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May 2023

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W-80 INDIA IS NOW RECOVERING FROM DISEASES FASTER THAN THE OTHER BREEDS

Disease Recovery at Farm in Telangana

Age of the Flock		2023	Week. Avg. H.D%		Cum. Mortality%		Cum. H.H.Eggs	
			W-80 India	Other Breed	W-80 India	Other Breed	W-80 India	Other Breed
●	19	20-Jan	16.60	43.89	0.03	0.04	1.17	3.07
●	20	27-Jan	54.00	73.50	0.09	0.12	4.94	8.21
●	21	03-Feb	79.60	82.46	0.18	0.23	10.51	13.98
●	22	10-Feb	88.21*	69.00*	0.29	0.42	16.67	18.80
●	23	17-Feb	74.68	62.00	0.41	0.62	21.88	23.12
●	24	24-Feb	68.70	69.26	0.53	0.79	26.67	27.94
●	25	03-Mar	76.66	75.16	0.64	0.94	32.01	33.16
●	26	10-Mar	83.22	78.75	0.77	1.08	37.80	38.62
●	27	17-Mar	86.70	80.76	0.90	1.24	43.81	44.20
●	28	24-Mar	88.43	82.03	1.04	1.39	49.95	49.87
●	29	31-Mar	89.50	83.80	1.16	1.54	56.15	55.66
●	30	07-Apr	90.23	85.00	1.27	1.67	62.39	61.52
●	31	14-Apr	90.34	86.17	1.40	1.82	68.64	67.45

*Impacted by VVND

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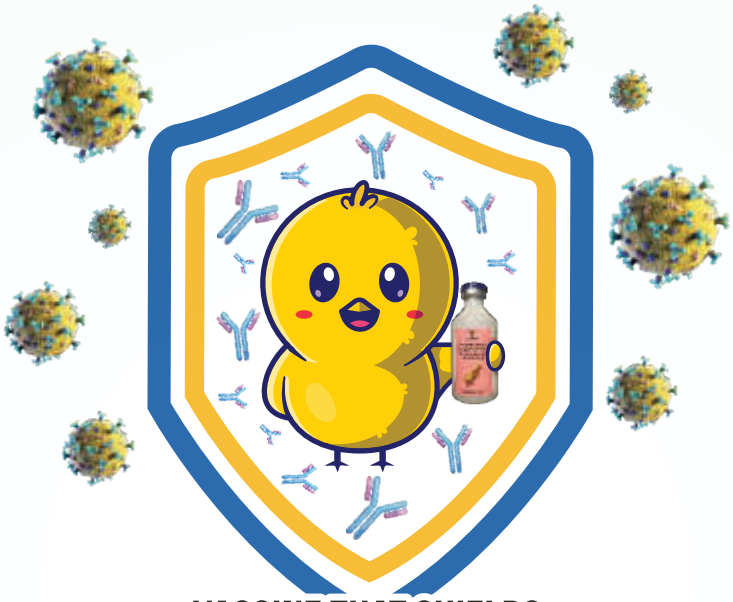

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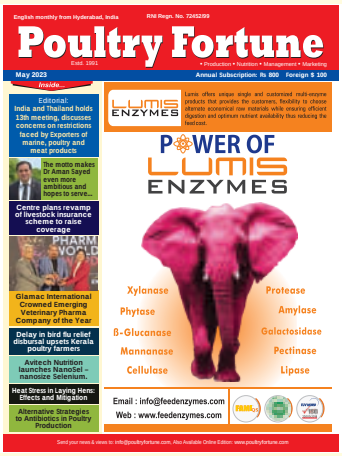

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M. A. Nazeer

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India and Thailand holds 13th meeting, discusses concerns on restrictions faced by Exporters of marine, poultry and meat products

Heat stress can have a significant influence on laying hens, so it's critical to understand what it does and how to avoid it. The poultry sector has grown quickly during the past few decades. Improvements in the genetic selection of the many breeds of laying hens have supported this evolution. There are multiple strategies to deal with heat stress in chickens, including proper curtain management, ventilation system adaptation and modification of the water and feed supplied. Some solutions offer vitamins, minerals and immunostimulants to help chickens avoid heat stress and build their immune systems.

Dear Readers,

The May 2023 issue of **Poultry Fortune** is in your hands. In the news section, you may find news about ....

India and Thailand held 13th meeting of the India - Thailand Joint Trade Committee (JTC) in New Delhi, the first physical meeting of the JTC that was revived in 2020 after a gap of 17 years. The Indian delegation, during the meeting, raised concerns about the restrictions faced by its exporters of marine, poultry and meat products. The meeting was co-chaired by Director General of Department of Trade Negotiations, Ministry of Commerce of Thailand, Auramon Supthaweethum and Joint Secretary, Department of Commerce, Ministry of Commerce and Industry, India Indu C. Nair. During the meeting, the two countries discussed various issues related to bilateral trade and cooperation during the meeting.

China's Ministry of Agriculture and Rural Affairs published guidelines that recommended lowering the amount of Corn and Soybean Meal in pig and poultry feed. According to a report from Reuters, the guidelines include recommendations for alternative ingredients with the goal of improving the usage of available raw materials and creating a formula that better suits China's conditions.

Glamac International Pvt Ltd, the upcoming Indian company in poultry nutrition segment, added another feather to its cap by winning the 'Emerging Veterinary Pharma Company of the Year' award at the 3rd Economic Times India Pharma World Awards 2023. The awards ceremony took place at the Hotel Taj Santacruz, Mumbai. Glamac introduced in India the globally renowned product Panbon is from Herbonis Switzerland - Vitamin D3 metabolites. It is a new and natural key element in animal nutrition - Initiated our drive for healthy bones and eggs of chicken.

Brazil might become one of the world's largest corn exporters and cheaper than the US corn. Chinese companies turn to alternative suppliers to diversify imports and increase food security. Steinbach also analyses the possible effects of a less competitive US grain production in the global food trade and how it might impact countries like Brazil. The conclusion is that unless the US reduces its corn prices or Brazilian production become uncompetitive (both unlikely), Brazil will continue to increase its corn exports to China – the largest consumer worldwide.

Mr Chitturi Jagapati Rao, a living legend of poultry industry, founder and chairman of Srinivasa Farms Pvt Ltd, celebrated his 90th birthday on 15 April 2023 at Hyderabad

Dr Aman Sayed, managing director for India and regional director of South Asia, Alltech Biotechnology, shared his 23 years career journey in poultry and aquaculture sectors. He feels that his motto makes him even more ambitious and hopes to serve in large geographic areas in future. He received his master's degree in veterinary (poultry) science from Bombay Veterinary College and was honoured with gold medal distinction

Contd on next page

NRS GROUP

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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both at graduation and post-graduation. The company produces specialty ingredients, premix supplements, feed and biologicals, backed by science and an unparalleled platform of services.

In the Articles section – *Heat Stress in Laying Hens: Effects and Mitigation,* *authored by* ***Dr Rambabu. D,*** said that heat stress can have a significant influence on laying hens, so it's critical to understand what it does and how to avoid it. The poultry sector has grown quickly during the past few decades. Improvements in the genetic selection of the many breeds of laying hens have supported this evolution. Additionally, there have been notable advancements in management, management welfare and nutrition. In order to meet the significant feed demand around the world, poultry farming has been able to combine all of these operations and optimize them. Poultry houses are distinguished by a high animal density inside the building. If adequate management conditions are not established, this large number of animals raises the temperature within the house. There are multiple strategies to deal with heat stress in chickens, including proper curtain management, ventilation system adaptation and modification of the water and feed supplied. Finally, some solutions offer vitamins, minerals and immunostimulants to help chickens avoid heat stress and build their immune systems.

Article titled – ***Alternative Strategies to Antibiotics in Poultry Production,*** *authored by* ***Prof. R.N.S. Gowda,*** said that alternative products play a crucial role in allowing farmers and veterinarians to reduce the use of antibiotics. Vaccines are among the most promising and widely used of these alternatives, but pre-probiotics and other innovative products are also in use are currently being recommended. Many of these have been shown to simultaneously prevent infection and improve animal performance, such as growth rate or egg production etc. However, the efficacy of alternative products tends to be variable across individual livestock operations and with the disease status of herds / flocks, and is often affected by external factors such as weather or feed composition. Withdrawal of antibiotics from poultry feed have created the need for alternatives that would influence improvement of health and production traits of chickens and safety for human consumption of poultry products.

