

**PF: What is the total feed market size in Indian poultry industry in Volume – both Layer & Broiler feed? In that, what is the size of your feed market in India and zone wise in the country?**

**Vinod:** As per the industry data informatics, the total Indian market size of Layer feed would be about 11.5 lacs metric tonnes per month & that for the Broiler feed is around 13.5 lacs metric tonnes per month. We contribute a small share to the pie of around 2% to the south Indian markets in the Broiler segment. In the Layer segment, we have a small presence, however, we are looking to venture into, but baby steps as of now.

**PF: To how many farmers you supply feed?**

**Vinod:** Approximately 250 regular farmers are our proud customers. The numbers have gone down during the







Corona period when the industry had taken a total both in terms of raw material availability and price instability.

**PF: According to you, who are the top 10 Commercial Poultry Feed (Layer & Broiler) manufacturers / suppliers in India with estimated feed production & supply?**

**Vinod:** There are very well-known top industry players, however, it will not be prudent on my part to really put them in order as each has its domain specialisation & strengths.

**PF: What is the annual business turnover of your company?**

**Vinod:** We clocked INR 120 crores turnover in our last annual performance.

**PF: What are your future plans and targets?**

**Vinod:** At present, we are in the process to consolidate the present systems which will shape the course of our future. To make it tangible, we have taken a target to achieve one lakh tonnes of feed sales by the end of the year 2026.

**PF: Do you have any message to your fellow feed millers, farmers and other stakeholders of poultry industry? And also to the Government at state and Central (Union) govt?**

**Vinod:** Rather we think there is a lot to learn from the industry peer leaders and expect them to show and lead the course. There has been a double whammy, in terms of rumours around Corona outset & with raw material erratic price behaviour. This offsets all the plans or targets and makes the market situation highly fluid and at times uncertain. We

have been able to tread the last 15 years with a lot of resilience through self-belief. I sincerely believe that we have to stand our ground and stay the course. I would rather like to express this through the common adage used by our MD which fits best in these situations that says "When the going gets tough, the Tough gets Going".





# HIGAIN FEEDS: One and half decades of COMMITTED SERVICE to the Farming Community !



*Hon'ble Member of Parliament Dr G. Ranjith Reddy inaugurating Higain Feeds 15 years completion celebrations at Bengaluru, along with Dr H.B. Nataraja and his wife Mrs Vani Nataraja.*



**HIGAIN FEEDS & FARMS PVT LTD** completed its major milestone of 15 years of Trust & Excellence in the Livestock business, mostly in the Poultry Industry. The event was conducted in Bengaluru and was celebrated and rejoiced in a lively enthusiastic tone.

The celebration was graced by the prominent presence of distinguished Veterinarian and Chief Guest for the event, Hon'ble Member of Parliament & President, Telangana Poultry Breeders Association Dr G. Ranjith Reddy along with Dr Thirupathi Reddy as a special invitee.



A warm welcome was extended by the Master of Ceremonies for the evening Major (Dr) Vinod Kumar, COO, Higain Feeds & Farms Pvt. Ltd. to all the esteemed farmers and well wishers highlighting the fact that there is a mission to empower every individual who is associated with Higain Feeds and that is the real business strategy behind every product & every customer interaction; capability building and curating the culture along the way.

It was heartening to see the august gathering and the valued presence of senior veterinarians like Professor Dr G. Devewogda, Professor Dr B.S.V Reddy,

Dr Sushanth Rai, President, KPFBA, Dr Mahesh P.S, Jt. Commissioner GoI & Director CPDTO & TI, Mr K.S. Ashok Kumar, MAA Integrators, Dr P. Nallappa, Dr G. Gopal Reddy, Vice President, IVPI, Dr Channe Gowda, Dr Basavaraj, Dr Sivakumar Pommiah, GM, KS Nutritional Solutions among many others dignitaries.

The event captured the celebrations of Higain's Journey & its presence through a Corporate video depicting 15 years of resilience and entrepreneurial spirit of Dr H.B. Nataraja, Chairman & Managing Director, Higain Feeds & Farms Pvt Ltd, The audience had first hand exposure to Company's past glory and got to experience the aspirational and the ambitious goal Higain Feeds sets to embark upon in the Director's message. Dr H.B. Nataraja further highlighted EQR as the mantra of the Company's growth. The company continues to be committed to the business with a laser-sharp focus on the feed and continued focus on Service with Quality. He acknowledged the presence of the farmers, key customers, consultants, veterinarians & industry leaders who in a true sense have been the real accelerators of the company.



## Glimpses of Higain Feeds Celebrations



An insightful session on 'Harmony at Work Place for achieving Operational Efficiency' was presented by Col (Dr) Y. Sudheer Kumar, VSM (CEO, SR Group) with practical on-the-job training examples, which are both implementable and executable for all cadres at managerial roles.

The highlight of the evening was the felicitation Ceremony of Dr G. Ranjith Reddy conducted by the farmers. The first lady of the Company Mrs Vani Nataraja welcomed the presence of Dr G. Ranjith Reddy on this momentous occasion and presented a special bouquet to the Chief Guest.

In his speech, Dr G. Ranjith Reddy, reminiscing the good old association with Dr H.B. Nataraja, commented that Higain Feeds has a great future with a great nutritionist and a great leader. He appreciated the knowledge base of Dr H.B. Nataraja who knows the art of fine-tuning, sticking to the basic principles of nutrition and judiciously avoiding 'nutritional overload' in a bird. He urged the Higain employees to take a valiant target of at least a lac tonnes and become

flag bearers of Poultry Industry. Dr G Ranjith Reddy wished Team Higain and all its customers a bright future & Godspeed in its journey!

A poetic vote of thanks was proposed by

Mr Mahendra Chillale in a unique way, following which the evening slipped into a musical grand gala Cocktail dinner!

A HIGAIN celebration that will be long remembered !!



# New Generation Poultry Production: Using Blue Sky Technologies

Email: [drns.gowda@gmail.com](mailto:drns.gowda@gmail.com)

**Dr R.N. Sreenivas Gowda**

Former and Finding VC, KVAFSU, Bidar, Karnataka, Former Director, IAH&VB, Bangalore, Former Prof and University Head, Dept. of Pathology, Veterinary College, UAS, Bangalore

## Highlight Points

*Globally there is great demand for poultry meat and eggs. This sector needs to evolve and innovate in line with this demand decreasing the production costs. The advancement in science in every field is fast approaching and specifically its application in poultry production has caught the attention of many learned poultry farmers. The automation has given boost to increase the operational capacity to many folds. A simple example is change over from deep litter to cage system, to present environmentally controlled units and introduction of automated feeding and watering systems. Currently application of computer based technologies in feed formulations, egg and meat production has generated a big data on all operations. Automation can be used to replace manual labor on poultry farms when it comes to repetitive tasks like checking bird welfare, vaccinations and managing litter. However, the latest technologies will change the future farming systems if they are used properly looking in to the economic implications in adopting newer technologies. This article enlightens some of the computer based technologies in smart future poultry production.*

## Introduction

The Poultry sector is a most important segment of the livestock industry. This sector consists of many different levels of production, including breeding farms, hatcheries, feed factories, broiler and layer farms and processing plants. Likewise, there are sub-units such as chicken, quail, duck, turkey, guineafowl and goose in terms of species in the sector. In terms of infrastructure, different types of housing from thatched shed to automated, environmentally controlled sheds, normal feeders to automatic feeders and regular channel watering systems to automatic cups and nipples, automatic egg collection, refrigeration systems, nutraceutical and medicine manufacturing units, vaccine manufacturing units, manufacturing mechanical components to electronic gadgets required for various functions. Rendering plants and production for feathers. Therefore, it involves all the derived sciences such as physics, chemistry, biology, biotechnology, and other engineering skills. There is enormous growth and progress in this sector and the sub-classes for production are divided into meat and egg production. All these have gradually grown from back yard to industrial proportion over six decades (1960 to 2020) owes to veterinarians, poultry scientists, technical and non-technical persons and dedicated farmers.

