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National Chicken Day Celebrated in India

Many a times, role of common nutrients like protein, energy, trace minerals and vitamins are overlooked and different substances are used for immunomodulation



Dear Readers,

The December 2021 issue of **Poultry Fortune** is in your hands.

On the occasion of the Birth Anniversary of Dr BV Rao, the

Poultry Farmers & Breeders Association -Maharashtra celebrated **on November 16.** To mark this day, the chicken was sold at a discounted price across 50 chicken shops in Maharashtra. President of PFBA (MH) C. Vasanthkumar said, "Considering nutrition value of chicken, we need to eat chicken 5/6 days in a week. This will help to boost our immunity to fight against Covid- 19."

Other state poultry associations like Karnataka Poultry Farmers and Breeders Association, West Bengal Poultry Federation and and other state associations celebrated 'National Chicken Day' to create awareness about chicken among the people." People should start eating chicken without any fear. Chicken is the best source of protein. If we eat chicken on a daily basis then the protein demand of our body will automatically be fulfilled. Hence Eat Chicken and stay healthy. As a part of its 'Chicken Awareness Campaign,' the association started a chicken promotional campaign through 'Television Commercials' on TV 9 Marathi from November 16, 2021.

The Department of Animal Husbandry & Dairying signed a memorandum of understanding (MoU) with the Ministry of Food Processing Industries recently for extending the benefits of various schemes to the beneficiaries by providing them credit support in establishing dairy processing,

recommended by the Department of Animal Husbandry to avail benefits under the Prime Minister Kisan Sampada Youjana, which is meant to augument the supply chain management from farm gate to retail outlet. In a move that is expected to bring regulatory clarity on genetically modified on foods. the Food safety and Standards Authority of India (FSSAI) has released draft regulations stating that no one can manufacture or sell any food products or food ingredients derived from genetically modified organisms (GMOs) without prior approval. The draft has been released for seeking stakeholder views, after an inter-ministerial consultation process. The draft regulations outline the procedure for approval as well as safety assessment and labeling norms. It also specifies norms that lab s will need to adhere for testing GM foods. Venworld has conducted two technical seminars in Namakkal and Coimbatore, Tamil Nadu, on 22 and 23 November. Dr Prakash Reddy, DGM, Technical Services, Ventri Biologicals, presented on the 'Risk analysis and critical control points over IBH and Mycoplasma'. He spoke on the evolution and emergence of new serotypes of Fowl adenovirus in India and how critical to match the serotypes by vaccination in controlling the disease. He told Ventri's updated IBH/HPS inactivated vaccine can give complete protection against the circulating Fowl Adenovirus serotypes in India and recommended vaccination in breeders and day old vaccination in commercial broilers for best IBH control.

meat processing and animal feed plant. The

units in the dairy and poultry sector will be

He also presented on the control measures of mycoplasmosis in breeders by drug program and VHMGK vaccination. He showed the trial



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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FOLLOW US: facebook.com/poultryfortune, twitter.com/nrspublications *Send a letter:* Letters to the Editor must include writer's full name, address and personal telephone and mobile numbers. Letters may be edited for purposes of clarity and space. Letters should be addressed to the Editor:

POULTRY FORTUNE, BG-4, Venkataramana Apartments, 11-4-634, A.C.Guards, Near Income Tax Towers, Masab Tank, Hyderabad - 500 004, T.S, India. Tel: +91 040 - 2330 3989, 70329 19554. Website: www.poultryfortune.com results for the effectiveness of the inactivated vaccine against Mycoplasma gallisepticum. It was clear that performances of the vaccinated flocks were better than the unvaccinated flocks.

In response to a growing demand for Ross 308 AP chicks, Aviagen India has announced a major expansion of its Great Grandparent (GGP) diagnostic laboratory in Tamil Nadu. The laboratory is used to regularly monitor the health of Aviagen breeding stock, ensuring that customers receive the highest quality chicks. Designed to comply with International Standards Organization (ISO) requirements, the new larger laboratory includes an additional molecular diagnostic unit, and is equipped with the latest technology, including an energy-efficient heating, ventilation and air conditioning (HVAC) system with cross-contamination control to optimize bird welfare and biosecurity. Further maximizing biosecurity, it has separate rooms for bacteriology, serology and molecular diagnostics, with no cross-over between these processing

areas. Supporting this modern laboratory's efficient operation and ability to produce accurate, repeatable results is a state-of-the-art laboratory information management system (LIMS). LIMS enables traceability from sample collection until the final

interpretation of test results.

In the Articles section -- Article titled **Multiple Mycotoxin Syndrome the ever increasing threat** written by Dr S. K. Maini, Vesper Group, said that Major problem with Poultry, Livestock and Aqua industries today is the Multiple Mycotoxin Syndrome or MMS, a large variety of mycotoxins, that were not tested earlier, are now being studied, evaluated and recorded on regular basis but by a very few laboratories around the world.A 2017 – 18 Survey (Provimi-India) revealed more than 95 % of the samples tested were contaminated with Multiple Mycotoxins.

There are nearly 54 detectable mycotoxins, that can be tested , most of these are not routinely tested by laboratories or regulated by the governments. Their incidence and co-existence is regularly increasing and causing damage to the production and performance of the animals and birds, while the experts in the Industry and Government/ICAR/Universities and private companies look the other way.

Another article titled -- Poultry Management: A Useful Tool for the Control of Necrotic Enteritis in Poultry

compiled by Dr Sekhar Basak, Innovista Feeding Solutions Pvt Ltd stated that

Necrotic enteritis (NE) is one of the most widespread diseases in broilers, imposing a significant economic burden on the poultry industry worldwide. Its total global economic loss is estimated to be over \$6 billion annually, while its occurrence is estimated to result in a 12% reduction in body weight and a 11% increase in feed conversion ratio compared to healthy birds. Despite our present understanding of the disease, and the identification of Clostridium perfringens as the aetiological agent, the predisposing factors, which are essential for the outbreak of the disease, are not fully understood. These factors can influence the ecosystem and disrupt the balance in the intestine, leading to the outbreak of the disease.

Poultry management includes all those practices applied to poultry at the farm level, in order to allow them to express their genetic potential efficiently and effectively. It takes into account health, welfare, legislation and economic issues, but its effect on gut health has not been fully elucidated. This review focuses on managerial strategies, such as nutrition, health and husbandry, which could be used to control NE in poultry without the use of antibiotics.

Ricky Thaper, Treasurer, Poultry Federation of India said that after achieving a healthy growth in India's poultry sector in the last many years, time

has come for the sector for adoption of automation and infrastructure creation at the

marketing point for ensuring that quality meat is supplied to consumers.