Another article titled – ***Cultured Meat and its Current Trend*** *- authored by* ***G. Ramya and G. Vignesh,*** said that the current population of World is 8,045,311,447, it is 0.88% increase from 2022. In 2050, the world's population is going to be 10 billion and feeding this population with the current food system is impossible. In future sure there will be a Climate Disaster and there is deficit in supply of good quality protein to human population is impossible, it advocated that innovation in food technology is very essential for our future generations. Cultured meat is made by growing animal cells in a lab. To take a cell sample, a biopsy is done on a live animal under local anesthetic and then the harvested stem cells are fed a growth medium containing amino acids, glucose, salt, vitamins and other nutrients and grown in a bioreactor. The cells multiply creating muscle tissue, which are then turned into the scaffolding of the final product, for instance a beef steak or a burger.

M.A.Nazeer
Editor & Publisher
Poultry Fortune

India expresses concerns to Thailand over export restrictions on marine, poultry and meat products

India and Thailand held 13th meeting of the India-Thailand Joint Trade Committee (JTC) held in New Delhi, the first physical meeting of the JTC that was revived in 2020 after a gap of 17 years. The Indian delegation, during the meeting, raised concerns about the restrictions faced by its exporters of marine, poultry, and meat products.

India on Thursday raised the issue of restrictions faced in its export of marine, poultry and meat products with Thailand. The countries decided to expand bilateral trade at the 13th meeting of the India-Thailand Joint Trade Committee (JTC) held in New Delhi, the first physical meeting of the JTC that was revived in 2020 after a gap of 17 years.

India exports various products to Thailand, including gems and jewellery, mechanical machinery, auto and auto components, agricultural products, and marine products. However, the Indian delegation raised concerns about the restrictions faced by its exporters of marine, poultry, and meat products.

The meeting was co-chaired by Director General of Department of Trade Negotiations, Ministry of Commerce of Thailand, Auramon Supthaweethum and Joint Secretary, Department of Commerce, Ministry of Commerce and Industry, India Indu C. Nair.

During the meeting, the two countries discussed various issues related to bilateral trade and cooperation during the meeting.

The Commerce Ministry of India stated that there are potential sectors for strengthened partnership between the two nations, including value added marine products, smartphones, electric vehicles, pharmaceuticals, and food processing.

The two nations also agreed to explore the establishment of mutual recognition and cooperation arrangements in nursing, accounting, audio-visual, and medical tourism. They also reviewed the progress of ongoing efforts to connect India's UPI (Unified Payments Interface) with Thailand's Prompt Pay Service and settlement of trade transactions in local currency.

Both countries emphasised the need to identify new potential products and priority sectors to further enhance bilateral trade.

Both sides identified a range of potential commodities and sectors for strengthened partnership such as value added marine products, smartphones, Electric vehicles, food processing and pharmaceuticals.

Thailand is India's important trading partner in ASEAN with total trade of USD 16.89 Billion in 2022-23. Thailand accounts for 13.6 percent of India's total trade with ASEAN. Thailand is an important destination for India's gems and jewellery, mechanical machinery, auto and auto components and agricultural products especially marine products.

Delay in bird flu relief disbursal upsets Kerala poultry farmers

Over 80,000 birds, mostly ducks, were dead/culled in the last bout of avian flu first detected at Vazhuthanam in Alappuzha in October 2022

Several months after bird flu hit Alappuzha and other parts of the State, poultry farmers affected by the outbreak are yet to receive the promised compensation from the government.

According to the Animal Husbandry Department, more than 80,000 birds, mostly ducks, were dead/ culled in the last bout of avian flu (H5N1) which was first detected at Vazhuthanam in Alappuzha in October 2022. The disease was later reported from several places in Alappuzha, Kottayam, Thiruvananthapuram, Kozhikode and Pathanamthitta districts.

An inordinate delay in providing aid has put poultry farmers, especially duck farmers who were the worst affected by the outbreak, in peril. Following the previous bird flu outbreaks, the government had given a compensation of ₹200 for each bird above 60 days old and₹100 for birds below 60 days old. Besides, ₹5 was given for each destroyed egg. This time too, the government assured to compensate the farmers, but no date has been announced for the disbursal of the payment.

Thulasidas V., a duck farmer from Karumady in Alappuzha who is entitled to compensation for 8,732 ducks, says the government "hardly cares" about the sufferings of duck farmers. "I raised ducks after taking loans. My ducks were around 80 days old whenbird flu struck the farm. I have defaulted on loan repayment and still owe money to myhelpers. Though authorities have collected all details, no one is saying when thecompensation will be paid," says Mr. Thulasidas, adding that he decided against raisingducks ahead of this Easter season. Like Thulasidas, about a dozen duck farmers await thepromised relief from the government.

Cash crunch

Officials say the relief disbursal has been delayed due to a cash crunch. "The Centre owes ₹4.4 crore to the State as its share of compensation for bird flu outbreaks in Kerala since2016. Following the previous outbreaks, the State government did not wait for the Centre'sshare to compensate farmers. Farmers were provided relief from the corpus fund of theAnimal Disease Control Project. This fund has been almost exhausted and we cannot paythe farmers until the Centre clears the dues, " says an official attached to Minister forAnimal Husbandry and Dairy Development J. Chinchurani's office, adding that the matterhas been taken up with the Union government.

Associations of duck farmers say the "lackadaisical attitude" of the government towardsthe sector is forcing many to move on to pastures new. As per data available with theAnimal Husbandry department, only around 100 'big' farmers (having a flock size of 2,0000r above) are engaged in duck farming in Alappuzha.

Assam borders shut over flu fears, poultry price plummets in Kolkata

KOLKATA: The price of dressed chicken - one of the most popular sources of lean protein in the Bengali diet – has fallen sharply in the city, by as much as Rs 100 per kilo, owing to the Assam government's continued shutting of its western borders to poultry from Bengal since the first week of March over bird flu fears in Jharkhand.

The Assam border closure since March 6 has cut off the movement of Bengal's poultry not only to that state, but to all northeastern states.

Most poultry owners, facing heavy losses, have resorted to distress sales, even as the reduced price has made the average middle- and upper middle-class Kolkatan happy.

The outbreak of avian influenza in Jharkhand was notified bythe Centre on February 20. Following the notification, the Assam government shut its borders to poultry – including from Bengal - on March 6.

Madan Mohan Maity, the secretary of Bengal Poultry Federation, said the ban was "illegal". "The government of India's standard operating procedure for such cases, including culling, is about 10 days. Thus, the Assam government's continuation of the ban much beyond the stipulated 10 days is illegal," he said.

In fact, on April 6, Bengal's additional chief secretary of the animal resource development department, Vivek Kumar, wrote a letter to the principal secretary of Assam's animal husbandry and veterinary department, Manish Thakur, requesting him to review and reconsider the order banning the free movement of poultry. The Bengal government has not received any reply yet, sources said.

With supply far exceeding demand, the price of chicken has slid precipitously in the last three weeks, leaving poultry farm owners panicky. ▸▸

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'Dip in chicken price strikes a balance in kitchen budget'

The price of dressed chicken was Rs 290 a kilo on March 20. After successive cuts, the price is now down to Rs 190 a kilo. The average consumer in the city is happy. "In this time of inflation, you will rarely find the price of a commodity dipping," said Biren Ghosh, a resident of Parnasree. "The price of vegetables is so high that the price of chicken now strikes a nice balance in the kitchen budget," he added.

Some consumers, however, seemed wary because of bird flu fears. "I bought chicken but felt scared about a probable health impact," said Salil Dakua, a schoolteacher from Kidder pore.

Maity, however, said Bengal had not experienced any case of avian flu, nor was there any unusual mortality in Bengal's chicken. "The price may fall further as poultry farms are making distress sales. Losses are mounting daily. In north Bengal, the loss surpassed Rs 500 crore. Nearly 50% of north Bengal's poultry production goes to Assam and other north-eastern states," he said.

Rs 250 is the standard price of dressed chicken with a balanced profit. Anything below that causes problems for traders.

"With prices falling almost daily, we are also confused about the price at which we should sell dressed chicken. The older the stock you have, the costlier would be your chicken. The losses will be higher," said Anik Das, a poultry owner based in East Burdwan.

Formerly daily wagers, father-son duo in Telangana set up poultry farm under Dalit Bandhu

Municipal Administration and IT Minister K T Rama Rao going around the poultry farm set up by a father-son duo under the Dalit Bandhu scheme at Gandilachapet village in Rajanna Sircilla district.

The landmark Dalit Bandhu scheme is heralding a new era of economic empowerment for Dalits in the State, said Municipal Administration and IT Minister K.T. Rama Rao.