With all the developments yet there is organized and unorganized sectors in poultry in our country. Organised sub-sector needs conducive environment to grow for which policy support & intervention is required mainly for disease surveillance, drug residue and drug/ vaccine quality control, standardization & quality control of poultry feed, eggs & meat, application of HACCP (Hazard Analysis and Critical Control Point) and Good Manufacturing Practices (GMP) for compliance to WTO & CODEX norms and gradation, value addition, brand promotion & export boosting etc.

By the end of this decade, globally, poultry meat is expected to represent 41 per cent of all the protein from meat sources, according to the OECD-FAO Agricultural Outlook 2030.

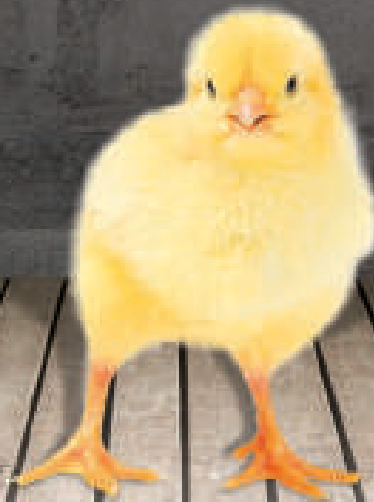
The Indian poultry industry is poised to benefit from the ongoing changes in lifestyles in general and eating habits in particular. No wonder, the share of organised commercial farms is rising as it is largely modernized and technically improvised.

According to government data, egg production has been rising steadily, having risen from 95 billion in 2017-18 to 105 billion the following year and to 114 billion in 2019-20. Similarly, poultry meat production, too, has been expanding from 3.7 mmt in 2017-18 it grew to 4.1 mmt the following year, and then on to 4.3 mmt in 2019-20.

Although ambitious, some projections suggest, by 2023, the country may produce 136 billion eggs and 6.2 ml t poultry meat.



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\*Natural as defined by the American Association of Animal Feed Company Officials



**Provimi Animal Nutrition India Pvt. Ltd.**  
Email at: [info\\_info@cargill.com](mailto:info_info@cargill.com) | Call at: +91-9606077510

For consumer feedback, please write to:  
**Consumer Care Cell, Provimi Animal Nutrition India Pvt. Ltd.**  
IS-40, KHB Industrial Area, Yelahanka New Town, Bengaluru - 560 064, India

The global poultry market reached a value of nearly \$319.2 billion in 2019, having grown at a compound annual growth rate (CAGR) of 5.5% since 2015, and is expected to grow at a CAGR of 6.1% to nearly \$405 billion by 2023. The market is expected to grow at a CAGR of 7.2% to nearly \$465.7 billion by 2025, and at a CAGR of 6.8% to \$645.7 billion by 2030.

### **Change in the farming systems**

The progress in all sectors of poultry is due to the advancement of technologies in the management, nutrition and health care systems. Over the years, the successors of farmers now are with highly qualified and having double degrees, Technical/engineering and even medical and veterinary professionals. Therefore, the poultry industry is now in the hands of well leant and educated groups. They always think differently and adopt any technology available globally for the benefit of profitability. These are not only innovators but also have open mind to accept and adopt any innovation that are useful in modern poultry farming. The new farming systems are called “Smart farms, Automated farms, Mechanized farms and Digital farms.

### **New Trends in Poultry Farming**

Two years ago (March 11, 2020) the World Health Organization formally declared a pandemic caused by a novel coronavirus. And as COVID-19 spread across the globe, humanity had little time to adapt to lockdowns and staggering losses.

The COVID-19 pandemic has severely affected many economic sectors across the world, including livestock production. It has also sparked fears of an impending economic crisis and recession. Disrupted production and transportation, declining consumer demand and volatile markets brought huge financial difficulties, even leading to the permanent closure of many farms. Social distancing, self-isolation and travel restrictions have led to a reduced workforce across all economic sectors and caused many jobs to be lost. Schools have closed down, and the need for commodities and manufactured products has decreased. In contrast, the need for medical supplies has significantly increased. The food sector is also faced the increased demand due to panic-buying and stockpiling of food products. More than the above, the problems started in labour management and this lead to adopt new innovative ideas in poultry farming. In short 2020 was a critical year- COVID-19 posed numerous challenges for the poultry industry, from worker shortages to interruptions throughout the supply chain. The New technologies can help the industry solve these issues and look forward to future opportunities to thrive and succeed. This paper deals with the adoption of several such advances and innovative products for successful poultry farming.

**The following are emerged as some of the new trends in poultry Farming:**

- Is there a genetic solution for preventing male chicks ?
- 3D cameras could capture precision broiler weights
- MRI technology can help identify which eggs are fertile
- Could smart watches solve poultry processing's labor problem ?

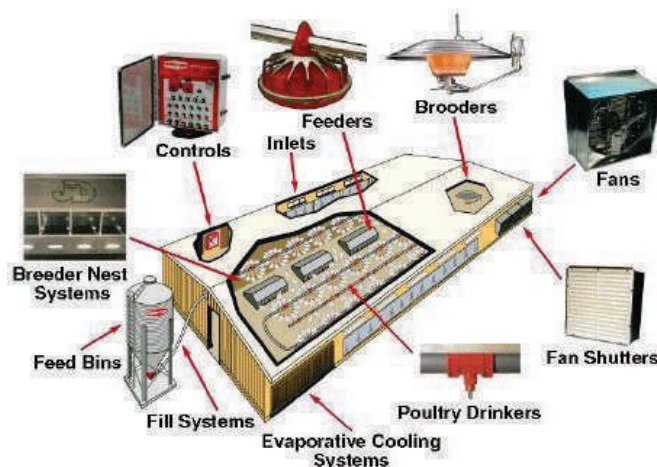
- 24/7 feedback loops could improve poultry flock outcomes.
- Collaborative robots could further poultry automation
- In-line poultry chilling could be improved using kinematics
- Preventing antibiotic resistance in poultry using peptides
- Digital technologies set to simplify poultry data analysis.
- Hyperspectral imaging could help find poultry meat defects.
- Machine vision can detect broiler floor distribution.
- Will CRISPR transform the poultry industry ?
- Robots are ready to meet poultry processing challenges.
- Automation helps prepare case-ready poultry for the future.
- Digitalization can optimize poultry productivity planning
- Healthy chicks establish adult poultry microbiome quickly.

**The Technologies that could disrupt future production and processing operations are:**

#### **1. Remote sensing**

Remote sensing allows visibility in real-time on a number of factors, conditions within the poultry house, bird performance, bird health and welfare. Not only is it the case that the farmer can keep watch over the status of sheds and birds when they decide to take a look at the computer but importantly the readings from these sensors can be set to provide “alerts” to management if any parameter falls out with the agreed requirements for the specific age of birds 24/7.

- Sensors can help streamline the data collection process for both birds and workers, resulting in precision poultry production.
- Application of the smart phones helping the owner to monitor real time environmental contexts such as temperature, humidity, ammonia gas, water level.
- In this system describes an Integrated Solution for Smart Poultry Monitoring Using WSN (wireless Sensor Network) and GPRS Network.
- For example, in poultry, sensors can be used to help estimate body weights and measure the flock uniformity.
- They can also help solve labour issues and improve worker retention and food safety when used as a wearable sensor for employees.