Another Article titled Immunomodulation - Role of Nutrition and Phytobiotics written by Dr Sathya Sooryan, Product Manager, Vetogen Animal Health highlighted that Immunomodulation in birds have become as important as vaccination when it comes to prevention and fast recovery of birds from diseased condition. Many a times role of common nutrients like protein, energy, trace minerals and vitamins are overlooked and different substances are used for immunomodulation. This article throws light on how modifying or reconsidering the nutrient requirements plays an important role in maintaining optimum immune response during diseased condition. The major Phytobiotics and their mechanism of action in stimulating the immune system is also briefed in the article.

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.

M.A.Nazeer Editor & Publisher Poultry Fortune



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PFBA - MH celebrates 'National Chicken Day' in Pune



PFBA - MH President C. Vasanthkumar and the team during National Chicken Day on November 16 at Pune, India

Pune: On the occasion of the Birth Anniversary of Dr BV Rao, the Poultry Farmers & Breeders Association - Maharashtra celebrated 'National Chicken Day' on November 16. To mark this day, the chicken was sold at a discounted price across 50 chicken shops in Maharashtra. Speaking during the event, President of PFBA (MH) C. Vasanthkumar said, "Considering nutrition value of chicken, we need to eat chicken 5/6 days in a week. This will help to boost our immunity to fight against Covid- 19." He further added that "Other state poultry associations like Karnataka Poultry Farmers and Breeders Association,



C. Vasanthkumar giving chicken to promote chicken consumption



Sushanth Gosavi, Sales Manager, Godrej Tyson Foods distributing Chicken in Pune.

West Bengal Poultry Federation and many more state associations are celebrating 'National Chicken Day' to create awareness about chicken among the people." People should start eating chicken without any fear. Distribution of chicken at Food Junction, Bhandarkar Road, Pune was inaugurated by President Mr C. Vasanth Kumar. Mr Vinay Kumar from Quality Poultry and Mr Sushant Gosavi, Sales Manager, Godrej Tyson Foods were present. Mr Gosavi said that "Chicken is the best source of protein. If we eat chicken on a daily basis then the protein demand of our body will automatically be fulfilled. Hence Eat Chicken and stay healthy." As a part of its 'Chicken Awareness Campaign,' the association started a chicken promotional campaign through 'Television Commercials'

on TV 9 Marathi from November 16, 2021. Earlier, the association started "Chicken Awareness Campaign" through radio jingles on Radio City. Through this campaign benefits of chicken and the nutritious value of chicken will be conveyed to people across Maharashtra. In the next stage of the 'Chicken Awareness Campaign,' it is decided to organize 'Chicken Recipe Competition'. However, dates and other details will be dependent upon government guidelines related to Covid-19 restrictions. Hence, the Poultry Farmers & Breeders Association (MH) requested the media you to give wide publicity to this initiative which not only helps to increase chicken consumption, tbut also helps to boost the immunity of the people amid Corona virus outbreaks.



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Animal Husbandry Dept Signs MoU with FOOD Processing Ministry to extend benefits of various schemes to beneficiaries

New Delhi: The Department of Animal Husbandry & Dairying signed a memorandum of understanding (MoU) with the Ministry of Food **Processing Industries** recently for extending the benefits of various schemes to the beneficiaries by providing them credit support in establishing dairy processing, meat processing and animal feed plant. Detailing and synergizing efforts of both the departments especially in the context

of the common objective of helping the farmers double their income through the livestock sector in the need of the hour, said Union Fisheries, Animal Husbandry and Dairying Minister Parshottam Rupala. Both the departments pledged to work together to achieve the goal of income generation and sustainable development for the rural poor.

Ministry of Food Processing industries has been implementing schemes

such as one District one Product (ODOP), while the Department of Animal Husbandry and Dairying runs the credit link grant assistance scheme to dairy, fisheries, poultry and animal feed units. **Quality testing Infra** Now, new Units for ODOP products will be supported for capital investment. Similarly the units in the dairy and poultry sector will be recommended by the Department of Animal Husbandry to avail

benefits under the Prime Minister Kisan Sampada Youjana, which is meant to augument the supply chain management from farm gate to retail outlet. "There is a shortage of Milk quality testing infrastructure and village-level cold chain infrastructure which is adversely affecting the export, though the possibilities are there," the government said in a Statement.

Avitech appoints Arjun Vohra as CEO

Gurgaon: Mr Arjun Vohra has been appointed as Chief Executive Officer of Avitech wef 1st November 2021. Mr Vohra will be based at Avitech's Head Office at Gurgaon. Mr Vohrais an Economics graduate from the DAV College, Chandigarh. Mr Vohra has rich and varied experience of over 35 years in various industries. Prior to joining Avitech Nutrition, Mr Vohra was associated with Ferrari Logitech as their Chief Executive Officer.



Arjun Vohra Vohra will provide strategic impetus and direction to Avitech in its drive to become a global entity in the feed additive and premix sector.





K K Dwivedi The Management of SYLON Group of companies announces the induction of Mr K K Dwivedi as their new Zonal Sales Manager Marketing. He will be responsible for marketing activities of the group and developing marketing strategy plans and implementing the same in North & Eastern Zone and Nepal with Lucknow as head quarters. He got 30 years of experience in poultry industry and served earlier in Alembic / IBC / Interface at various levels, all team members of North & Eastern Zone will report to him. Further Business Manager

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FSSAI releases Draft Regulations for GM Foods Outlines Procedure for Prior Approval, Safety Assessment and Labeling

New Delhi, November 17: In a move that is expected to bring regulatory clarity on genetically modified on foods, the Food safety and Standards Authority of India (FSSAI) has released draft regulations stating that no one can manufacture or sell any food products or food ingredients derived from genetically modified organisms (GMOs) without prior approval. The draft has been released for seeking stakeholder views, after an inter-ministerial consultation process. The draft regulations outline the procedure for approval as well as safety assessment and labeling norms. It also specifies norms that lab s will need to adhere for testing GM foods.

'Banned in infant food'

The proposed regulations will apply to "Genetically Modified Organisms (GMOs) or Genetically Engineered Organisms (GEOs) or Living Modified Organism (LMOs) intended for direct use as food or for processing". The regulations' ambit will include food products, that may have been made using food ingredient or processing aid derived from GMOs, even if GM content is not present in the end product.

The food safety authority has also said that Genetically Modified Organisms or Genetically Engineered Organisms "shall not be used as an ingredient" in infant food products.

"No person shell manufacture, store, distribute sell or import in the country any food or food ingredient, as the case may be, derived from Genetically Modified Organisms, except with the prior approval of the Food Authority. The provisions of this regulation are in addition to, and not in derogation, of any other rules or regulations made under the Act," the draft regulations stated.

Labelling norms

The draft also proposes labelling norms for food products that contain one per cent or more that one per cent of GMO content. "All food products having individual Genetically Engineered (GE) ingredient one per cent or more shall be labelled- contains GMO/Ingredients derived from GMO." the draft regulations stated. Industry observers said the regulations once finalised will bring in clarity of regulatory status especially when it comes to imported food products. In a bid to ensure only non-GM crops are imported into the country, the food

safety regulatory had last

year said that imports of 24 crops will need to be accompanied with "Non-GM,GM-Free" certificate from January 1. However, after receiving some representations from stakeholders it was postponed and these norms march 1. The norms were laid down since FSSAI was in the process of finalising the regulations.