Addressing a meeting after inaugurating a poultry farm set up by a father-son duo under Dalit Bandhu at Gandilachapet village in Rajanna Sircilla district on Monday, he said the scheme is a path-breaking initiative by Chief Minister K Chandrasekhar Rao to help Dalits become entrepreneurs.

Terming it as a trailblazing effort to promote entrepreneurship among Dalits, he said, "The initiative enabled Durgaiah and Suman, the father-son duo, formerly daily wage labourers, to become proud owners of a poultry farm in their village."

As many as 34 income generating units including a rice depot, a sheep unit and ladies emporium have been grounded under the Dalit Bandhu scheme in the village, he noted adding that an amount of ₹6.89 crore were allocated to Gandilachapet for various welfare and development initiatives.

He said the proposed mega aqua hub on an extent of 350 acres at the Mid Manair Dam (Sri Raja Rajeshwara reservoir) will provide job and livelihood opportunities to the local youths.

He said development works worth ₹12 crore were initiated in Cheerlavancha village.

Later, the Minister inaugurated a physiotherapy clinic at the Primary Health Centre, a first-of-its-kind facility in the State, in Thangallapalli mandal headquarters. Similar clinics have started functioning in as many as nine PHCs in Rajanna Sircilla district offering physiotherapy services to the needy, sources said.

Mr.Rama Rao also participated in a series of programmes in various villages in Yellareddypet and Thangallapalli villages later in the day.

Collector Anuraag Jayanti was also present.

China issues plan to reduce soymeal use in animal feed

New plan aims to reduce soybean meal inclusion in animal feed to less than 13% by 2025.

China's agriculture ministry has issued a three-year action plan to reduce the inclusion rates of soybean meal in animal feed in an effort to reduce its reliance on soybean imports.

The new plan says soymeal inclusion in animal feed should be reduced to less than 13% by 2025, down from 14.5% in 2022, according to a Reuters report. It would "guide the feed industry to reduce the amount of soybean meal, promote the saving and consumption reduction of feed grains, and contribute to ensuring the stable and safe supply of grain and important agricultural products," said the document, published by the Ministry of Agriculture and Rural Affairs.

In April 2021, China's Ministry of Agriculture and Rural Affairs published guidelines that recommended lowering the amount of corn and soybean meal in pig and poultry feed. The guidelines include recommendations for alternative ingredients, "with the goal of improving the usage of available raw materials and creating a formula that better suits China's conditions," Reuters reported at the time.

The guidance recommends rice, cassava rice bran, barley and sorghum as alternatives to corn. Acceptable alternatives to soybean meal include rapeseed meal, cottonseed meal, peanut meal, sunflower meal, distillers dried grains, palm meal, flax meal, sesame meal and corn processing by products. It also suggests feed formulations based on the region of the country, such as reducing corn by at least 15% in pig rations in the Northeast by using rice and rice bran. In the southern region, it recommends using sorghum, cassava flour, rice bran meal and barley to replace corn in pig feed.

In March, China's soybean imports rose 7.9% from the same month a year earlier as buyers in China stocked up ahead of expected strong demand.

According to reports, the General Administration of Customs noted total imports for the month came to 6.85 million tonnes, down 2% from February's 7.04 million tonnes.

Arrivals for the first three months of the year came to 23 million tonnes, up 13.5% from a year earlier, the data showed.

Much larger volumes are expected in coming months, said traders and analysts, but demand has proven weaker than expected.

BAADER Signs Partnership with RND Automation

From left: ***Dr Norbert Engberg, Managing Director, BAADER, Marcel Franz, Managing Director, BAADER Asia, Nikhil DuBois, Managing Director, RND Automation and Gero Heeschen, CSO BAADER Poultry***

Lubeck, Germany: The Indian poultry market is on the rise and along with this comes the need for processors to keep optimizing and professionalizing their plants. On 8 March 2023, BAADER signed a partnership agreement with RND Automation with the goal to enable customers to increase their production to up to 15.000 birds per hour while receiving great service to both machines from BAADER and RND Automation.

Dr Norbert Engberg, Managing Director BAADER, Gero Heeschen, CSO BAADER Poultry Holding, Marcel Franz, Managing Director BAADER Asia, and Nikhil DuBois, Managing Director RND Automation signed the partnership agreement at the BAADER booth during the VIV Asia in Bangkok.

"BAADER offers advanced machinery with high processing capacities and yield. RND Automation on the other hand provides great solutions for lower speed lines, excellent service, and local know-how in processing", says Dr Norbert Engberg, Managing Director BAADER. "We believe that we complement each other perfectly and look forward to this partnership".

RND Automation Pvt. Limited provides poultry processing machines for processors all over India and beyond. Just like BAADER, they are a family-owned company based on the founder's engineering expertise.

"The poultry processing market in India specifically but also all over Asia is shifting towards big processing plants. With BAADER on our side, we believe we have the right partner to help our customers upgrade their factories and shape this transformation", says Nikhil DuBois, Managing Director RND Automation.

With this partnership, RND Automation is now able to sell BAADER poultry processing machines and equipment to the Indian market.

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Glamac International Crowned EMERGING VETERINARY PHARMA COMPANY OF THE YEAR at Economic Times India Pharma World Awards 2023

A start-up started in 2017; it successfully positioned itself as a serious player in animal nutritional solutions for poultry and potential competitor to the historically dominated multinationals.

Glamac International Pvt Ltd, the fastest-growing Indian company in the poultry nutrition segment, added another feather to its cap by winning the **"Emerging Veterinary Pharma Company of the Year"** award at the 3rd Economic Times India Pharma World Awards (ETIPWA) 2023. The glittering awards took place at the Hotel Taj Santacruz, Mumbai.

In just 5 years, to be recognised as the leading "Emerging Veterinary Pharma Company of the Year" at ET Health World Summit is yet another milestone in the firm's drive to be acknowledged as one of the pre-eminent players in the competitive sphere of animal nutrition in poultry.

Ms Meghana Mukherjee, Director Glamac at ET India Pharma Summit at Taj Santacruz, Mumbai

ETIPWA presenting the award to Abir Mukherjee, MD & Ms Meghana Mukherjee Salvi, Director, Glamac International Pvt Ltd

The award celebrated innovation and exemplary contributions in the Indian Pharmaceutical sector by exhibiting the best-in-class health, nutrition and medicine organisations. It was curated to identify individuals, teams and companies responsible for driving the pharmaceutical progression. From bio-processing, manufacturing, packaging and drug distribution to formulations and more, ETIPWA covered all aspects of Pharma operations.

Reflecting on the firm's achievement, Mr Abir Mukherjee, The Founder and Managing Director of Glamac International said, "We were overwhelmed when ET decided to nominate us for the award category and we are overjoyed to have won the prestigious award. It is a testament to our clients and associates' faith in us. It wouldn't have been possible without our team, who, with their dedication and hard work, helped us gather this milestone. Our focus is continuous innovation and developing research-backed products and formulations for the world through our global relationship network. From the very first year of our existence, we made a mark in the industry with our next-generation nutritional solutions".

Glamac, a Veterinary Formulation Company, based in Mumbai (Thane, Maharashtra), is a technically driven, competent Veterinary Pharma organisation. Glamac specialises in Poultry Nutrition & Feed Supplements. The firm developed strategic sourcing channels through its strong relationship with organisations worldwide. It established dynamic business tie-ups in Europe, including marketing partnerships with Xvet Germany and Herbonis, Switzerland, a company specialising in natural solutions for Animal Nutrition.

Glamac is a pioneer in the market with their flagship product Glam-Sone, a non-antibiotic growth promoter. Other notable products of Glamac are Glam-Quindox, an AGP-best solution for E. Coli control, Cynka-Antidiarrheal range, Liptivo-XT-Nutritional Emulsifier & Glavitro-Anticoccidial range.

And recently, Glamac introduced in India the Globally renowned product Panbonis from Herbonis Switzerland - Vitamin D3 metabolites. It is a new and natural key element in animal nutrition -Initiated our drive for healthy bones and eggs of chicken.

Award Trophy

It would not be the first time for Glamac to be awarded for its remarkable efforts in the industry. Their efforts were redeemed when the organisation was awarded the **"Fastest Growing Indian Company Excellence Award"** by the **"International Achievers Conference"** in 2019. Glamac is indeed grateful to be recognised as part of a community that's passionate about making a positive impact on the world. Being an honorary recipient of the ETIPWA award will motivate the team to strive for excellence.