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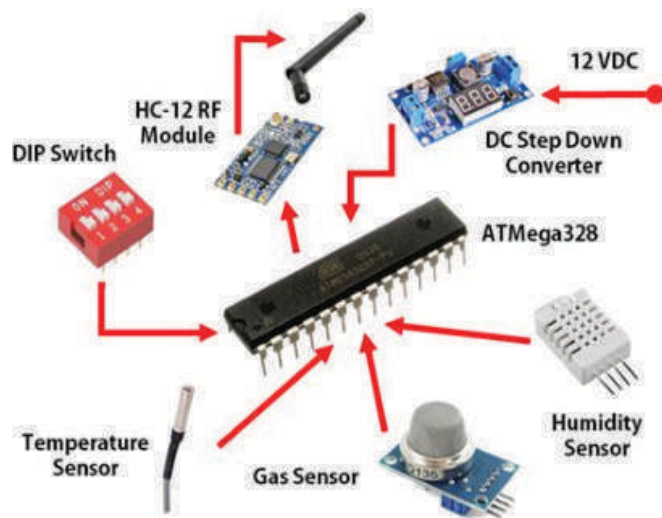
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**Factory:**

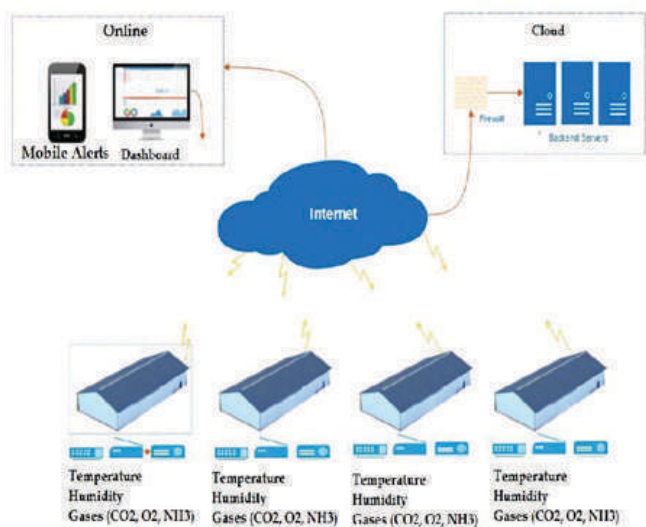
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**Fig: 1. Use of gadgets at different stages of poultry operations**



**Fig: 2. Automation and use of internet to measure the data generated in different houses**

## 2. Automation and Digitalization, Big data: a major value chain in poultry Industry

- Automation can be used to replace manual labor on poultry farms when it comes to repetitive tasks like checking bird welfare, removing welfare, vaccinations and managing litter.
- In processing plants, there are robots that can cut meat from the bones, which could help space out workers at risk of COVID-19.
- The integration of wireless sensors and GPRS network to control and automatically monitor environmental parameters in a poultry farm.
- The environmental parameters like temperature, humidity, ammonia gas control etc.
- The person in-charge can able to get the internal environmental situation of poultry farm by receiving a message on registered mobile number

## 3. Robotics and automation

Robotics and automation generated intense interest for their potential to reduce labor, be on duty 24/7 and report remotely. Robotic technology can encourage broiler breeders and layer hens to move around the house, reducing the incidence of floor eggs and stimulating fertility, improving bird health and welfare and reducing the amount of labor required. The robot can save up to 50% of a farmer's time, reduce the number of trips by two-thirds and improve working conditions.



**Fig: 3. Robots in poultry operation**

Robotic technology that uses artificial intelligence to help farmers make data-driven decisions about broiler production could result in a healthier, more productive growing environment. Use robotics to encourage the birds to be more active to increase muscle mass, which ultimately drives better improvements when it comes to the feed conversion ratio.

Robots offer not only increase productivity and profits but their presence can also contribute to improved health and welfare. Some robots will continuously scratch the litter to eliminate caking and wet spots, reducing the incidence of pododermatitis, foot burn and breast burn (fig4). Others can monitor and map ammonia, temperature and humidity levels throughout the house. This is valuable information for producers who can adjust ventilation and address any localized issue that may affect bird welfare or productivity. These corrections can prevent a localized issue from affecting the entire flock.



# THE ORIGINAL ALPHA D3

**1980s**  
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University of Georgia



**1989**

Patent granted for the  
Alpha D3 metabolite

**2010**

Alura launches  
Alpha D3 in poultry



**1 $\alpha$  OH-D3**

**2010**

Alura bring  
Alpha D3 to India



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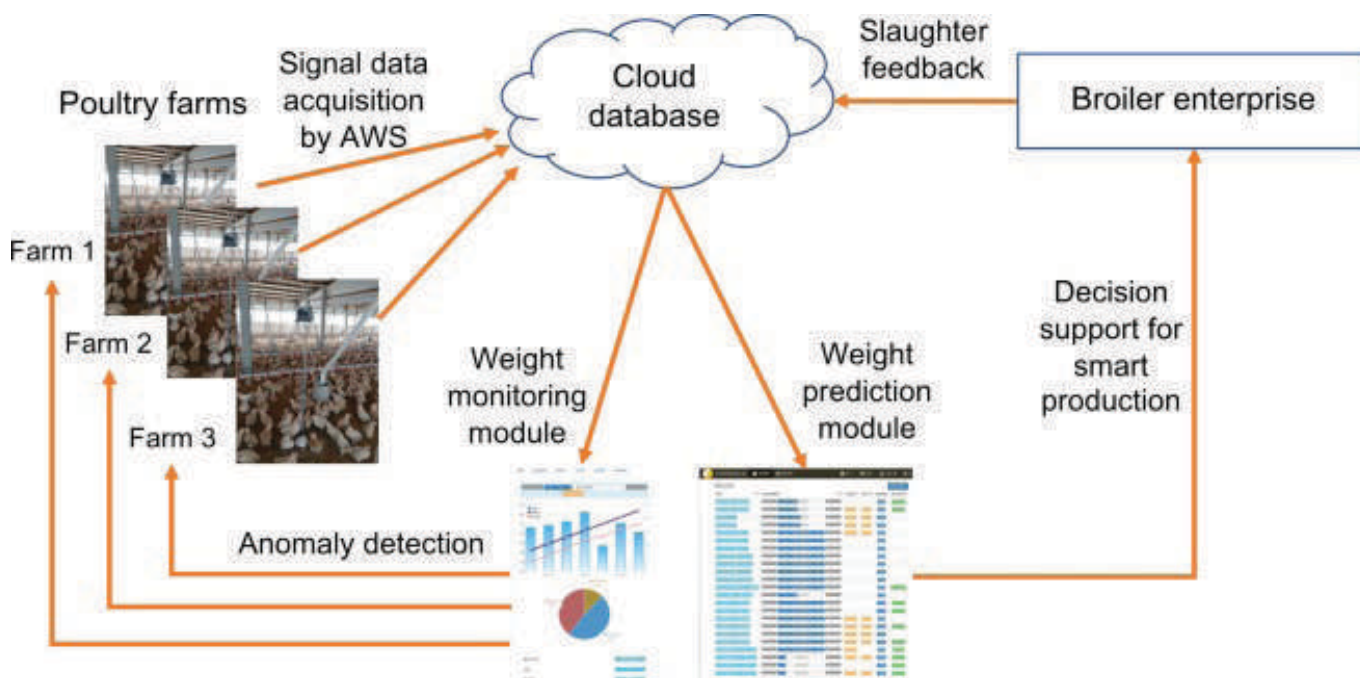
a) **Collaborative robotic technology** is one of the most popular new trends in automation. Collaborative robots, also known as ‘cobots’ are designed to work safely alongside human workers. Typically, the robot is responsible for any repetitive task, freeing up the human worker to perform more complex, thought-intensive tasks. The robot that navigates poultry house floors using imaging sensors and machine learning, has the capability to detect and pick up floor eggs and sense environmental temperatures, gasses and light levels. Robots can free up human workers to perform more complex, thought-intensive tasks, streamlining operations.

**Some of the benefits of Cobots include:**

- ▶ Cost-effective approach to simpler applications
- ▶ Improved ROI calculation for low-speed applications
- ▶ Ability to implement robots into space constrained applications
- ▶ Shorter programming time
- ▶ Quicker deployment

b) **Chicken Boy**, an autonomous ceiling-suspended robot incorporating **artificial intelligence** and sensors, assesses ambient conditions, health and welfare and equipment failures. Already on the market in Europe, developers at Farm Robotics and Automation planning to continue adding capabilities including removal of dead birds and analysis of litter moisture.