Venworld Organises Technical Seminars



M.R.I. Magdum, General Manager Venkateshwara Hatcheries Pvt Ltd addressing the seminar.

Venworld has conducted two technical seminars in Namakkal and Coimbatore, Tamil Nadu, on 22 and 23 November. Dr Prakash Reddy, DGM, Technical Services, Ventri Biologicals, presented on the 'Risk analysis and critical control points over IBH and Mycoplasma'. He has spoken elaborately on the evolution and emergence of new serotypes of Fowl





adenovirus in India and how critical to match the serotypes by vaccination in controlling the disease. He told Ventri's updated IBH/ HPS inactivated vaccine can give complete protection against the circulating Fowl Adenovirus serotypes in India and recommended vaccination in breeders and day old vaccination in commercial broilers for best IBH control.







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A View of Participants in Venworld Technical Seminar

He also presented on the control measures of mycoplasmosis in breeders by drug program and VHMGK vaccination. He showed the trial results for the effectiveness of VHMGK (inactivated vaccine) against Mycoplasma gallisepticum. It was clear that performances of the vaccinated flocks were better than the unvaccinated flocks. Mr M.R.I. Magdum, GM, Venkateshwara Hatcheries Pvt. Ltd, has also joined the meeting and emphasized

on the importance biosecurity of the poultry farms. Broiler breeder customers, consultants and VHL technical persons attended the seminar and appreciated the information. Dr Baburaj, DGM, Marketing, Venworld, welcomed the customers. Dr.Vijavanand, Zonal Manager, Mr Chinnaraj, Zonal Manager, Dr Kandasamy, AGM, Techical and other team members participated in the meeting. The meeting was followed by cocktail dinner and discussions, informed a note from the company.

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Aviagen India expands Diagnostics Laboratory in Ongoing Effort to Enhance Bird Health and Quality of Service to Customers

Nov. 30, 2021 – Udumalpet, India: In response to a growing demand for Ross 308 AP chicks, Aviagen India has announced a major expansion of its Great Grandparent (GGP) diagnostic laboratory in Tamil Nadu.

The laboratory is used to regularly monitor the health of Aviagen breeding stock, ensuring that customers receive the highest quality chicks. Designed to comply with International Standards Organization (ISO) requirements, the new larger laboratory includes an additional molecular diagnostic unit, and is equipped with the latest technology, including an energy-efficient heating, ventilation and air conditioning (HVAC) system with crosscontamination control to optimize bird welfare and biosecurity. Further maximizing biosecurity, it has separate rooms for bacteriology, serology and molecular diagnostics, with no cross-over between these processing areas. Supporting this modern laboratory's

efficient operation and ability to produce accurate, repeatable results is a state-of-the-art laboratory information management system (LIMS). LIMS enables traceability from sample collection until the final interpretation of test results.

On the expansion, Marc Scott, Business Manager for Aviagen India, commented, "Aviagen is committed to continuously innovating and improving to promote the success of our customers and the health and welfare of their birds. The updated laboratory features advanced technologies to enable fast and precise flock health monitoring, giving our customers assurance of consistentquality breeding stock." Dr Kavitha Natarajan, Head of Veterinary Services, added "Quality is a cornerstone of our breeding program at Aviagen India. The laboratory's improved and upgraded elements will strengthen customer success through optimal biosecurity and disease

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Mr. K.G.Anand visits The Advanced Nutrition Lab at Hyderabad

Recently, Mr. K.G.Anand - General Manager Venkateshwara Hatcheries Pvt. Ltd., visited The Advanced Nutrition Lab set up by Uttara Impex Pvt. Ltd. (UIPL) at Hyderabad. He was greatly impressed with the advanced equipments as well as with the array of tests conducted at the lab. He said, "I deeply appreciate the efforts by UIPL to help poultry farmers analyze the nutritional value of the raw material and poultry feed through the services provided by this lab. It will help the farmers immensely."



Praneeth Rao, Director, Uttara Impex Pvt. Ltd. said, "The Advanced Nutrition Lab has made the NIR Calibrations robust by taking support of Poultry Diagnostic and Research Center, Pune and ADISSEO France. The lab supports farmers by providing Total and Digestible Amino Acids of Feed ingredients by making formulations and thereby nutrition, precise and accurate. The lab is equipped with latest Mycotoxin analyzer which gives quick and accurate analyses of major toxins."

The importance of proper analysis of raw material has been increasing day by day in the Indian Poultry industry. Farmers want to understand the value of raw material in terms of AME, amino acid profile, TPP, TDAA which helps to increase bird performance. Earlier poultry farmers gave samples for proximate analysis only to 2-3 labs to ensure accuracy of

analysis. Now it is possible to get accurate analysis report with additional AME, TPP, Amino acid profile from Uttara Impex - The Advanced Nutrition Lab.

The laboratory is equipped with an Advanced Transform Near-Infrared Spectroscopy (FT-NIR) machine. FT- NIR is a non-destructive chemical analysis technology, which is a means of identifying and analyzing various raw materials. FT- NIR systems have certain advantages like higher resolution, better wavelength accuracy, higher signal energy, stability, real time analysis and repeatability. FT- NIR conducts tests like Amino Acid Profile, Apparent Metabolizable Energy (AME), Total Phytic & Available Phosphorus (TPP), Total & Standardized Ileal Digestible Amino Acids (TDAA) and provides Proximate Analysis of Raw Material

At present, the lab is receiving samples from across India on a regular basis. The raw material is tested with the following three methods to ensure an accurate analysis report-

- ADISSEO PNE services
- Venky's Indian Calibration and
- Wet chemistry

With the support of PDRC Pune, the lab has designed a robust NIR calibration for proximate analysis. This calibration is purely based on Indian raw material. After several years of testing and research this calibration provides perfect results. Making use of this calibration it





is possible to provide accurate results within minutes. Facilities like wet chemistry is also available at The Advanced Nutrition Lab where samples are analysed through advanced digital equipment's like Toxin Analyser, Digital Buretee, Magnetic Stirrer, Muffle Furnace, Hot air Oven and Advanced Protein Analyser amongst many others. The lab undertakes tests such as Crude Fiber, T2/HT-2 Toxin, Zearalenone, Soluble Protein, Thirum, Sand & Silica, Total Phosphorus etc. Oil analysis is also available here. Accurate report and on-time analysis has definitely helped farmers to trust the lab



Benefits

- Higher accuracy due to Indian calibration, Wet Chemistry and ADISSEO Precise Nutrition Evaluation (PNE) services
- · Highly experienced technical staff
- · Advanced equipments help in accurate analysis report
- · On-time analysis report