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Indian Herbs takes part in VIV Asia

INDIAN HERBS, pioneer and global market leader in Herbal Animal Health Care Products Industry since 1951, participated in VIV ASIA held at Bangkok, Thailand,8th to10thMarch, 2023 with its strong technical and marketing team. It was a colossal and magnificent event and our stall was visited by our global business partners, customers, consultants and poultry nutritionists. The sales and marketing team extended a warm welcome to all the visiting customers and consultants at **INDIAN HERBS** stall.

Being a pioneer of Veterinary Ayurveda, **INDIAN HERBS**has been continuously innovating to give the world innovative phytogenic feed supplements and healthcare products. Innovation is what always keeps us at the forefront of discoveries in phytogenics. With the holistic approach of 'Traditional Glory and Modern Science', **INDIAN HERBS**is dedicated to transform 'Herbalism' into a 'Dynamic, scientifically validated and evidence based science'. **INDIAN HERBS** offer unique phytogenic alternatives for synthetic products with superior efficacy at lower cost which are free from side effects and residual toxicity. The company is catering to wide range of animal species including poultry, ruminants, equine, swine, pets, aquatic and other animal species for more than seven decades. Realizing the emerging challenges of animal industry, **INDIAN HERBS**innovated natural alternates in segments such as antimicrobial growth promote AGPs), immunopotentiator, metabolic stimulant, gut enhancers, respiratory anti-septic, anti-stressand adaptogen for different species. INDIAN HERBS phytogenic solutions are unique since there is an advantage of combination of several plant-derived bioactive and phyto-compounds, and their synergistic effects than a single component that empowers our products to exploit the animals full genetic potential, promote growth, immunity & for control of diseases. On basis of advanced scientific techniques, safety, efficacy and mechanism of action of products is deciphered successfully.

Our product portfolio is constituted by 230 + products for poultry, cattle, swine, equine, aqua and companion animals. We strictly adhere to quality norms, comply with the regulatory compliances and we have core competence in research and development. **INDIAN HERBS** has very diligently invested in research and development activities. Our R&D and QC laboratories are well equipped with the state-of-the-art scientific instruments to ensure quality and consistency of our products. We rigorously pursue product quality

control and scientific validations. Product quality control on basis of herbal standardization and phyto-analytical profiling. Product safety and efficacy is validated on basis of scientific trials in collaboration with global research institutes and veterinary universities.

The products of **INDIAN HERBS** are natural, safe, efficacious, environment friendly, hence there is no withdrawal period of these herbal products. Therefore, the herbal products are becoming clear choice for the consultants and farmers. These products are suitable to produce **ANTIBIOTIC FREE CHICKEN / EGGS.** Looking to the harmful after-effects of synthetic medicines, the veterinarians, consultants and farmers all over the world are now taking keen interest in the use of herbal feed supplements and health care products and Indian Herbs is dedicated to promote the use of natural products for the betterment of animal health and production performance.

INDIAN HERBS is successfully marketing its products to more than 50 counties across four continents including Asia, Europe, Latin America and Africa successfully. In many countries, these products are under active consideration for granting registration or authorization for marketing. **INDIAN HERBS** has also received the certificate from **EXPORT INSPECTION COUNCIL OF INDIA**, Ministry of Commerce and Industry, Govt. of India and was the first Herbal Company to get this recognition. The R&D Centre of **INDIAN HERBS**, which is approved by the Ministry of Science and Technology, Govt. of India, since 1986, is well equipped with the best available state of the art modern facilities for standardization and quality control of herbal products.

The stall of **INDIAN HEBRS** attracted a large number of global visitors, including feed millers, integrators, large farmers, consultants, nutritionist and distributors etc. All the queries of the visitors were answered by the technical team of **INDIAN HERBS** to their best satisfaction. With a re-affirmation of our vision and following a path to sustainability and global well-being, **INDIAN HERBS** is committed to support animal healthcare industry and esteemed customers by all means. **INDIAN HERBS** is committed to foster the wellbeing of animals through nature's bliss and caters antibiotic free, residue and resistance free, environment friendly, cost effective phytogenic solutions for animal healthcare and ensuring feed to food safety.

We are indebted to all our customers, patrons, scientists and well-wishers for their support, cooperation and guidance. We look forward to explore new business dimensions and to receive your continued cooperation in future as well.

PAN India Broiler Farm Gate Rates Realised in FY 2022 - 2023 in INR

S No	State Name	Avg 22-23	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
1	Andhra Pradesh	101	107	129	134	95	83	101	110	96	103	94	79	85
2	Bihar	95	100	126	107	77	92	113	87	79	87	88	92	95
3	Chattisgarh	93	93	115	118	75	76	108	93	83	94	91	77	89
4	Gujarat	100	112	125	121	78	84	121	97	82	95	101	85	96
5	Haryana	91	93	116	108	82	79	108	85	72	82	85	93	95
6	Himachal Pradesh	92	95	116	112	85	77	106	90	67	80	86	94	99
7	Karnataka	98	109	124	121	86	76	93	104	108	97	96	75	82
8	Maharashtra	94	108	124	116	74	75	102	100	89	94	95	73	80
9	Odisha	98	99	122	119	82	86	109	94	95	100	90	85	97
10	Punjab	92	94	116	111	85	78	106	88	68	80	85	93	98
11	Rajasthan	91	93	116	108	81	78	108	83	71	81	85	91	94
12	Tamil Nadu	92	105	116	111	85	71	87	97	95	100	89	73	79
13	Telangana	101	110	136	133	85	83	102	110	101	102	94	77	80
14	Uttar Pradesh	93	93	122	112	77	87	112	85	79	85	86	91	93
15	West Bengal	106	112	132	116	89	100	117	102	96	94	98	100	118

Courtesy: Karnataka Poultry Farmers & Breeders Association

Centre plans revamp of livestock insurance scheme to raise coverage

Poor coverage: ***The Parliamentary Standing Committee's report reveals that not even a single animal was insured during 2022-23, whereas during 2021-22, 1,74,061 animals were insured.***

Pulled up recently by a Parliamentary Standing Committee (PSC) for zero insurance coverage of livestock in 2022-23, the Centre is considering a comprehensive livestock insurance scheme modelling the Prime Minister's Fasal Bima Yojana. The Union Animal Husbandry Ministry's move is to roll out the scheme ahead of the 2024 Lok Sabha elections. There are initial proposals to waive off premium for cattle rearers from Scheduled Caste (SC)-Scheduled Tribe (ST) communities. At present, less than 1% of the country's cattle population is insured and the average yearly premium is 4.5% of the insured amount.

The Animal Husbandry Ministry recently held a meeting with various insurance companies and other stakeholders on the matter. "Our effort is to reduce the premium so that more farmers enroll in the scheme," an official said, adding that a comprehensive livestock insurance will replace the present Livestock Insurance Scheme. The scheme is functional in 100 districts of the country. The Centrally-sponsored scheme is being managed by the respective State Livestock Development Boards.

Recently, the Animal Husbandry Ministry had told the Parliamentary Standing Committee on Agriculture and Animal Husbandry that farmers are often caught in the fight between state government officials and insurance companies. A report submitted to Parliament by the panel on Demands for Grants of the Ministry quoted an official and said the Ministry prefers direct transfer of benefits to farmers' accounts.

The panel said in the report that not even a single livestock was insured during 2022-23, whereas during 2021-22, 1,74,061 animals were insured. "The Committee were informed of the hardships faced by the livestock owners in getting their livestock insured and also about the measures being taken to ease the process of livestock insurance. Expressing concern over no Insurance >> during 2022-23, the Committee recommended the Ministry to take effective steps so that the process of insurance of livestock is made easy for the beneficiaries. "The Committee would also like the Department to explore the possibility of developing an App-based Livestock Insurance facility for livestock owners. The Committee would like to be apprised of the total progress made by the Department in this regard," the report added.

The official said high policy premium rate and general economic conditions of farmers are reasons for lower enrollment in such schemes. "The government considers subsidy on the premium paid by socially marginalised farmers from SC-ST communities," the official added.

In the meeting with insurance companies, the Centre stressed on the importance of expanding the ambit of the scheme and decreasing the premium paid by the farmers.

During the Lumpy Skin Disease pandemic, about two lakh cattle died in the country. Farmers had demanded compensation from the government for the loss. The Centre's attempt is to keep the premium low and ensure maximum coverage of livestock. Hence, the centre's attempt is to keep the premium low and ensure maximum coverage of livestock.

"The coverage at present is very poor as most of the farmers are not in a position to pay premium. Some exquisite cattle breeds are insured by the breeders, but the government wants to insure more animals," the official added.

Several farmers' organisations had also demanded comprehensive livestock and crop insurance in the background of pandemics such as lumpy skin disease.