**4. Monitor poultry floor distribution with machine vision**



**Fig 4: Smart poultry production and data recording for analysis**

In commercial bedding floor poultry houses, bird density and distribution pattern are critical factors for evaluating production management and animal health/welfare. Currently, daily routine inspection of broiler flock distribution in commercial grow-out houses is done manually, which is labor intensive and time consuming. This will also indicate how a machine vision-based method can monitor floor distribution of chickens in drinking, feeding and resting/activity zones. This study provides the basis for developing a real-time evaluation tool to detect broiler chicken floor distribution patterns, behaviors and welfare indicators in commercial production facilities.

The egg sector also has its fair share of applications for AI. The quality of the egg white – for instance, the absence of any trace of yolk – is important for many applications requiring optimum egg white foaming. Modern breakers operate at very high speeds, in the order of 200,000 eggs per hour or roughly 60 eggs per second, making it impossible for the human eye to detect an issue.

a) **Artificial Vision:** In poultry processing the use of artificial vision offers real-time yield monitoring of high-value chicken parts, allowing supervisors to immediately give feedback to employees who can address any potential deficiency. Artificial vision also constitutes a standardized method that can be used to compare results between workers, shifts and processing plants, particularly valuable for large companies operating across multiple sites. Artificial vision can also be combined with smart automation to optimize efficiencies; for example, where broiler parts are automatically sorted after inspection. For processors, AI allows higher processing speeds and accurate packing of premium value products, translating both into more profits and fewer customer complaints. Researchers are now looking at means to totally replace human intervention for some specific tasks considered painful or hard to achieve accurately and consistently.

b) **Woody Breast Detection** with machine vision and high-speed cameras is capable of detecting and/or sorting breast





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 **B-TRAXIM**  
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fillets at normal line speeds without contacting or damaging fillets. Muscle rigidity is measured as the fillets move on and fall off a conveyor.

c) **3D Bird Deboning Cutting Virtual Reality** generates cutting trajectories for automated poultry processing systems. It is under development at Georgia Tech Research Institute. Testing started with models but now is on real birds.



Fig. 5. Automation in checking of meat and eggs.

#### d) Food safety

Food safety is a critical concern in the poultry business, and the innovations. This needs to be addressed both the live production and processing stages. All the above technologies developed ultimately help the production of safe food for human consumption.

#### 5. Technicon Composite-housing Gearboxes

With steel endoskeletons eliminate rust, dissipate heat and withstand wash-down processes. Housings are corrosion-resistant and blended with an antimicrobial material that does not exhibit odor or staining in harsh environments. Market launch is perhaps two years away, and prices of the composite gearboxes are expected to be competitive with units with painted cast-iron housings.

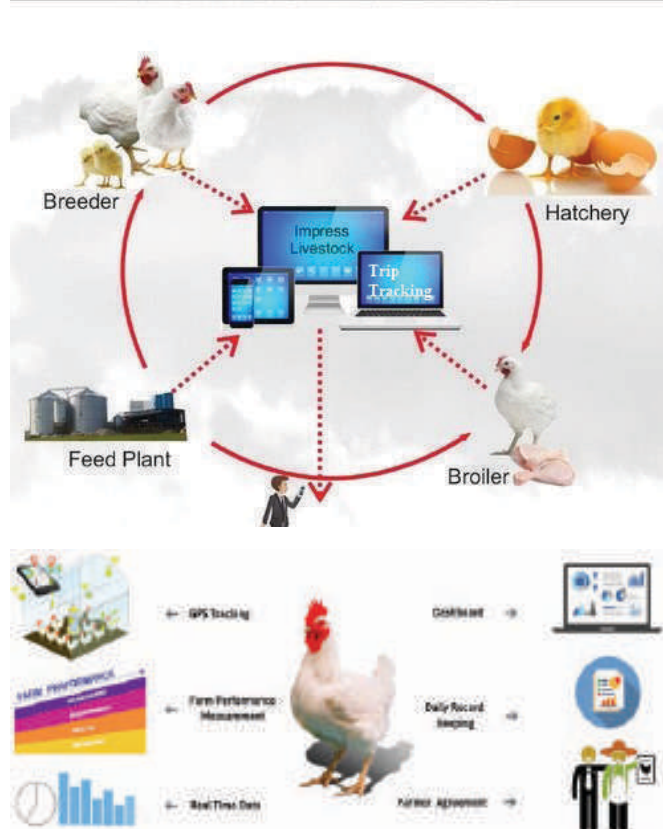


Fig. 6. Data generated by breeders, Hatchery, Feed plant and Farms are computerized

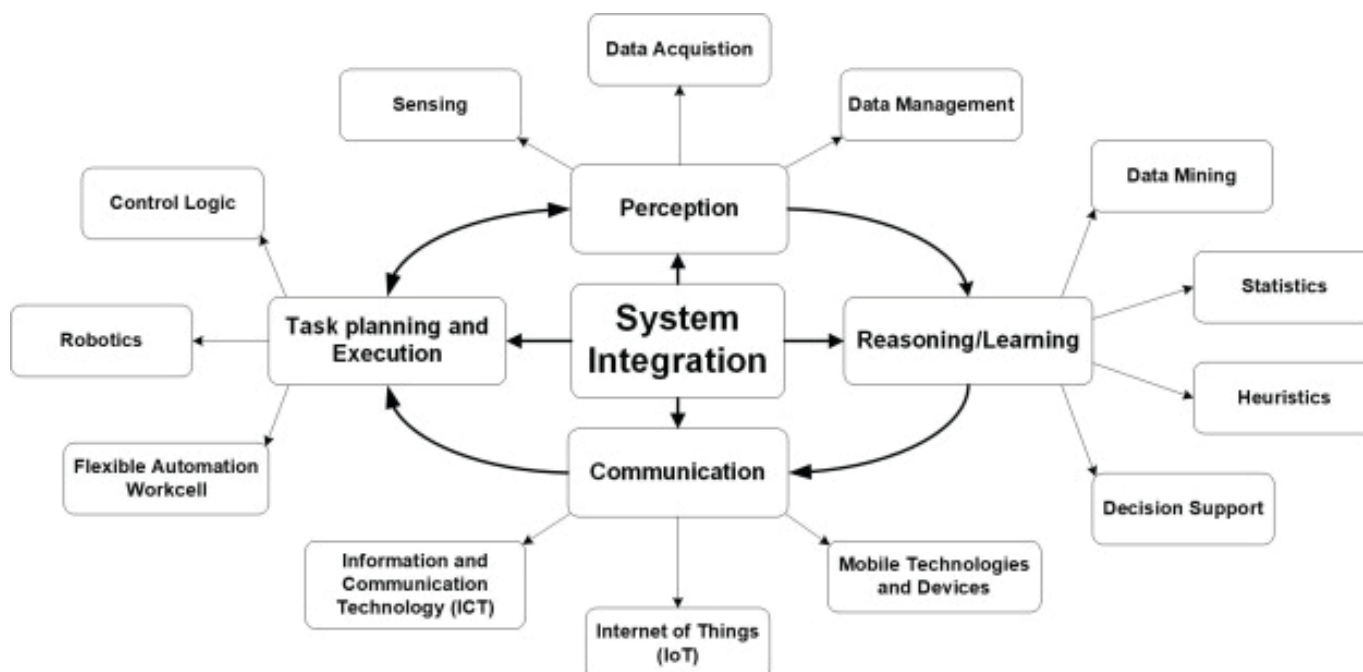


Fig. 7. System integration in poultry operations



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Using advanced data analytics and bioinformatics tools for detection and serotype identification of *Salmonella* spp. in samples taken from carcass rinses, ground poultry, poultry parts, boot swabs and equipment swabs. The system's accuracy reduces inventory holding time and delayed shipments, confirmation costs and delays, and retail short-supply penalties.

## 7. Big data and artificial intelligence

Harnessing the increasing amounts and complexity of data available to the poultry enterprise is not only a daunting task but a huge opportunity (fig. 6 and 7).

## 8. Artificial Intelligence (AI)

Artificial intelligence, when applied to broiler and egg production, may not only improve efficiency but help producers address following challenges.