Tests Conducted At The Lab

Moisture	Calcium	Thirum
Crude Protein	Magnesium	Aflatoxin
Crude Fat	Salt	Ochratoxin
Crude Fiber	Soluble Protein	T2 / HT-2 Toxin
Total Ash	Urease Activity	Zearalenone
Sand & Silica		
Total Phosphorus		
	Moisture Crude Protein Crude Fat Crude Fiber Total Ash Sand & Silica Total Phosphorus	MoistureCalciumCrude ProteinMagnesiumCrude FatSaltCrude FiberSoluble ProteinTotal AshUrease ActivitySand & SilicaTotal Phosphorus

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MULTIPLE MYCOTOXIN SYNDROME THE EVER INCREASING THREAT

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

Major problem with the Poultry, Livestock and Aqua industries today is the Multiple Mycotoxin Syndrome or MMS, a large variety of mycotoxins, that were not tested earlier, are now being studied, evaluated and recorded on regular basis but by a very few laboratories around the world.A 2017 – 18 Survey (Provimi-India) revealed more than 95 % of the samples tested were contaminated with Multiple Mycotoxins.

There are nearly 54 detectable mycotoxins, that can be tested , most of these are not routinely tested by laboratories or regulated by the governments. Their incidence and co-existence is regularly increasing and causing damage to the production and performance of the animals and birds, while the experts in the Industry and Government/ICAR/Universities and private companies look the other way.

These Mycotoxins are here and will stay as long as the grains, their products and their by-products are being used for the feeding of the above mentioned types of animals and birds, in other words for ever.

The fact is more than 90% of the poultry and livestock problems today are directly or indirectly related to the presence of MMS, all other problems like the bacterial, viral, parasitic diseases, nutrition, vaccinations and disease control, management, hygiene and sanitation etc., together come to hardly 10 %, MMS is neither properly understood nor studied, and the market situation will not change for several years to come.

Local Vets, Poultry Advisors, Consultants and Farmers, when told of toxicity in feed as a reason for their problem, think only about the aflatoxins, Farmers are usually heard as saying I personally inspect every lorry of ingredients received and ensure its quality, Nutritionists give well balanced computer feed formulations for economy and efficiency, Vets, Pathologist and laboratory people, who fail to properly diagnose the problem, always think and tell, its some viral infection and no further work is done, taking advantage of the situation the pharma companies keep launching and introducing new products, everyone makes money while the birds and the farmers suffer directly and the consumers of the products produced by these mycotoxin affected birds suffer indirectly.

For several years, mostly and only aflatoxins are being tested and reported, other mycotoxin testing has not been taken up by the laboratories for various reasons. My request to the Farmers and their Associations, and all other Associations connected with the Poultry Farming Business is to impress upon the Central Govt., the State Govts, and private laboratories to start testing the various mycotoxins in the feed and feed ingredients used and detecting their metabolites in the body fluids and blood, that cause damage to the birds and their performance and end up in the human food chain, for the safety of both the birds and the people who consume their products.

It is well understood that testing mycotoxins in the feed or the feed ingredients alone is not enough, it needs to be combined with the body fluids and blood analysis for better understanding and covering the total risk of the presence and damaging effects of the multiple mycotoxins present. Today validated and patented biomarkers are available to test 36 different mycotoxins in blood using the FTA cards, enhancing the accuracy and helping the detection of minute quantity of mycotoxins that will escape the normal test procedures or go undected.

It is true aflatoxins and other mycotoxins, alone or in combination cause extensive damage to the GI Tract, liver, kidneys and metabolism of the birds and animals that consume it, by interfering in the nutrients uptake, suppression of the immune system, cause various metabolic disturbances in the body, inhibit protein synthesis, cause inflammation of the gut epithelium, also cause damage to the functioning of the liver and kidneys, and are sometimes neurotoxic, are cytotoxic to cells and cause cell death, some are estrogenic and interfere in reproductive performance.

As Aflatoxins never come alone, they always are accompanied by few other type of mycotoxins, they work synergistically and do the damage, hence called MMS, Mycotoxins are secondary metabolites of fungi, mostly produced by the genera like Fusarium, Aspergillus, Penicillium, Alternaria etc., One mold can produce a variety of mycotoxins, that can be classified as Neutral, Acidic or Basic depending upon their physic-chemical properties, hence any one product, chemical or ingredient/item will not be able to give desirable results.

Till the establishment of laboratories with the latest state of the art analysing and detectingfacilities for various mycotoxins, the Farmers, field Vets., and others need not worry, get the aflatoxin tested (these facilities are available in almost all places) and multiply it with a factor 3.5 during dry weather period and with a factor of 5.5 during wet weather period, new grains with higher than normal moistureand for places close to the coast where humidity is high, that will give the approximate mycotoxin load of the feed that needs to be looked into and its remedial methods/ products adjusted accordingly.





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The strategy that works best in the absence of the elaborate testing for the mycotoxins, considering the above mentioned situation and available facilities, begins with purchase of good quality, dry grains with less than 12 % moisture, the storage area be sprayed with a product containing a mix of organic acids to check the growth of fungus on weekly basis, prevent rodents and insects in the storage and feed milling area as is done in the storage area's of FCI, and in the farms, use products that protect the health and functioning of the GI Tract, Liver and

Kidneys of the birds, a good toxin binder, adsorber and absorber to bind the mycotoxins already produced, along with product for the biotransformation or enzymatic degradation of the chemicallydifferent toxic molecule, and a good probiotic, also support the immune system of the birds to ensure the vaccines used give the desirable results, simultaneously increase the inclusion level of trace minerals and vitamins by 25 to 30 % during this period, to ensure minimum damage to the flock and its performance and to get maximum returns.

Poultry Management: A Useful Tool for the Control of Necrotic Enteritis in Poultry

Compiled by: Dr. Sekhar Basak, Innovista Feeding Solutions Pvt. Ltd. New Delhi, (IND) Email: md@innovistaconsulting.com

Introduction

Necrotic enteritis (NE) is one of the most widespread diseases in broilers, imposing a significant economic burden on the poultry industry worldwide. Its total global economic loss is estimated to be over \$6 billion annually, while its occurrence is estimated to result in a 12% reduction in body weight and a 11% increase in feed conversion ratio compared to healthy birds.

Despite our present understanding of the disease, and the identification of Clostridium perfringens as the aetiological agent, the predisposing factors, which are essential for the outbreak of the disease, are not fully understood. These factors can influence the ecosystem and disrupt the balance in the intestine, leading to the outbreak of the disease.

Poultry management includes all those practices applied to poultry at the farm level, in order to allow them to express their genetic potential efficiently and effectively. It takes into account health, welfare, legislation and economic issues, but its effect on gut health has not been fully elucidated. This review focuses on managerial strategies, such as nutrition, health and husbandry, which could be used to control NE in poultry without the use of antibiotics.