Avitech Nutrition launches NanoSel – nanosize Selenium

Gurugram: Nano technology is an emerging technology with a promising potential and diverse application in many areas such as human health, animal nutrition and animal feed. While trace minerals are commonly used in animal feeds, their effectiveness is often limited due to factors such as low bioavailability, antagonism and high wastage rates.

NanoSel is a nano size Selenium. NanoSel is a highly bioavailable, stable and safe source of dietary Selenium. It is free-flowing, dust free and easy to mix. NanoSel helps enhance immune response, antioxidant defence, hormone metabolism, cell growth, meat quality etc. With a broad safety margin and superior antioxidant enzyme activity, NanoSel represents the optimum choice for Selenium delivery in animal nutrition.

Brazil May Export 5 million Tonnes of Corn to China in 2023

Opinion Focus

- Brazil might become one of the world's largest corn exporters.
- Brazilian corn is now cheaper than the US corn.
- Chinese companies turn to alternative suppliers to diversify imports and increase food security.

Director of the Center for Agricultural Policy and Trade Studies of North Dakota State University, in the United States, the economist Sandro Steinbach is considered one of the top voices on global food chains. Last year, he concluded a study about global shipping disruptions during the pandemic and the effects on the U.S. agricultural exports.

Steinbach also analyses the possible effects of a less competitive US grain production in the global food trade and how it might impact countries like Brazil. The conclusion is that unless the US reduces its corn prices or Brazilian production become uncompetitive (both unlikely), Brazil will continue to increase its corn exports to China – the largest consumer worldwide.

At the end of 2022, Beijing approved several Brazilian companies that can export corn to China (the list is 400 long). According to market estimates, Brazil may export around 5 million tonnes of corn to China this year – this is 10% of total global corn exports and 194% more than Brazilian corn exports to China in 2022.

In December alone, just after China and Brazil concluded a corn trade deal, Brazil exported 1.1 million tonnes of corn to China. In January, almost 1 million tonnes were exported. "Since May 2022, Brazilian corn prices became cheaper than the US corn by US$ 0.05 per kg on average", says Steinbach in an interview to Czapp.

Read the interview below:
China is ramping up corn imports from Brazil: one of the main reasons is the loss of competitiveness of the US corn? Is it cheaper now to buy Brazilian corn than the US corn?

A trend of increasing price difference between the two countries can be observed since May 2022, with Brazil's average corn export price being lower.

Moreover, it is noted that since 2019 an additional tariff of 10% has been imposed on corn imported from US by China as a measure of trade retaliation.

It is possible that the combination of higher corn export price and the additional retaliatory tariffs has made it difficult for corn importing companies in China to continue sourcing from the United States. As a result, these companies may have turned to alternative suppliers with lower prices. Unless US reduces its corn export prices, China removes the retaliatory tariffs or Brazil's corn export prices become uncompetitive compared

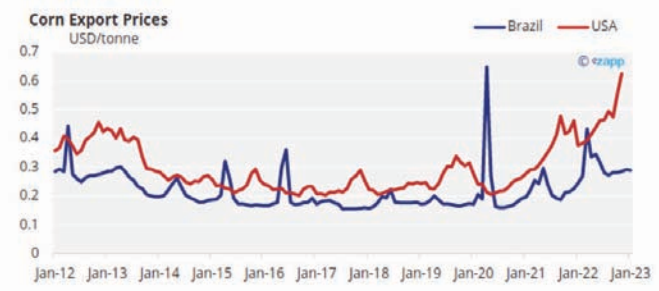
Source: USDA, Comex.

to other suppliers, it is likely that China will continue to increase its corn imports from Brazil.

How much cheaper was the Brazilian corn last year comparing to the US corn ? Do you see this trend continuing in the medium and long term ?

Since May 2022, the Brazilian corn price became cheaper than the US corn by US$ 0.05 per kg on average. The USDA's feed outlook for January 2023 projects a decrease in US corn production because of a decreased domestic consumption and exports.

Sales have been sluggish in comparison to the previous year, primarily due to increased export prices resulting from limited exportable supplies and high transportation expenses from rural areas to export terminals, specially via barge from key locations along the Mississippi River to the Gulf of Mexico.



Source: USDA, Comex.

If the trend of decreased production and increased prices for US corn continues, China is likely to turn to Brazilian corn and other sources to meet their needs in the medium and long term.

In that sense, should China continue to buy corn from Brazil in the future ?

This is a to be expected development. China is diversifying its supply chains to be less dependent on supply from the US. That's a lesson learned from Covid, the shipping challenges and the trade war. Brazil's corn export prices had also been lower than from the United States during the last 12

months, providing Chinese state-owned importers further incentives to expand purchases from Brazil.

It is common for US corn exports to China to fall during winter. However, the increased exports from Brazil represent a major shift that will, depending on the price gap, continue to exist in the mid to long-run. An additional variable to consider is Chinese demand. Depending on the size of the economic downturn, there might be less demand in the near term. However, I expect diversification will continue to contribute to additional demand for Brazilian corn from China.

Since China is diversifying its supply chains, they might look at a variety of countries and food products ? What should we expect in that sense ?

We can expect similar patterns we are already seeing. An example is the rise of Ukraine as a major corn exporter to China before the war. These trends will continue and intensify with growing political and trade tensions between the United States and China.

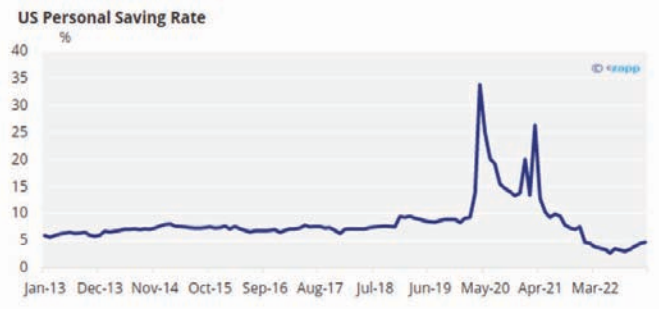
Source: World Bank

Finally, has the United States lost $10 billion in agricultural goods exports during the pandemic due to logistical issues? Why did it happen ?

Yes. According to our analysis in **our research article (Carter et al., 2022),** the US lost around $10 billion in agricultural exports between May 2021 to January 2022. The reason for the losses can´t be solely attributed to the pandemic or the logistic issues. The pandemic initially started the losses for the US agricultural exports, but there´s more to it.

The Government response, the unbalanced trade market, the maritime freights and lack of container are all responsible for the logistic issues that caused the losses for the US agricultural exports.

The drivers for the losses can be summarized in four main points.



Source: Federal Reserve of Saint Louis

First, the skyrocketed personal saving rate. Since the pandemic outbreak in early 2020, increased unemployment benefits, stimulus checks and deferred consumption expenditures have caused the US personal saving rate to skyrocket by about 14 percentage points until September 2021.

The additional savings allowed the US people to have more purchasing power to buy more durable goods, which were usually imported from Asian countries like China. However, the ports on the West Coast became increasingly overwhelmed by the incoming products, causing congestion in the ports and slowing the turnaround time for the ships that travel around the continents.

Second, the growing demand for durable goods from Asia resulted in a substantial increase in **maritime freight rates.** In January 2022, the container freight rates from Asia to the United States increased more than six times comparing to the pre-pandemic period while the shipping rates from the US to Asia remained stable.

This shipping rate differential made it more profitable for containers to be sent back to Asia empty instead of waiting several days to fill with US agricultural products.

Third, the slowed turnaround times amplified the issue. The amount of time taken to ship agricultural products from the US West Coast to China reached more than 110 days in January 2022 – back in 2019 it took only 50 days.

This slow turnaround time makes shippers less willing to wait more days in the western ports for agricultural products. They instead chased higher shipping rates by carrying goods from China to the US.

Fourth, the agricultural exporters faced a shortage of containers. Agricultural exporters faced increasing container rental fees, demurrage, and storage fees.

Some agricultural exporters were forced to re-route containers through Texas, Vancouver, or the East Coast at a great expense. Also, many shippers decided to cancel contracts and refused to supply empty containers to US exporters, returning them unfilled to Asia instead.

Srinivasa family & friends Celebrate Jagapati Rao's 90th Birthday

Mr Chitturi Jagapati Rao, a living legend of poultry industry, Founder & Chairman of Srinivasa Farms Pvt Ltd, celebrated his 90th birthday on15 April 2023 at Hyderabad. The celebration was held in the presence of family, friends and staff of Srinivasa Farms. An exclusive interview was videoed capturing larger than life events of Jagapati Rao which garnered wide viewership. People wished him healthy and long-life.