- Scientists are now teaching machines how to recognize any sound of distress or discomfort to aid in monitoring bird wellbeing.
- Another area with great potential for AI is its use in detecting early stage disease.
- AI has the potential to assist in detecting diseases during their incubation period, allowing producers to quickly prevent spread throughout a flock.
- AI can also help with disease diagnosis.
- Using AI to complement or augment the human brain - collaborative intelligence - will give us the potential to be more efficient and accurate in diagnoses.
- Other areas for AI include feed formulation optimization, genetic selection and hatchery management.
- All segments of the poultry sector will be able to benefit from applications using AI.
- Using advanced artificial intelligence software, integrators can find solutions through data that would otherwise difficult to perceive.
- New artificial intelligence technology can help integrators save money and get better flock performance by facilitating investigation and decision making.

## 9. Little Bird Feed Cast System

This estimates the amount of feed in on-farm bins using a small device to apply vibration to the bin surface along with sensors and software. The solar-powered units wirelessly report feed levels via web portals and a mobile app to growers, feed mills and integrators. The web portal presents a history of a house's feed levels and displays projections. Feed outages are reduced or eliminated and less feed is reclaimed at the end of a flock.

## 10. Poultry System Simulation Model (PYSSM):

Simulates the water, energy, waste water and labor utilization of a poultry processing plant. Based on VENSIM [<http://vensim.com/vensim-software/>] software, the model simulates all processes that require water use. Designed by developers at Georgia Tech Research Institute as a decision making tool with predictive capabilities, there are modules for labor, water, energy and wastewater processes.

## 11. Machine Learning: Statistical Process Control (SPC)

Uses machine learning and historical location-based data as well as plant-level outcomes to dynamically model the live operations supply chain, predict outcomes and apply outcome scores. It allows quicker and more accurate identification and response to potential changes in variables that impact food safety or production outcomes throughout the poultry supply chain.

## 12. How Audio - Analytic - Software detect respiratory disease

- New analytical software can detect symptoms of laryngotracheitis, infectious bronchitis and potentially other diseases as well as welfare issues.
- Thanks to machine learning techniques, audio software can help farmers detect sick birds before they can.
- The two diseases IB & ILT are primarily detected by a farmer present in the house who hears the coughing of the birds.
- The amount of days that pass after an outbreak are critical in the progression of the disease and its potential damage to a flock.
- If there were a way to automatically detect it instead of waiting for a farmer to randomly encounter it, it could make detection of the disease – and treatment – quicker. Create a hardware and software system to detect and recognize the specific sounds of an avian cough symptomatic of the conditions among the noise of the poultry house.
- The research was able to identify certain auditory shapes in the sonic spectrum of the house that correlated with the coughs. The next challenge was to teach a machine to recognize those shapes and share the detection with its user.

## 13. Simple Vet Regulatory Compliance Data Management

This applies Blockchain technology to veterinary records to maintain transparency and traceability while also providing analytics to evaluate efficacy of treatments. A suite of integration tools integrate data sources, including public and private block chains, traditional databases and systems and **internet-of-things** (IoT) enabled devices such as RFID tags and remote sensing technology.

## 14. Block Chain Technology (Value Chain Management)

Uses predictive analytics and deep learning analysis to display and forecast future performance throughout the supply chain. An integrated view of operational data allows finished product to be traced back through the value chain at a minute level of detail. The cloud-based platform uses **block chain** technology and deep learning neural networks to monitor poultry operations at large scale and across regions.

- Block chain's opportunity in the poultry industry is its ability to resolve food safety and transparency issues. Walmart, Unilever, Nestlé and other food giants are working with **IBM** using block chain technology to secure digital records and monitor supply chain management, ensuring traceability of the poultry products sold in stores.



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- Block chain can be used to monitor all aspects of the food supply chain, from farmers and producers to processors and distributors. This is Walmart's third experiment with block chain, and the increasing interest of other large food conglomerates demonstrates the unique capabilities of this technology.

### 15. Transport Genie

Records micro-climate conditions of live poultry during transport, including real-time communications with the driver and key stakeholders. If a threshold is exceeded, an alert is sent automatically. The sensor can be used by processors to improve bird welfare during the loadout, in transport and in plant holding sheds.

### 16. Gene Editing Technology (egg XYT CRISPR)

Inserts a bio-marker in the DNA of male chicks at the parent stock level to create an optical signature in embryos detectable at the breeding/hatching operation. Upon scanning of incoming eggs, those with male embryos are diverted to food production. A pilot study in a poultry layer flock is planned for late 2018. Developers are said to be in negotiations to incorporate the technology in the stock of a major breeding company.

### 17. Microbiome and Life sciences

Advancements in genetics, microbiology, poultry health management, nutrition and more help improve flock management to raise healthier birds. In human medicine, the microbiome has been linked to everything from intestinal health to obesity and mental disorders. Scientists are now applying these findings to poultry, developing probiotics to help control Bacterial and protozoal diseases and to improve the immunity.

**a) Edible Vaccines** enable chicken producers to dose room-temperature stable vaccine in the feed for both mucosal (in the gut) and systemic (intracellular) protection against coccidiosis. The technology platform inserts genes for specific antigens into corn plants to create the vaccines.

**b) Phytogetic Blends for Coccidiosis Control** chemically block receptors specific to parasites and physically disrupt the parasite cuticle. The blends are composed of GRAS-listed terpenes that naturally occur in food plants known to be safe as food flavorants. Using a proprietary encapsulation technology, the formulation will be active in the intestine of the chicken.

**c) General Probiotics Antimicrobial Probiotics** are genetically modified microbes for use in the feed or water of poultry that can detect pathogens and secrete antimicrobials against pathogens, secrete multiple antimicrobials lowering resistance emergence and/or secrete engineered antimicrobial lysins. Prototypes against Salmonella, Campylobacter and Clostridia have been developed. The company expects to complete regulatory requirements and bring the products to market within three years.

**d) Nutritional Technology:** Digital tools like artificial intelligence (AI) can help poultry producers optimize the decision-making process when it comes to feed management

and assessing the health of the gut microbiome. AI-powered tech can provide recommendations how to improve the feed composition to recommendations to improvements in farm management practices with the goal of improved performance and health of the flock.

**The nutritional research focus, henceforth, will be influenced mostly by the following innovations:**

- Feed formulation software and feeding programmes
- Novel feed ingredients and feed additives
- Gastro-intestinal conditioners for gut health, birds' welfare and food safety
- Modern technologies for feed processing and feeding packages
- Perinatal nutrition and epigenetic programming
- Advances in AI could lead to a better understanding of the poultry gut microbiome.
- In recent years, the microbiome has captured the attention of researchers, who have linked the microbial makeup of the gut to a variety of poultry diseases and other conditions affecting flock health.
- The health of the gut microbiome, a collection of microorganisms present in the gastrointestinal tract, can be affected by changes in raw materials, diet, additives, vaccine programs and farm management practices.
- Techniques of in-ovo-nutrition

A combination of statistical analysis, machine learning and AI can work together to create insights and recommendations on the status of a flock's microbiome, based on data from a non-invasive cloacal swab-sampling of live birds. Producers can use this information to determine what actions to take to improve flock performance.