Nutrition management

The raw materials and physical form of poultry feed significantly affect the pathogenesis of NE in broiler chicks. In particular, high levels of animal protein, fat and cereals, which contain increased content of non-starch polysaccharides, are well known NE risk factors. They can alter the physicochemical properties of intestinal digesta, can affect the microbiota, can provide substrate and create an environment that favours the growth of C. perfringens in the intestine. Feed management is a promising strategy for the control of NE. Feed restriction is applied in poultry, in order to control the growth rate and to prevent metabolic disorders. Tsiouris et al. showed that feed restriction of broiler chicks limited the severity of NE lesion and reduced the C. perfringens population in the caecum in an NE experimental model. The protective effect of the feed restriction against NE was attributed to the neuroendocrine and immune system influence, as well as to the absence of nutrients in the intestinal tract. Furthermore, feed restriction improves blood circulation to the intestinal mucosa and may protect it from becoming necrotic.

Feeding of whole grains is a management practice used frequently in poultry, in order to reduce feed costs. The mechanical stimulation of the gizzard, in addition to the associated reduction of the pH in the intestine, provides an unfavourable environment for C. perfringens proliferation and could be used to combat enteric diseases in poultry. However, there are no scientific data available for the effect of whole grain feeding on NE.

Health management

The best-known predisposing factor for NE is the mucosal damage caused by coccidial infection. In contrast, attenuated anticoccidial vaccination, which also causes mild intestinal lesions, showed a significant protective effect against subclinical experimental NE in broiler chicks. The protective effect of anticoccidial vaccine against NE was attributed to the stimulation of non-specific and specific immunity mechanisms, as a result of local inflammation. In addition, the reduction of severe coccidiosis lesions in the mucosa limits the mucous secretion and the available nutrients for C. perfringens proliferation in the gastrointestinal



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tract. Finally, the control of coccidiosis discourages the attachment of C. perfringens to the intestinal mucosa. Immunity, specific and non-specific, against C. perfringens is an essential factor for the control of NE. The vaccination programme must target against immunosuppressive diseases of poultry, such as Gumboro disease, chicken infectious anaemia, Marek's disease, etc. Moreover, vaccination against C. perfringens seems a logical preventive tool for protection against NE. However, only a C. perfringens type.

Mycotoxins are numerous and commonly found in poultry feed. They are implicated with growth retardation in poultry and pose a risk to public health. In addition, in an experimental NE model, broiler chicks fed a diet contaminated with 5 mg deoxynivalenol/kg of feed were predisposed to NE. Mycotoxins negatively influence small intestinal epithelial cell integrity and morphology, and are also related to immunosuppression, which subsequently could increase the severity of coccidiosis and NE lesions. Husbandry management

Stocking density is a management factor with critical implications for the poultry industry, since excessive density can have a negative effect on the performance, welfare and health of birds. As far as NE is concerned, high stocking density increased significantly the incidence and severity of NE and liver lesions, as well as the pH and C. perfringens counts in the caeca in an experimental NE model. The stress of birds reared under high stocking density can negatively affect the humoral immune system and the poultry litter quality, which subsequently could increase C. perfringens in the litter and affect the intestinal microbiota.

Temperature is one of the most important physical environmental stressors, which could significantly affect the performance, health and welfare of poultry as well as the profit for the farmer. According to the results of the experimental study by Tsiouris et al, cold stress predisposes birds to develop NE lesions, as a result of immunosuppression. Similarly, heat stress was associated with the outbreak of NE in unchallenged birds and increased the severity of NE lesions in experimentally infected broiler chicks. These effects can be attributed to the influence of high environmental temperatures on the immune system and on the intestinal microbiota. The role of heat shock proteins, which increased under various stressors including heat stress, is also important.

Additional husbandry factors, such as the poultry house microenvironment (e.g. air humidity, litter condition), which are also affected by temperature, may be involved and further research is needed. Furthermore, lighting programme is an essential husbandry factor, which significantly affects the performance, the welfare and the immunity of birds. However, there are no studies about its effect on NE.

Conclusion

NE represents a classic example of a multi-factorial disease process in poultry. It is a consequence of imbalance of the intestinal ecosystem, as the presence of C. perfringens per se does not lead directly to disease. Additional factors that modify the intestinal ecosystem and allow the overgrowth of C. perfringens are required in order to elicit the clinical signs and lesions of NE. Thus, an outbreak of NE is considered as a gut health issue and depends on interactions between host, infectious, nutritional and managerial factors.

The ban of antimicrobials and the financial impact of NE in modern broiler industry have led to the development of new strategies for its control. The identification of C. perfringens virulence factors and the control of predisposing factors are strategies of major importance. Optimization of poultry farm management practices, including husbandry, strict biosecurity and poultry house sanitation protocols, dietrelated strategies and nutraceutical alternatives (probiotics, prebiotics, herbs, organic acids and enzymes) have become more relevant. Active immunization will be effective, as a part of a holistic approach for the control of NE and not on its own

The past decade was characterized by great progress in understanding the aetiology and pathogenesis of NE in the gut of chicks. New research should focus on reducing the risk of the disease by enhancing or avoiding management practices as appropriate, controlling the pathogenic C. perfringens in the intestine, as well as by enhancing the immune system and the intestinal microbiota of chicks. For further information on control of Clostridium perfringens and NE, feel free to contact:





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Its time to adopt Automation and Infrastructure Creation in Poultry

-- Ricky Thaper, Treasurer, Poultry Federation of India

After achieving a healthy growth in India's poultry sector in the last many years, time has come for the sector for adoption of automation and infrastructure creation at the marketing point for ensuring that quality meat is supplied to consumers.

India's poultry sector, despite the challenging times of 2020 and 2021, has been one of the fastest growing segments of Indian agriculture and allied sector. In fact, while the agricultural production has been growing at around two percent, in the last decade, the production of eggs and broilers has been rising in the range of around eight to ten percent on an annual basis. The Poultry sector especially is growing at a compounded annual growth rate (CAGR) at a constant 10.5% and playing critical role in promoting livelihood options in the rural economy. Due to this steady growth, India has emerged as the world's third largest egg producer and sixth largest producer of broiler meat. Economic growth, rise in urbanization and stress on consumption of protein rich food have contributed to steady growth in demand for poultry meat and eggs.

Despite several field and raw material rates challenges, the business-to-consumer demand for poultry remains good. Consumers are looking for additional sources of protein rich foods and poultry meat is preferred over other meat products as it is considered more hygienic and supplies are uninterrupted throughout the year in relatively economical prices compared to prices of mutton and fish. According to Basic Animal Husbandry Statistics, 2020, India's poultry meat production was 4.34 million tonnes, contributing more than 50% of the total meat production in 2019-20. The egg production stood at 114.38 billion in 2019-20.