Ch. Suresh Rayudu, Dr T. Krishna Reddy, V. Ganesh, P. Usha Lakshmi and others presented bouquets to Jagapati Rao.

Poultry Fortune Editor M. A. Nazeer presenting a memento to the Chairman Emeritus of Srinivasa Farms Pvt Ltd C. Jagapati Rao on the occasion of his 90th Birthday on 15 April 2023 at his residence in Hyderabad. Talking to Poultry Fortune, Jagapati Rao said that more efforts are needed to enhance per capita consumption of Eggs in India as countries like China has 300 plus Eggs consumption.

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The motto makes Dr Aman Sayed even more ambitious and hopes to serve in large geographic areas in future

Alltech's Dr Aman Sayed shares his 23 years career journey

Bangalore, India – Dr Aman Sayed is the managing director of India and regional director of South Asia at Alltech. He earned his master's degree in veterinary (Poultry) science from Bombay Veterinary College and was honoured with gold medal distinctions both at graduation and post-graduation. In the mid-2000s, through the work he completed during the last year of his master's program, he realized that there weren't enough veterinary specialists in the field and that customers were in dire need of professional assistance. This realization led him to begin pursuing roles in privately owned enterprises.

His journey began in the year 2000 with setting up an R&D farm for an Iowa-based multinational firm, where he was later elevated to a technical position serving West India. In 2003, he joined Emirates Agriculture Technologies to oversee a free-range poultry project in Sharjah. He gained job experience in Dubai during his time in the Middle East and established Kentucky Equine Research's operations there, working in the equine racing industry.

The opportunity to join Alltech knocked on his door in 2005, and Dr Sayed recalled that moment by saying, "It has been said that everything comes to you at the correct time and that you need to trust the process, and this exactly defines my career."

> *"I feel passionate and energetic about what I do at Alltech; it's what I live and breathe."*

Alltech's Dr Aman Sayed

He initially had the chance to meet Alltech's creator, Dr Pearse Lyons, in 2006. Dr Sayed was profoundly impacted by his encounter with Dr Lyons on multiple levels. Dr Sayed has always been driven by and remains motivated by Dr Lyons' philosophy that problems need to be proactively addressed as soon as possible rather than waiting for them to happen and then reacting. Dr Lyons' advice inspired him to always go that extra mile and helped him land in his current position.

While working at Alltech, Dr Sayed has learnt that every day is a new day and a new beginning. He wants his team to maximize business growth and serve customers to the very best of their ability.

Over the course of more than 17 years with Alltech, Dr Sayed has held a number of positions, rising from business development manager to regional area manager for the business's poultry and dairy operations in West India. Later in his career, he took on the responsibilities

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of general manager of sales for North India and started to manage the markets in Bangladesh and Nepal. He eventually rose to the position of general manager for Poultry in India before being elevated to general manager of South Asia in 2012.

He has participated in numerous professional training programs including the Alltech Mini-MBA program in collaboration with the University College Dublin Michael Smurfit Graduate Business School in Ireland, in addition to getting experience while managing Alltech's multispecies business unit. He gained knowledge from the course about the value of preserving an entrepreneurial attitude and being prepared to take financial risks in order to turn a profit.

As someone who serves in a decision-making role, Dr Sayed has the responsibility of building a team of people who have a strong work ethic. He consistently assesses team members based on three fundamental values: honesty, openness and diligence. He thinks that everyone who works for any company should uphold these fundamental values. A person's ethics and morals, a growth-focused attitude, and a high degree of engagement, both personally and professionally, can be seen in this trio of characteristics.

> *"We are a global leader in the agriculture industry. Our team produces specialty ingredients, premix supplements, feed and biologicals, backed by science and an unparalleled platform of services"*

Over his 23-year career journey, Dr Sayed has experienced both calm and rough waters while making challenging decisions related to driving business growth and profitability. To tackle these challenges, he has always strived

to make unbiased decisions guided by the core principles of business growth – but he also endeavors never to neglect the human aspects of empathy, compassion and emotion.

In 2019, Dr Sayed had a meeting with Dr Mark Lyons, Alltech president and CEO, where the Indian Poultry Journalists Association posthumously honoured Dr Pearse Lyons with a Lifetime Achievement Award. At the event, Dr Mark Lyons spoke about Alltech's purpose of Working Together for a Planet of Plenty™ and invited everyone to collaborate, across industry sectors and geographical boundaries, to create a place where animals, plants and people thrive in harmony.

"I am so delighted to be a part of this vision, which focuses on creating a world of abundance for future generations," said Dr Sayed. "This mission continues to drive me to make a positive contribution, as the only way to do exceptional work is to enjoy what you do. I feel passionate and energetic about what I do at Alltech; it's what I live and breathe."

Dr Mark Lyons has shared the proverb, "If you want to travel fast, go alone; but if you want to go far, go together" Dr Sayed is a great supporter of teamwork above individual performance, and taking that route has gotten his team to where they are today. This motto makes him even more ambitious, and he hopes to serve in larger geographic areas in the future.

"Because of their sheer dedication and contributions to society and to my life, I will always be grateful to the Lyons family," said Dr Sayed.

About Alltech:
Founded in 1980 by Irish entrepreneur and scientist Dr Pearse Lyons, Alltech delivers smarter, more sustainable solutions for agriculture. Our diverse portfolio of products and services improves the health and performance of plants and animals, resulting in better nutrition for all and a decreased environmental impact.

We are a global leader in the agriculture industry. Our team produces specialty ingredients, premix supplements, feed and biologicals, backed by science and an unparalleled platform of services.

Strengthened by more than 40 years of scientific research, we carry forward a legacy of innovation and a unique culture that views challenges through an entrepreneurial lens. As a private, family-owned company, we adapt quickly to our customers' needs and focus on advanced innovation.

> *"While working at Alltech, Dr Sayed has learnt that every day is a new day and a new beginning. He wants his team to maximize business growth and serve customers to the very best of their ability."*

We believe agriculture has the greatest potential to shape the future of our planet. Our more than 5,000 talented team members worldwide share our purpose of Working Together for a Planet of Plenty™. Together, we can provide nutrition for all, revitalize local economies and replenish the planet's natural resources, said Dr Aman Sayed.

Headquartered just outside of Lexington, Kentucky, USA, Alltech serves customers in more than 120 countries has five bioscience centers, and operates more than 80 manufacturing facilities across the globe.

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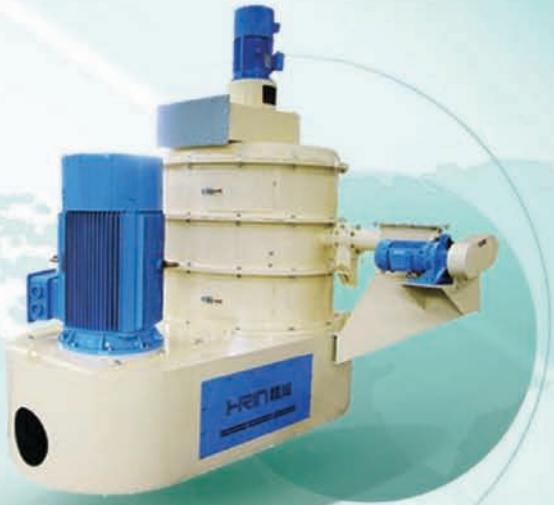

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Totally enclosed spraying space, Precision & Efficient spraying proportion widely ranged from 2%-30%.

Heat Stress in Laying Hens: Effects and Mitigation

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Highlight Points

Due to the warm weather, poultry is vulnerable to heat stress, also known as summer stress, throughout the summer. This happens when the body's heat production and loss are out of balance. In addition to affecting bird performance, this condition causes significant economic losses due to poor growth, decreased production and an increase in mortality. To prevent heat exhaustion in laying hens There are many ways to manage heat stress in hens, including appropriate curtain management, modifying the water and feed offered and modifying the ventilation system. To prevent heat stress and strengthen chickens' immune systems, some solutions also provide vitamins, minerals and immunostimulants.

Introduction

Heat stress can have a significant influence on laying hens, so it's critical to understand what it does and how to avoid it. The poultry sector has grown quickly during the past few decades. Improvements in the genetic selection of the many breeds of laying hens have supported this evolution. Additionally, there have been notable advancements in management, management welfare, and nutrition. In order to meet the significant feed demand around the world, poultry farming has been able to combine all of these operations and optimize them.

Importance of heat stress in poultry farming

The rate of development of producing poultry has accelerated both throughout the juvenile and production stages. The physiology of this poultry has changed as a result of an increase in metabolic rate necessary for quick development and a more productive stage.