### 18. Nanotechnology for virus detection

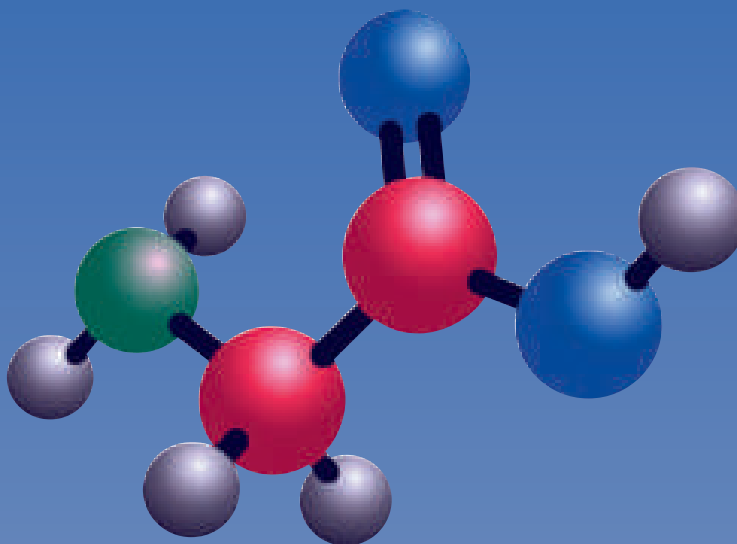
Nanotechnology plays a pivotal role in the mechanism of tracking virus entry. The single virus tracking technology (SVT) makes it possible to track the different stages of a single virus in its life cycle, thus providing dynamic insights into the basic process of virus occurrence in living cells (Liu et al., 2020). It helps in trap avian flu viruses for early detection.

Biosensors have come up with a lot of promises in terms of detecting viruses and diseases connected with them. The development of various types of such biosensors such as Affinity-based Nano-biosensors, Nano island affinity-based biosensors, Graphene affinity-based biosensors, Nanowires based biosensors, Optical Nano biosensors, Fiber optic Nano-biosensors, Surface Plasmon Resonance (SPR) based optical Nano-biosensors, Total internal reflection fluorescence, Surface-Enhanced Raman Scattering (SERS), Electrochemical Nano-biosensors had helped us in the rapid and sensitive detection of viruses. Aid to these Nano sensors, viral detection now becomes very sensitive, rapid and cost has come down to a significant low. In this review, an attempt has been made to compile all of the different Nano-biosensors and their applications. Due attention is given to the fact that the reader gets the grasp of the concept with much ease.



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**Conclusion:**

The growth of poultry farming can be visualized from its expansion from initial stage and transformation to industrial proposition over a period of six decades (1960-2020). Thanks to the dedicated private poultry suppliers, farmers, technicians and poultry scientists who stood at every level of its growth facing many challenges and finding the salvations from time to time. The advancement in science in every field is fast approaching and specifically its application in poultry production has caught the attention of many learned poultry farmers. The automation has given boost to increase the operational capacity to many folds. A simple example is change over from deep litter to cage system, to present environmentally controlled units and introduction of automated feeding and watering systems.

Currently application of computer based technologies in feed formulations, egg and meat production has generated a big data on all operations. Automation can be used to replace manual labor on poultry farms when it comes to repetitive tasks like checking bird welfare, vaccinations and managing litter. However, the latest technologies will change the future farming systems if they are used properly looking in to the economic implications in adopting newer technologies.

**(Acknowledgements:** All the illustrations are from Google library. Thanks to all the authors. Poultry tech summit news / industry news & trends / layer breeding & genetics / new technologies / broiler husbandry... organised by watt poultry.2018)

# USE OF BACTERIOPHAGES IN POULTRY INDUSTRY

## Highlight Points

- ▶ Emergence of antimicrobial resistance in zoonotic, food-borne pathogens is of public health importance.
- ▶ Bacteriophages are live viruses available in nature which are against bacteria.
- ▶ Bacteriophages, because of their antibacterial nature, can be used as therapeutic, prophylactic, biocontrol and disinfectant agents in poultry industry.

## Introduction

Poultry are collectively domesticated species of birds that can be raised domestically or commercially for eggs, meat and or feathers. The term "poultry" covers a wide range of birds, chickens, ducks, turkeys, guinea fowl, geese, quail, pigeons, ostriches and pheasants. Poultry production is considered as one of the fastest growing sectors all over the world due to increasing demand. At present, India is among the largest producer of poultry products in the world, 5<sup>th</sup> in egg and 18<sup>th</sup> in broiler producer such as eggs and broiler meat and is expected to grow at a CAGR of 15.2% during 2021-2026 (APEDA).

Unhealthy flocks lead to reduction in feed conversion ratio directly affecting the growth rate, breeding performance and egg production resulting in economic loss for the farmers. In addition to economic impacts, zoonotic diseases meaning diseases which can be transmitted from animals to humans directly or indirectly along the food chain is of utmost concern.

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## Causes of poultry diseases

Many factors contribute to diseases in poultry. These are biotic and abiotic factors. Biotic factor are infectious agents that can spread from one bird to another such as viruses, bacteria, fungi and parasites. Abiotic factors include extreme environmental conditions such as temperature, poor quality air, nutritional deficiencies and stress unlike biotic factors do not spread from bird to bird.

## Management of poultry diseases

Diseases in poultry are prevented and control by combining vaccination, chemotherapy and proper biosecurity measures. Biosecurity measures starts from practicing foot dips at farm entrances, use of disinfectants for cleaning sheds and farm premises, preventing access to wildlife and rodents to minimized exposure to disease causing organisms and its spread. Vaccination is done from day one to prevent infectious diseases outbreak as one of precautionary measures. Chemotherapy is the treatment of infections using substances which can kill or suppress the growth of microorganism. Antimicrobial chemotherapy is the most reliance practice to treat infectious diseases.

Antibiotic is used in sub-therapeutic doses as preventive measures but the misuse of this as growth promoter in food animals has raised the risk of antimicrobial resistance that reach human population through food chain. Because of the growing threat of antibiotic-resistant bacteria, the European Union banned the incorporation of antibiotics as growth promoters in food-producing animals in 2006, but they are still being used in other parts of the world.



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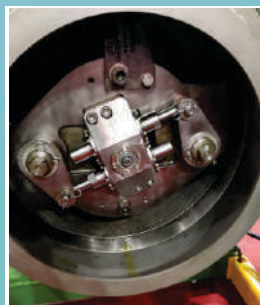


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The universal decline in the effectiveness of antibiotics has forced the researcher to consider non-antibiotic alternatives to combat antimicrobial resistance. This has led to revisit bacteriophage potential which was discovered a century ago, overshadowed by the discovery of antibiotic.

### Bacteriophage

Bacteriophages, also known as phages, are bacterial viruses that only infect bacterial cells. They are discovered more than a century ago by Frederick Twort and then by Felix D'Herelle. Phages can be found in a wide range of environment including faeces, sludge, sewage, seawater, soil and anywhere where bacteria may grow. Bacteriophages are considered the most abundant organism on earth which is approximated  $10^{31}$ - $10^{32}$ . A typical bacteriophage structurally composed of head packed with genetic materials, long tail with collar, a based plate with short spikes and tail fibers. The phages will attach on the receptor present on the surface of susceptible bacterial host and lysed the bacteria, releasing many progeny phages ready to infect new bacterial cells. Phages typically infect specific strain or species of bacteria, but some are polyvalent, meaning they can infect more than one species or strain of bacteria.

### Advantages

1. Bacteriophages are specific in their action. They have specific bacterial strain or a group of hosts unlike antibiotics which affects the normal intestinal microbiota, that can result in dysbiosis, immunosuppression, and thus secondary infections.
2. Bacteriophages are bactericidal in nature whereas most antibiotic are bacteriostatic.
3. There is no need for repeated doses in phage therapy as the bacteriophage can replicate at the site of infection.
4. Phages are effective on biofilms, produced by pathogens which are difficult for many antimicrobial agents to act on.
5. As phages exist in environment naturally, preparation is simpler and inexpensive to manufacture as compared to the production of new antibiotic.
6. Waste from phage preparation and treatment is mostly biodegradable, and its ecotoxicity only affects the phage's potential hosts.