According to the National Action Plan for egg and poultry – 2022 prepared by Department of Animal Husbandry, Dairying and Fisheries, more than 80 percent of India's poultry output is produced by organized commercial farms. Major poultry companies have vertically integrated operations which comprise approximately 60-70 percent of the total poultry meat production.

The broiler meat industry is witnessing growth because of adoption of the backward integration system. The companies, which are integrators, have hatcheries, feed mills, and primary processing facilities. The integration model ensures that farmers (who own farms with 5000 – 10,000 broilers capacity) are insulated against fluctuations in market prices as under the contract they remain assured of getting predetermined fixed prices. Directly and indirectly this poultry sector provides employment to around six million small and medium farmers

However, for meeting rising demand for poultry products in the coming years, the poultry farmers need to adopt automation for ensuring efficient production system and improving infrastructure at the existing wet market.

A large chunk of the broiler and layer farms in India do not have climate control system, which exposes the broilers or layers to various climate changes, which could adversely impact productivity. Latest farming technologies such as climate-controlled farm houses, automated feeding lines etc. can help improve the productivity in farms. Feeding, water supply, temperature and humidity control are some of the variables that require automation in poultry farming.

With rising cost of labour as well as reduction in supplies of workforce in parts of the country, the automation at farm level has to be installed for bringing in efficiency in the production at broilers and layers farms. According to industry sources, automatic feeding system could reduce the labour cost and improve farming level and Feed Conversion Ratio (FCR) efficiency.. With automation, FCR is bound to improve further thus making India's poultry meat production more efficient. The broiler and layer farmers usually refer to feed costs as the critical component of controlling and lowering production costs.

There has been gradual adoption of environmentally controlled (EC) sheds by commercial broiler farmers. The EC sheds ensure bigger harvests, better feed conversion and economy both on capital and revenue investments. Keeping air and floor temperature in the house fully under regulation are essential during brooding. Some of the elements of EC sheds include temperature and humidity maintenance, supplementary levels of heating and cooling at all times, increase of biomass in the shed and floors are prepared for keeping the even heat distribution.

The Commercial production of eggs and chicken meat on scientific principles has been well standardized, while the marketing system of eggs and broiler meat are not fully organized. Eggs are sold mostly from retailer next door for meeting the daily needs of consumers. Eggs go through the value chain of wholesale dealers, sub-dealers, retailers etc.

Broilers are sold live or slaughtered openly in the liv market and according estimates around 90% of broile meat is sold through wet market. There is need for creating infrastructure for hygienic slaughter. There is need fo investment in improving marketing infrastructure for both broiler birds and eggs for attracting more health-consciou consumers especially in the post-COVID phase. Hence there is a need for setting up of broiler meat processin plants in the near future and sale of processed chicken to increase both to cater domestic as well as export markets

The demand supply situations witness significant seasona fluctuation in broiler and eggs prices. The prices as well as demand mostly decline during religious festivals. The majo industry players attempt to support prices by reducing chick placements when demand falls. However, th industry needs to put in place robust market information in advances by assessing demand pattern.

The demand for poultry and processed poultry products has seen an expansion especially since middle of 2020. There has been huge increase in e-commerce with expansion o home delivery as a response to COVID-19 lockdowns an the fear of exposure by shopping in traditional wet markets The online segment is expected to continue to drive broile and eggs consumption in the coming years thus by pushing increasing per capita consumption of poultry meat an eggs.

Recently the Government had announced Special Livestoc sector package amounting to Rs.9,800 crore over th next five years starting 2021-22. The poultry meat as well as egg sectors must take advantage of this financial assistanc to boost infrastructure. A capital subsidy should be there on setting up EC sheds with improvement in infrastructure in the wet market that would boost demand as well as consumption.



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Immunomodulation - Role of Nutrition and Phytobiotics

Dr. Sathya Sooryan, MVSc (Animal Nutrition), PGDOH Product Manager, Vetogen Animal Health Email: sathyas@vetogen.com

Highlight Points

Immunomodulation in birds have become as important as vaccination when it comes to prevention and fast recovery of birds from diseased condition. Many a times role of common nutrients like protein, energy, trace minerals and vitamins are overlooked and different substances are used for immunomodulation. This article throws light on how modifying or reconsidering the nutrient requirements plays an important role in maintaining optimum immune response during diseased condition. The major Phytobiotics and their mechanism of action in stimulating the immune system is also briefed in this article.

Immunomodulation

Manipulation of immune system in any manner is defined as immunomodulation. Immunomodulation to accomplish an intended goal can be achieved by pharmacological means or by supplementing specific dietary nutrient or by supplementing herbs with specific phytochemicals or by combination of any of these. It is also distinct that correcting nutritional deficiency also has a positive impact on immunomodulation. In this article role of different nutrients and herbs in building, modulating and functioning of immune system is briefed

Poultry Immune System & Function

Birds primarily prevents the entry of foreign organism entering the body system by physical barrier like skin and mucosal membrane which consists lining of digestive tract and respiratory tract. If these physical barriers fail to prevent the entry of foreign organisms, immune system of birds recognises these foreign organisms to initiate and manage the physiological response of the body to neutralize or eliminate them.

Poultry immune system primarily consists 2 forms of immunity i.e. innate and acquired immunity. Innate immunity is a group of non-antigen specific mechanisms meant to eliminate pathogens from the bird, and is one of the earliest defence mechanisms against any infectious agent. If pathogens evade these barriers, pathogenassociated molecular patterns (PAMP) present on the organisms are recognized by the cells of the innate immune system through Toll-like receptors (TLR) and pattern recognition receptors. The localized activation of innate immunity can lead to inflammation, which involves the release of chemical signals that result in the recruitment of phagocytic cells like heterophils, dendritic cells and macrophages which kill pathogens through the release of toxic chemicals such as reactive oxygen species and nitric oxide and through degranulation. The phagocytes also process and present antigen to cells of the acquired immune system. Other innate immune cells protect the host through activation of complement proteins, which targets pathogens for elimination by other cells, and the release of histamine and heparin from mast cells, which dilates blood vessels and further recruits phagocytic cells to the site of inflammation. Unlike the acquired immune response, the innate response recognizes generic patterns and non-self molecules, and therefore does not exhibit immunologic memory. That is, a given pathogen will elicit a similar innate response each time it is encountered.

During an inflammatory response, the innate immune cells release signals that travel throughout the body both to recruit distant immune cells to the site of infection, and change the metabolism of them, an inflammatory response can be nutritionally costly. The body creates an inhospitable environment for the invading pathogen by increasing metabolic rate (fever), reducing feed intake, and initiating the preferential breakdown of skeletal muscle to support gluconeogenesis and synthesis of acute phase proteins in the liver.