A quick metabolism, on the other hand, suggests that nutrients are quickly metabolized. These metabolic activities produce heat, which the chickens are unable to effectively expel.

The first is radiation, where the body radiates heat into the environment, but the feather covering reduces this. There are also less effective ways for the poultry to shed heat. Second, by conduction when coming into contact with cool surfaces, however confined laying hens lack this effective route of heat removal. Thirdly, using convection, which relies on a productive ventilation system in the home, heat is transferred to the air that is flowing. The efficiency of evaporation by respiration, our final option, relies on the humidity of the surrounding air. These factors make chickens prone to heat stress, which is bad for the wellbeing of the animals.

Heat stress effects on laying hens

According to their degree and duration, acute and chronic heat stress that affects production poultry can be broadly categorized into two categories. Acute heat stress is characterized by a rapid increase in temperature, which causes the fowl to exhibit acute symptoms. On the other hand, chronic heat stress is defined as a continuous and sustained state of heat stress that affects chickens with varying degrees of severity. This poultry issue affects chicken functionality and physiology in a number of ways, as discussed below.

Performance and nutrition for productivity

According to studies on chicken husbandry, heat stress in laying hens reduces body weight, egg production, egg weight, and eggshell quality. Additionally, poultry under heat stress consumes less feed. Chronic heat stress has been reported to dramatically lower dietary protein intake and have an impact on feed digestion, particularly for lipids and proteins. The health and productivity of the chickens are subsequently impaired.

Mineral homeostasis

Animals like laying chickens need the right mineral balance to ensure the laying stage, particularly minerals like calcium. However, it is noted that the acid-base balance is disturbed during acute heat stress, which hinders calcium absorption at the duodenum level. Heat speeds up the poultry's respiratory rate, which causes a significant CO_2

exhalation and causes respiratory alkalosis. According to reports, in this condition, the amount of plasma-available ionic calcium, which is necessary for the production of the eggshell and affects both its quality and thickness, is decreased. This ionic imbalance also increases the risk of skeletal system degradation.

System of defense

The immune system is impacted by heat stress in chicken husbandry, according to research. It has been discovered that this issue has an impact on young poultry's particular immunity, suppressing white blood cells and elevating the heterophile/lymphocyte ratio (stress indicator).

In addition, it has been discovered that under specific circumstances, heat stress in laying hens might lower the quantity of antibodies generated. Production poultry are more likely to have significant morbidity and mortality rates in cases of infectious diseases due to their decreased immunity. Since effective immunization is not obtained, it may even disrupt the vaccination process.

Mortality

According to studies on heat stress in poultry, this condition greatly raises the percentage of deaths from acute asphyxia and chronic immunosuppression in the species.

Physiology of reproduction

The system in charge of egg development in chickens is the reproductive system. Due to the oxidative stress that heat stress puts the ovarian follicles under, its functionality is affected. On the other hand, it has been discovered to enhance chemicals that cause liver cells to apoptose with severity comparable to mycotoxins.

Control measures for heat stress

Poultry houses are distinguished by a high animal density inside the building. If adequate management conditions are not established, this large number of animals raises the temperature within the house. To combat heat stress in poultry, there are methods on many fronts.

Curtain Regulation

By managing the curtains, poultry houses may improve the temperature and humidity levels. The chicken house's inside is cooled and made less warm by outside air in this manner. To properly balance these elements, however, temperature and humidity metres should be present. Animal welfare and productivity are enhanced when chickens are kept in a safe and comfortable setting.

Ventilation Strategies

Poultry buildings that are large or have a lot of birds inside need have a reliable ventilation system to maintain a controlled environment. Additionally, they lessen the likelihood of issues caused by humidity, ammonia, and heat stress. To consistently assure their operation, it is advised to examine the effectiveness of exhaust fans and fans on a regular basis.

Food and Water

If the poultry coop is generating heat, the temperature of the water that is available for consumption may rise. Because it causes them to drink less water and experience more stress, this has a negative impact on the health of the fowl. As a result, the water temperature should be kept cool and regularly checked in relation to the outside temperature. On the other hand, the feed ratio can be altered in tropical regions or places with high ambient temperatures. To lower the poultry's metabolic rate and prevent a state of heat stress, the diet's protein, carbohydrate, and fat content can be changed.

Supplementing with vitamins and minerals

Supplements for vitamins and minerals can be given to poultry, such as Alquerfeed Ovoponedoras, which improves the quality of the eggshell. This product helps laying hens produce eggs more efficiently, particularly when they are under heat stress. As a result, it reduces the availability of calcium for ideal physiology and inhibits bone demineralization.

Heat stress causes a variety of pathological changes in poultry, including decreased productivity in laying hens, which has an impact on the quality of their eggs. The mineral balance is also changed, and feed intake is decreased. The physiology of the reproductive system is impacted as well as the immunological system.

Immunostimulants

Immunosuppressive conditions brought on by heat stress can be avoided thanks to the immunostimulants included in the diet. Both in young and adult poultry, Alquernat Inmuplus improves both the specific and non-specific immune system. As a result, the reaction to vaccination is improved, which also helps to improve the poultry house's immunity to infectious diseases.

Conclusion

Genetic selection has been used to improve the productivity and efficiency of laying hens. In addition, their production has benefited from notable advancements in nutrition and welfare. The physiology of chickens, however, poses challenges to managing excessive heat. The high metabolic rate and inability to expel heat produced by poultry define them. Therefore, poultry farming experiences heat stress.

Heat stress causes a variety of pathological changes in poultry, including decreased productivity in laying hens, which has an impact on the quality of their eggs. The mineral balance is also changed, and feed intake is decreased. The physiology of the reproductive system is impacted as well as the immunological system.

There are multiple strategies to deal with heat stress in chickens, including proper curtain management, ventilation system adaptation and modification of the water and feed supplied. Finally, some solutions offer vitamins, minerals and immunostimulants to help chickens avoid heat stress and build their immune systems.

Alternative Strategies to Antibiotics in Poultry Production

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Introduction

The emergence and spread of antibiotic resistance have created a growing global threat. Because the use of antibiotics in any form resistance occurs, it is important to minimize the use of these antibiotics both in animals and human treatment -a goal that depends on eliminating inappropriate uses and finding other means of preventing infections. In Animal and Human medicine, strategies can include reducing health care-associated infections, limiting the unnecessary use of antibiotics, ensuring the use of those antibiotics effective against a narrow spectrum of bacteria whenever possible and increasing the use of appropriate vaccines.

On March 08, 2023, The International Poultry Council (IPC) at a program during VIV Asia in Bangkok, Thailand was pleased to announce eight private-sector organizations that have recognized the importance of responsible antimicrobial use and are endorsing the council's antimicrobial use stewardship principles. These international leaders, representing over 15% percent of the global broiler production, include six associations and two companies and together they represent a collective effort in reducing reliance on antimicrobials globally. These organizations were recognized as leaders for adopting the antimicrobial use stewardship principles and serve as an example for others that want to make a tangible impact on global health security. Therefore it is time to think for alternatives to antibiotics in animal production.

Alternative products play a crucial role in allowing farmers and veterinarians to reduce the use of antibiotics. Vaccines are among the most promising and widely used of these alternatives, but pre- and probiotics and other innovative products are also in use are currently being recommended. Many of these have been shown to simultaneously prevent infection and improve animal performance, such as growth rate or egg production, etc. However, the efficacy of alternative products tends to be variable across individual livestock operations and with the disease status of herds/flocks, and is often affected by external factors such as weather or feed composition. More research is needed to understand exactly why efficacy is so variable and to ensure optimized use, but this is complicated by the fact that the mechanism of action (i.e., the molecular processes that generate the desired effect) for many alternative products is not well understood. These alternative products should be considered as one part of a comprehensive herd or flock health management program aimed primarily at the prevention of diseases, rather than curing of infections. This paper aims to provide an overview of the options available to reduce the need for antibiotics in animal agriculture through the use of non-antibiotic alternative products and strict biosecurity practices restricting the enter of infection.

What are the Alternative Strategies to Antibiotics ?

The most important ways to prevent antibiotic resistance are:

- Minimise unnecessary prescribing and overprescribing of antibiotics. This occurs when people expect doctors to prescribe antibiotics for a viral illness (antibiotics do not work against viruses) or when antibiotics are prescribed for conditions that do not require them.
- Complete the entire course of any prescribed antibiotic so that it can be fully effective and not breed resistance.
- Use of appropriate Vaccines to control the occurrence of infections.
- Supplementation of alternative products to reduce or prevent use of antibiotics (such as Enzymes, Organic acids, Probiotics, Prebiotics, Synbiotics, Postbiotics and Phytobiotics).
- Practice good hygieneand biosecurity measures such as hand-washing and use appropriate infection control procedures.