### Uses of Bacteriophages in poultry industry

1. Phage therapy
2. Food control
3. Disinfectant/ Bio-sanitizers

#### Phage therapy

Bacteriophage or phage therapy is the use of live lytic bacteriophages to treat bacterial infections. This therapy uses the advantage of bacteriophages ability to kill bacteria exclusively without any negative effect on animal cells. Phage preparation is available as single host specific or phage cocktails. These preparations can both be used in pre-harvest and post-harvest segments. Bacteriophage has been used in pre-harvest aspect, prior to slaughter for

prevention, treatment and control of bacterial infections in poultry. The therapeutic effect of phage was first demonstrated against fowl typhoid, a bacterial infection caused by bacteria *Salmonella Gallinarum* by d'Herelle which were then followed by many satisfactory experimental reports. Phage preparation can be administered by mixing with feed or with drinking water to control and in lower doses to prevent many bacterial outbreaks in the flock such as Salmonellosis and Colibacillosis. Many phage preparations are available in the market targeted against common bacterial infections. Some against *Salmonella* spp. are Bafasal®, Biotector®S, Salmon FREE®, against *E. coli* are Coli-Pro, BAFACOL. They can be added to drinking water or mixed with feed to eliminate or prevent infection.

### Food control

Foodborne illnesses remain a major cause of hospitalization and death worldwide. Poultry products are considered as one of the common sources of many major foodborne pathogens which affect food producers globally and is of public health concern. Microbial contamination can occur as a result of wrong handling such as spillage of intestinal contents on the surface of meat during slaughtering process and insufficient sanitation practices. Common foodborne pathogens encountered in poultry products are *Salmonella* sp., *Campylobacter* sp., *Shigella* sp., *Escherichia coli* and *Listeria monocytogenes*. To reduce the spread of these pathogens along the food chain, various methods have been in practice such as physical, chemical and biological treatment but with many drawbacks. Chemical based antibacterial agents can be harmful to consumers when traces of chemical remain in the food. Physical treatment like heat, pressure and radiation can modify the nutritional value of foods.

Use of bacteriophage as antibacterial control is one of the promising approaches, as they leave no chemical residues neither altered food quality. Uses of phages as food biocontrol agent has been applied in raw meat, fresh vegetables, fruits, ready-to-eat products and also as decontaminant on carcasses. Phages preparations are used to reduce viable counts of pathogen rather than to eliminate completely to enhance food safety. Phage preparation can be administered by spraying or dipping of the carcass immediately after slaughtering and evisceration. Bacteriophage as biocontrol is increasingly accepted as a safe and effective method to eliminate, or significantly reduce the levels of, specific bacterial pathogens from foods. Many commercial bacteriophage products are currently available and have been approved for use.

ListShield™ by Intralytix Inc. Baltimore, USA targeted against *L. monocytogenes* is a cocktail of six lytic bacteriophages applicable as a food additive for ready-to-eat meat and poultry products and can be applied directly on food. Listex™ against *Listeria monocytogenes* can also be used as spray or dip. SalmoFresh™, SalmoPro®, Salmolex™, Phage Guard S™ targeted against *Salmonella* spp., can be applied on used on food surfaces or by spraying, dipping or immersion.



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- Infectious Bronchitis Virus
- Infectious Bursal Disease Virus
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- *Mycoplasma gallisepticum* (chicken, turkey)
- *Mycoplasma meleagridis* (turkey)
- *Mycoplasma synoviae* (chicken, turkey)
- Newcastle Disease Virus (chicken)
- Newcastle Disease Virus (turkey)
- *Ornithobacterium rhinotracheale*
- *Pasteurella multocida* (chicken)
- *Pasteurella multocida* (turkey)
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**IDEXX**

### Disinfectants / biosanitizers

Several approaches have been proposed to reduce bacterial contamination in poultry facilities, ranging from legal restrictions to biosecurity strategies. Poultry flock is the primary source of meat contamination, therefore bacteria-free meat could be achieved by reducing their number in poultry farms itself. Biosanitizers or disinfectants based on bacteriophages can be used in hatcheries, farms, transport crates, poultry processing plants, and food contact surfaces. In addition, many reports claim the effectiveness of bacteriophage on inhibiting biofilm formation and distribution of mature biofilms produced by pathogenic bacteria like *Salmonella* spp. on poultry industry equipments' surfaces. They can also be used to disinfect food contact surfaces, the skin of poultry carcasses, direct on-food application, and food packaging in food processing plants.

Phage-based commercial disinfectants such as BacWash™ marketed by Omni Lytics Inc., USA against *Salmonella* is available that is applicable as mist, spray or as wash. In addition, they can also be used as pre-slaughter treatment directly on live animals. Intralytix has also developed Ecolicide PX™ targeted against *E. coli* O157:H7 to apply on skin of live animals prior to slaughter as decontaminant.

### Conclusion

The raising emergence of multidrug-resistance (MDR) pathogens and antibiotic resistance accompanied by

negligible development of new drugs to combat this issue has raised concerns worldwide. Since MDR can be transmitted from food-producing animals to humans through direct contact or through the food chain and the environment, there is an immediate need for the search of alternatives. Bacteriophage as biocontrol can serve as an additional tool in a multi-hurdle approach to prevent foodborne pathogens from reaching consumers, and this method is especially promising under circumstances when food processors strive to preserve the natural and often beneficial, microbial population of foods and to only remove the bacteria that may cause illness.

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**\*More References can be provided on request.**

# Effects of Ammonia and its Alleviating Measure in Poultry House



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Our India is one of the fast growing nations among the world, at the same time it is expected to reach a total population of 1.5 billion by 2030 and 1.66 billion by 2050, the UN said. The Indian livestock sector currently contributes 25.6% to the agricultural GDP and 4.11% to the national GDP which is far below the potential it holds. The poultry sector alone it contributes Rs 1.3 lakh crore to the GDP. In future there will be increasing in demand for high quality protein foods.

Poultry is one of the cheapest protein sources available to every household people in India. So, we are in the zone of producing good quality protein to the people. One of the biggest complaints currently raised in poultry industry apart from flies that is the smell of the poultry manure. Ammonia is the reason for this smell and it is harmful for both birds and workers inside the farm. I believe in this article you can able to understand how Ammonia gas formed inside the poultry house and its impact and its alleviating measures for better production.



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Better consistency of faeces, reduced  $\text{NH}_3$  conc. in animal houses, better animal welfare and litter quality



### Feed inclusion rate

500 g per ton of feed or  
as advised by the poultry  
consultant

### Presentation

25 kg



Watery and sticky droppings in layers have been a problem in the egg industry for years. High proportion of non starch polysaccharides (NSP) increase gut viscosity leading to pasty vent / loose droppings. High fibre in diet, change in feed, irritant effect of organic acids, chemical toxin binders, feed contaminants, dietary factors, stress due to summer or high production are also responsible for non-specific diarrhoea & dysbacteriosis and further complicating into enterotoxigenic / enteroinvasive enteritis.



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**What is Ammonia (NH<sub>3</sub>) ?**

Ammonia is a colourless poisonous gas with a pungent odour or noxious smell.

**Generation of ammonia gas in poultry house**

Whenever poorly ventilated poultry house coupled with high protein diet with dampness in the litter material or stagnant of water in the excreta of birds, it makes favorable condition for Ammonia generation. Poultry excreta contains uric acid 80 %, Ammonia 10% , urea 5% when this components exposed under anaerobic digestion or it goes under microbial enzyme activity ammonia is readily released inside the farm environment.

**Factors responsible for Ammonia formation in poultry house**

i) Litter type ii) birds activity iii) stocking density iv) manure handling v) frequency of manure removal vi) ventilation rate inside the house

**Effects of ammonia at various concentrations**

Normally the ammonia level is calculated in parts per million

CONCENTRATION	EFFECTS
5 to 10 ppm	Acceptable level
25 ppm	Maximum exposure level for period of 1 hour will cause drop in production, irritation of eyes and respiratory tract
40 ppm	Headache Nausea in humans Loss of appetite in birds
100 ppm	Sneezing, salivation and irritation of mucus membrane
250 ppm	Severe drop in production and possibility of pneumonia in birds
300 & above	Can cause blindness in birds and affects farm workers health

**Effects of ammonia on birds health****Respiratory system**

Exposed to higher Ammonia level affects the mucosal surface of the trachea. It leads to severe damage on mucociliary blanket. The role of mucociliary blanket is entraps the bacteria and dust in respiratory tract with the help of cilia and mucosal secretion. The damage depends upon the concentration of ammonia and duration of exposure, if higher concentration is there it will leads to a airsacculitis, pneumonia, septicemia and E.coli infection.