Acquired immunity involves a specific, targeted response to the exposure and recognition of specific activators of immune function (antigens). The acquired immune response involve B cells that produce antibodies to antigen and cytotoxic T cells that actively kill specific invading pathogens. The acquired response results in immunologic memory with rapid response to the particular antigen every next time encountered. The acquired response typically has a minimal effect on energy and nutrient requirements of the bird, because the nutrients used for antibody production and expansion of B cell populations is minimal, even then lesser nutrients reaching to birds will result in sub optimal immunity status.



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The Role of Nutrition

Nutrition is a critical determinant of immune responses and malnutrition is the most common cause of immunodeficiency worldwide (Kirk, 1997; Chandra, 1997). Optimum nutrition not just ensures the proper growth of the bird but it also ensures optimum immunity. Role of major nutrients in maintaining and building immunity is discussed below.

Role of Protein

Each and every cells in the bird's body is majorly made of protein next to water, these cells combine together to form a tissue and tissues combine to form an organ. Similarly, all the enzymes, receptors, antibodies, chemical signals that recruits phagocytic cells, immunoglobulins are majorly made of proteins. The lower protein level in the feed not just effects the production of the birds but also weakens the immunity of the birds which predisposes the birds to many other diseases. Hence recommended protein level is needed to maintain the good performance of the birds and also to maintain optimum immunity and to reduce the incidence of diseases. Likewise increasing the protein percentage in feed in diseased condition increases the bird's ability to fight against the infection by producing enough immune cells, antibodies, immunoglobulins and related substances.

Role of Energy

Energy is the currency used in body for every reaction. Birds receiving all nutrients in optimum level, with sub optimum level of energy will express less immune response compared to birds receiving optimal energy. Poultry confronted with disease or physiological stress, adapt to the situation by increasing the body temperature, producing the immune cells and related substances in order to survive. This process of adaptation is essential and requires energy. The energy for adaptation comes from the three energy-yielding nutrients: carbohydrates, lipids, and proteins. These nutrients are only available from the feed and the nutrient reserves in the animal. During diseased condition, feed intake reduces and also nutrients in the feed are not digested and absorbed efficiently, and the animal must rely on the nutrient reserves of the body. These reserves are very important and help to sustain the animal during the diseased condition. The muscle and liver carbohydrate stores (glycogen) are immediately called upon to furnish energy. Protein is broken down to yield the glucogenic and ketogenic amino acids which, following deamination, will supply the bird with energy. This energy from carbohydrate and protein allows the bird to maintain its health and survival. During stress the vital functions of the brain, liver, heart, lungs, kidney, etc. cannot be compromised. Therefore, the less important functions such as egg production, reproduction, growth, and immunity are set aside to promote the vital functions of the body in stressful situations. Immediate survival is the number one priority in all animals when they are confronted with a severe stressor. The full genetic potential of the bird for growth and egg production is not expressed during stress.

The shift in metabolism during stress results in muscle protein and glycogen store depletion. During stress the consumption of water increases as a result of the necessity to clear the additional uric acid excretion arising from protein breakdown (Siegel and Van Kampen 1984). The increased water consumption is also probably necessary to maintain osmolality in the body fluids due to the increased sodium retention concurrent with the effects of corticosterone (Holmes and Phillips 1976).

Role of Micro Nutrients

The Micro nutrients especially trace minerals and vitamins even though their requirement is very little in the feed, they play a major role in influencing the immune responses. Micronutrient's role in oxidative stress management also protects birds from decreased performance, compromised immune function and poor meat quality.

Trace Minerals

The major trace elements such as selenium, zinc, copper, manganese, etc. have immunomodulatory effects and thus influence susceptibility to variety of viral infections. Some trace elements inhibit viral replication in the host cells and therefore have antiviral activity. Many trace elements act as antioxidants, regulate the host immune response and also has ability to alter the viral genome.

Selenium is an essential mineral for organic function and antioxidant function in organism, it neutralizes the free radicals that are resultant from many factors but especially by immune response. Selenium is the cofactor for the enzyme glutathione peroxidase which catalyzes the removal of peroxides (oxidative reaction of free radicals) thus important in the prevention of oxidative stress. Diet is the major source of selenium. In poultry, the nutritional requirements for all nutrients and even selenium was normally calculated based on experimental trial using healthy animal in very low challenge conditions. However, on practical way animals are continually exposed to different infection challenges and intense vaccine program increasing immune system activation. On this aspect, there are studies that show that immune activation response increases the necessity of nutrients, vitamins and minerals. Trace minerals especially selenium, zinc, copper, manganese, are required for proper immune development and function. Deficiencies can cause decreased antibody responses to vaccination. Multiple inorganic (sulfate and oxide) and organic sources (glycinates, methionine and HMTBa-chelated) in poultry have demonstrated source differences in both immune development and response to antigenic challenge. Supplementation with the organic sources had clear advantage over inorganic sources in improved cellular or antibody responses to vaccination.



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Vitamins

The most important vitamins that influences immune system are Vitamin C and Vitamin E, their influence on immune system is mainly due to strong antioxidant effect. Vitamin C acts as pro-oxidant and reduces transition metals, such as cupric ions (Cu2+) to cuprous (Cu1+), and ferric ions (Fe₃₊) to ferrous (Fe₂₊) during the conversion of ascorbate to dehydro-ascorbate, which otherwise generate superoxide and other reactive oxygen species. Reduction of Fe₃₊ into Fe₂₊ improves iron assimilation by intestine and thereby improves resistance to infections. A high concentration of Vitamin C is found in immune cells and is consumed readily during infections. It has been hypothesised Vitamin C to modulate the activities of phagocytes, the production of lymphocytes and cytokines, and the number of cell adhesion molecules in monocytes (Preedy et al., 2010).

Dietary vitamin E supplementation has an excellent immunomodulatory effect, The role of vitamin E for the functionality of the immune system has been extensively studied and it is based on the capability of vitamin E to prevent lipid peroxidation in membranes caused by lipid peroxyl radicals. Infectious diseases are an important factor in the production of free radicals for example as a consequence of macrophage function.

It was observed in several studies that 300 mg/kg vitamin E improved immune response and reduced mortality during diseased condition in poultry. Vitamin E also improved the immune response to vaccinations against Newcastle disease and promotes the phagocytic activity of macrophages, especially at thymus level and is involved in other immune mechanisms mediated by cells. Chicks from hens supplemented with vitamin E presented better humoral immunity and more active lymphocytes. Broilers infected with the virus causing malabsorption syndrome has suffered less damage and recovered sooner if the breeders had received a higher vitamin E supplementation.