**Eyes**

High concentration of atmospheric ammonia for prolong period will results in partial closure of eyes, it resembles almond shape and also we can notice conjunctivitis, swelling of eyes reddening of eyelids in case any viral infection is in the flock it will cause swollen head syndrome also.

**Ammonia burn**

Ammonia induced corneal erosion sometimes called as Ammonia burn, these birds may become partial to complete blind, it is otherwise known as calcify band keratopathy

(calcium salts & band of minerals deposits on the corneal epithelium).

**Alleviating measure to control ammonia****1. Dietary management**

High protein diet results in high Ammonia excretion in poultry dropping, high fiber diet encourage Birds to drink more water it will cause wet litter. So the birds should be provided with balanced diet fulfilling all nutrient requirements.

**2. Stocking density**

According to age and type of the Birds adequate Space need to be provided. If we place more number of birds in less area cause high dampness in litter.

**3. Ventilation**

However the ventilation rate is depends on the climate, but we need to ensure good ventilation inside the house through all the climates of the year by our management and we need to make birds all are in a comfort zone.

**4. Litter management**

Litter moisture should be 15 to 25%. Avoid caked litter and daily litter racking is essential, it is advisable to increase litter thicknesses 3 to 5 cm high in winter time in existing bed to absorb wet. In cage house – spraying disinfectant on litter & spraying pesticides (over maggots) and litter removal, all this activities should be carried out periodically.

**5. PH**

PH is one of the important factors to control ammonia, pH 7 below will release little Ammonia when its pH 7 and above it will release higher amount of ammonia at this time we can use litter amendment Chemicals like superphosphate, alum, aluminum chloride, sodium bisulphate etc., can be used to control ammonia.

**6. Prevention of water stagnation**

If there is any leakage in the pipeline or in nipple line and stagnant of water inside the shed need to be checked daily and immediately need to be resolved.

**7. Phytogetic feed additives**

Incorporating phytogetic feed attitude in poultry diet will increase the digestibility and helps in absorption of more nutrients in GI tract and maintains gut health which results in less nitrogen excretion in droppings.

**8. Ammonia sensor**

DOL 53 is an electrochemical, long-term stable NH<sub>3</sub> sensor available in market. The sensor is very robust and well-suited for use in livestock facilities. By this sensor we can analyze various concentration of ammonia.

**Conclusion**

Below 25ppm ammonia level in shed helps birds to protect their health. Nowadays, NH<sub>3</sub> sensor available in market, we can use that sensor to detect ammonia concentration and we can take immediate NH<sub>3</sub> control strategy. Ammonia control is a complex topic in poultry but with combination of good ventilation in house and with good management, this issue can be successfully overcome at any time at any cost.



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### SFSP66 Series Hammer Mill

Max capacity: 25-35t/h  
The hammer screen clearance is adjustable.  
Equipped a ultra wide multi-cavity grinding  
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### SLHSJ Series Double-shaft Paddle Type Mixer

Short mixing cycle, high mixing evenness, the CV can  
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Full widely-opened twin door discharging structure : at  
the bottom of mixer.



### HRZL Serise Pellet Mill

Suitable for manufacturing all kinds of poultry  
feed.  
The secondary transmission is adopted by  
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Material balanced by double pressure roller  
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### HRSL Series Crumbler

The roller gap can be adjusted precisely.  
Less powdery, easier for maintenance.



Model	HRZL420-II	HRZL550-II	HRZL660-II
Power (kW)	55×2	75×2	110×2
Capacity(t/h)	8-11	12-16	22-25
Die: (mm)	φ3.5	φ3.5	φ3.5



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Acidomix and Elimin-8 are unique potentiated organic acid blends and are potent antimicrobial for decontamination of feed, feed ingredients and water which prevents growth of pathogenic bacteria and moulds.

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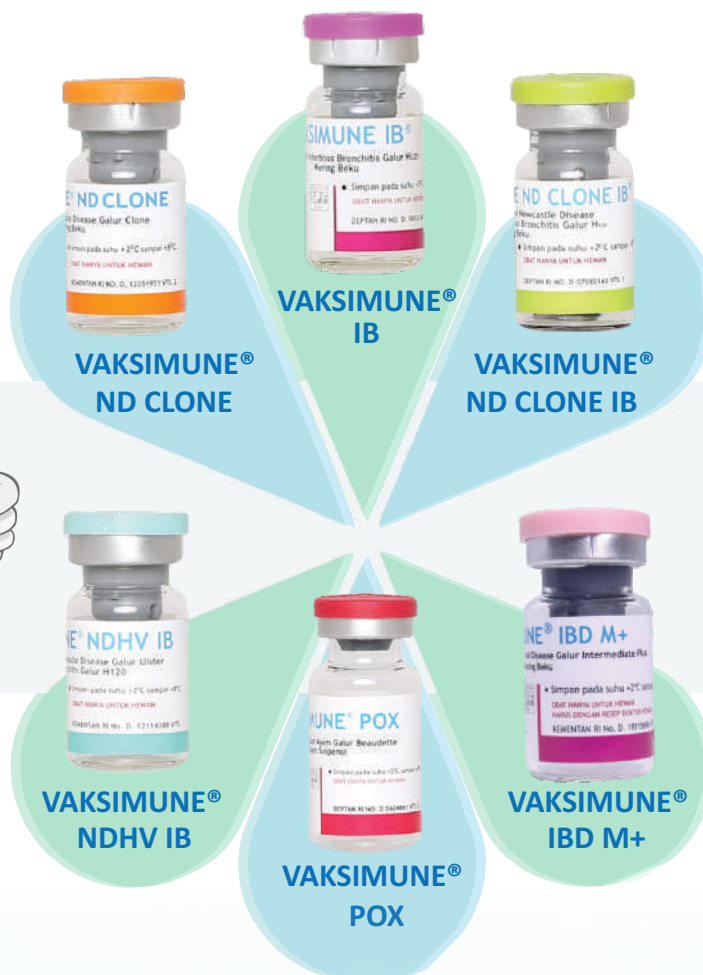
- Eliminates harmful pathogens in feed / drinking water source and protects against contamination of poultry feed and water
- Acidification of GI Tract
- Lowers pH of feed, water and gut
- Lowers feed buffering capacity
- Establishment of preferred microbiological environment within gut, facilitating nutrient absorption and birds health

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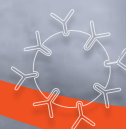
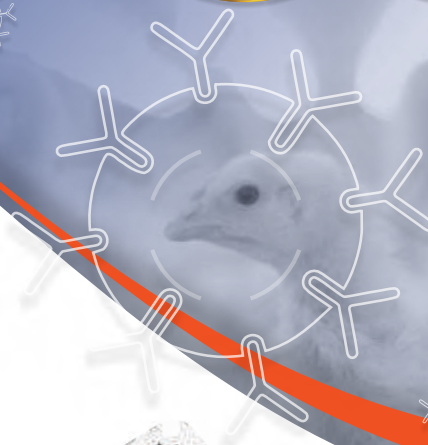
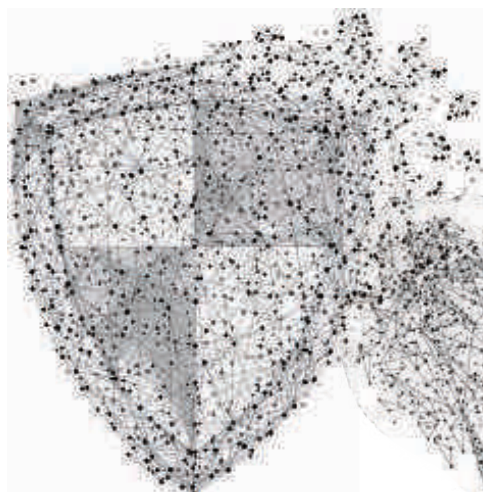
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