Role of Phytobiotic or herbal extracts

Natural products and natural product derivatives has a traditional history as immunostimulants. Emerging evidence indicates that herbal plants exert their beneficial effects on animal immune system mostly by plant's secondary metabolites. The immunostimulating activities of many of these components have been most widely studied in mouse, chicken and human cell lines. These pharmacological effects are extensive ranging. For example, Ginsing with its steroidal saponine, has immune-stimulating properties including cytokine production (IL-2, IL6, TNF-a and INF-y), macrophage activation and lymphocyte activity (Tan and Vanitha, Conversely, flavonoids and terpenes from 2004). Ginko biloba can mediate production and inflammatory cytokines (Li, 2000). Saponins have ability to stimulate the cell-mediated immune system, as well as to enhance

antibody production and cytokines such as interleukins and interferons (Od a et.al., 2000). As against the stimulatory effects on specific immunity components, saponins have also been shown to be capable to put a stop to some non -specie immune reactions such as inflammation and monocyte proliferation (Delmas et al., 2000; Yui et al., 2001) polysaccharides, also has been extensively . Herbal plant studied for immunomodulatory effects, polysaccharides obtained from Chinese herbs, Astragalus root, Isatis root, Achyranthes root and Chinese Yam improves antibody titer in vaccinated chicken. Phytosterol complex seems to target specific T -helper lymphocytes, the THI and TH2 cells, helping normalize their functioning, resulting in improved T-lymphocyte and natural killer cell activity. Furthermore, it has also been reported that Chinese herbs can stimulate the development of immune organs, such as the thymus and spleen as well as increase antibody production.

Conclusion:

Immune system cannot always rely on feed alone, but it is strongly supported by nutrients. Stressors like infectious challenges increases specific nutrient requirement, especially trace minerals like Selenium and Zinc, and Vitamins like E and C which cannot be overlooked for better immune response. Herbal extracts with emerging evidences strongly indicates its major role in improving the immune response. Ensuring the crucial-nutrient requirement via supplementation along with addition of specific herbal extracts ensures optimal immunity in birds.





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ALL ABOUT FEED – GUT HEALTH SPECIAL

Nutribiosis is key is post-AGP gut health

With the global regulation of antibiotic growth promoters expected to accelerate, what action can animal producers take to correct associated performance losses? Dr. Milan Hruby, global applications senior manager at Danisco Animal Nutrition, explains how taking a wider view offers a potential solution to this complex issue.

The move to restrict or remove antibiotic growth promoters (AGPs) in feed is one of the most challenging issues to hit the animal industry in recent years. Now, as global health bodies step up efforts to fight the threat of antimicrobial resistance in humans - viewed as a major public health issue - the use of antibiotics in the food chain is coming under ever greater scrutiny. It goes without saying that reducing or removing antibiotics from the farm is not an easy task. Taking away this long-established practice has serious implications for producers in terms of the health of their livestock and business. Most importantly, the daily challenge of providing optimal animal performance is severely compromised due to the depletion of available tools to fight against unpredictable diseases, such as Necrotic Enteritis (NE). According to recent research, such challenges are reportedly on the rise and believed to be contributing to high economic losses.

In considering alternatives to conventional antibiotics, however, it is not a question of a simple, "one size fits all" replacement. There are too many variables to consider such as farm management, national legislation and feed ingredient availability, to name a few. In addition, the use of antibiotics in - and of - itself is a complex process. Although they are known to suppress sensitive populations of bacteria in the intestines, for example, it is also recognised that they do not discriminate between beneficial and nonbeneficial types. Viewed in this context, continuing to look solely at nutrition as a stand-alone solution, without also considering the implications of the fields of microbiome and gut & immune function, is no longer an option. Animal performance is always an interaction of all three pillars (nutrition, microbiome and gut & immune function) within the gut - a state we refer to as nutribiosis. The aim is to understand how to positively influence all three pillars to achieve balance in the gastrointestinal tract (GIT) - also known as a "favourable nutribiotic state" - and so deliver the sought-after positive performance benefits in the animal.

Challenges to nutribiotic state

The removal of antibiotics from feed will naturally challenge the delicate nutribiotic balance, but it should be noted that their use does not allow for a "favourable state" in the first place. Under challenge the three pillars can become unbalanced and it is this lack of harmony that creates an "unfavourable state" in the gut; leading to reduced health and performance. This is why taking a holistic approach is vital. It helps to build a deeper understanding of these interconnected relationships and opens up new opportunities to improve overall production.

Nutritional challenges

Nutritionally, one of the greatest challenges to animal performance is high levels of undigested nutrients. While 100% digestibility can never be achieved, reducing levels as far as possible is a key goal for nutritionists and producers alike. This is partly because undigested feed reaching the terminal ileum provides ideal substrates for non-beneficial bacteria to feed on and thrive – and when the beneficial bacteria becomes outnumbered, it can lead to subclinical diseases, inflammation and gut damage. One opportunity that warrants further investigation is the use of feed enzymes to further remove undigested substrates. One study1 looking at the impact of xylanase, amylase and protease enzymes on levels of three undigested nutrients (protein, starch and fat) found that this intervention had a positive effect on all three nutrients. Levels of undigested starch, for example, dropped by 43%. Further research is helping to build on this knowledge; not just in terms of the types of feed or substrate needed for the microbes to work on, but also how to increase the production of shortchain fatty acids and potentially benefit the gut cell or gut microbiome through changes of substrate such as arabinoxylooligosaccharides or AXOS production.

Non-nutritional challenges

It is also important to understand the impact of nonnutritional challenges on the nutribiotic state. Particularly, how the immune response cuts into animal performance. Danisco has carried out a number of studies with NEchallenged birds which, unsurprisingly, demonstrate a significant reduction in performance. A recent study estimates that an immune response can account for 25% of total body weight reduction during a challenge. (See Figure 1). A promising way to address these types of nonnutritional challenges is with probiotics. What is interesting from a nutribiosis perspective is that, with studies2 demonstrating a positive influence on both microflora and gut health, these helpful bacteria can be seen to work constructively on all three pillars within the GIT. The next step is to demonstrate probiotic value within an antibioticfree narrative. Figure



Figure 1 -25% of total performance drop during challenge can be attributed to the immune response of the animal.

Multi-pronged approach

While enzymes and probiotics undoubtedly offer benefits individually, one of the most exciting areas to explore what happens when they are used together. Our data points to a clear opportunity to make considerable gains. Specific enzyme and probiotic combinations have been shown to improve key aspects of gut health including digestibility of key nutrients in broiler diets and enhanced intestinal integrity. Research also suggests this intervention contributes to a significant reduction in inflammation. IL-6 is a key pro-inflammatory cytokine which initiates the acute phase protein response and induces fever, see Figure 2. This cytokine is typically elevated during times of physiological stress.

There are other issues to consider which are subject to further research. Improving the water holding capacity of intestinal cells, with the use of organic osmolytes like betaine for example, may improve the nutribiotic state. Phytogenics could also be part of an integrated approach. Equally important is effective facilities management; housing, vaccination, education should all play a part in efforts to rectify any performance losses brought about by the reduction in antibiotics. So as the industry continues to evolve towards antibiotic-free production, the understanding of nutribiosis offers a new platform to explore additional opportunities; providing valuable insights for improved animal performance, welfare and gut health – and ultimately helping producers make more profitable decisions for commercial success.



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