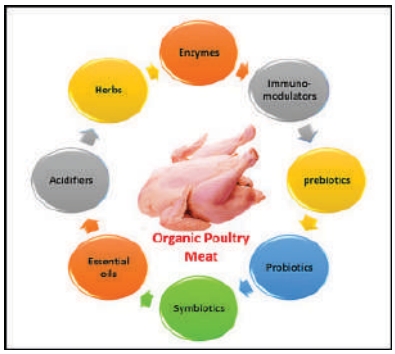
As the public health concerns of antibiotic resistance and the resulting withdrawal of antibiotics from prophylactic uses started happening in recent years, a dire need for alternative strategies has sparked in the production animal industry. Many researchers seek the potential of various natural and synthetic molecules in fighting bacterial infections, weighing their efficacy and cost-effectiveness on the scale. Probiotics, Prebiotics, Synbiotics, Postbiotics, Organic acids, Vaccinations, Innate immune stimulation and improving biosecurity are at the forefront of these alternatives. Although these strategies may not have shown consistent efficiency throughout research, combinations of two or more approaches have exhibited proficiency.

Withdrawal of antibiotics in poultry

Withdrawal of antibiotics from poultry feed have created the need for alternatives that would influence improvement of health and production traits of chickens and safety for human consumption of poultry products. Since antibiotic use is diminishing because of concerns such as the emergence of antibiotic-resistant bacteria, alternative strategies have become valuable in the control of infections. Recent advances in research identified several possible replacement therapies. Researchers are focusing on finding a replacement to treat bacterial infections that can devastate flock health.

What is an alternative to antibiotic in poultry feed ?

The natural alternatives to antibiotics includes: **Enzymes, Probiotics, Prebiotics, Symbiotics, Organic acids, Immunostimulants, and Phytogenic (Phytobiotics) including herbs, botanicals, essential oils, and oleoresins** are the most common feed additives that acquired popularity in poultry industry(fig.1)



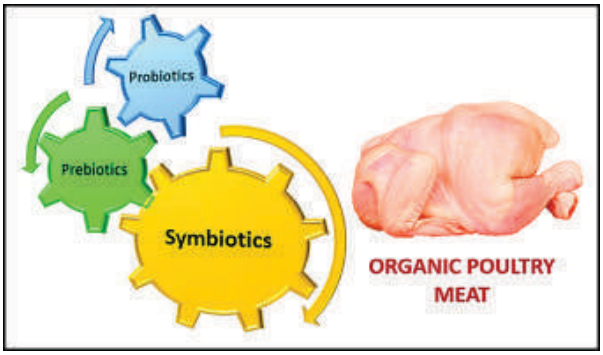
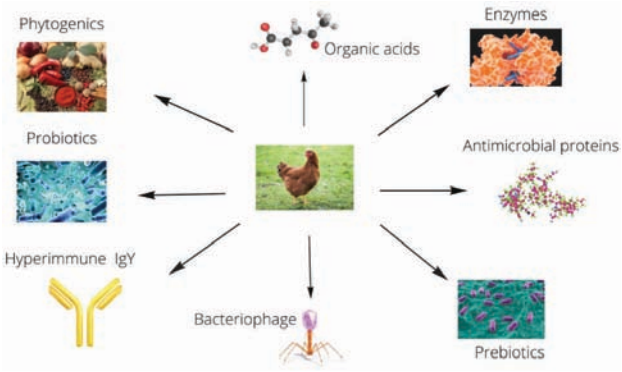


Fig 1. *Common natural alternatives used for production of organic poultry meat.*

(Source: Mohamed E. Abd El-Hack et,al. Poultry Science, Volume 101, Issue 4, April 2022, 101696)



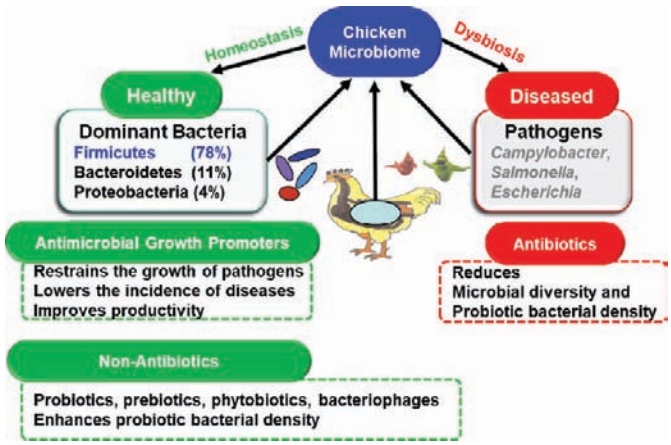


Fig 2. Antimicrobial growth promoters.

(Source: Vipnchandra kalia et.al.2022 Recent developments in antimicrobial growth promoters in chicken health: Opportunities and challenges. Science direct Volume 834)

Feed Enzymes

The nutrients for the multiplication and growth of bacteria in the intestinal tract are derived largely from dietary components, which are either not digested by digestive enzymes or absorbed so slowly that the bacteria in host guts compete for them. Addition of enzymes not only influence the absorption of nutrients but also produce nutrients for specific populations of bacteria through their action. Therefore, their use has a direct impact on the microfloral populations. The most widely used feed enzymes are mixture of a variety of glycanases, and the single-using degrading enzyme is phytase.

Inclusion of the enzyme phytase in animal diets aids in the digestion of phytate to inositol and inorganic phosphate. This is usually done because the phosphorus from cereal grains cannot be digested by poultry without phytase addition. The addition of phytase in poultry diets is economical because it efficiently utilizes phosphorus, which is regarded as the most expensive mineral in poultry production. It is essential to include fiber and starch digesting enzymes in poultry diets as they assist in digesting non-starch polysaccharides. Xylanase and β-glucanase addition to poultry diets improve feed conversion ratio, digestibility, growth performance, and nutrient utilization and reduce wet litter. The inclusion of enzymes in livestock diets is of great benefit not only to the animal through improved health, nutrient utilization, and growth but to the farmer also through reduced cost and increased returns.

Organic acids

Short chain fatty acids such as formic, acetic, propionic and butyric acid and other carboxylic acids such as lactic, malic, tartaric, Fumaric, and citric acid have been most commonly used in the poultry industry because their chemical and physical properties are applicable to poultry diets.

Dietary organic acids have gained great attention because of their antimicrobial activity against pathogenic bacteria and the fact that these compounds can induce a pH reduction in the gastrointestinal tract (GIT), which can improve nutrient utilization in poultry diets.

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EUROPEAN QUALITY

The organic acidshelp to enhance digestibility of energy and protein contents of the feed and reduction of microbial pathogens, improving the immunity, lowering the infection level, and reducing the ammonia and other harmful metabolites.

Probiotics

Probiotics are live microorganisms including bacteria (i.e., Lactobacillus acidophilus) and yeast that are commonly supplemented in poultry feed to improve animal well-being through a variety of mechanisms. Probiotics have a variety of functions in host, which are mainly triggered by their outer membrane composition and metabolic outputs. Some of the bacterial probiotics are several Lactobacillus species, Bifidobacterium, Bacillus and Enterococcus. Yeast or fungal probiotics are added to feed such as Saccharomyces cervisiae), Aspergillus oryzae. Candida pintolopsii and Saccharomyces that caused positive effects on the performance and gut health.

Necrotic enteritis is an acute infection caused by the bacteria C. perfingens. Intestinal damage in poultry allows the bacteria, which is a normal inhabitant of the intestinal tract, to attach, proliferate and produce toxins.The bio -therapeutic uses a combination of genetic engineering and synthetic biology techniques such as Probiotics are commonly used alternative to antibiotics against C. perfringens and necrotic enteritis. It effectively decreases mortality by 40-70% against C. perfringens. In addition, birds that were administered the live therapeutics showed improved feed conversion ratio. Further the research suggests that the bio therapeutic will work against other poultry diseases, including coccidiosis and avian influenza.

There are also certain adverse effects reported contradictory to the positive effects. However, multiple reports depict the positive enteric health effects of probiotics in improving intestinal integrity and mentioning that they could be a great alternative to antibiotics in the poultry industry.

The mechanism of action of probiotics consists of:
1) Competitive exclusion
2) Maintaining dysbiosis
3) antagonism and
4) Immunomodulation (fig. 3 and 4)

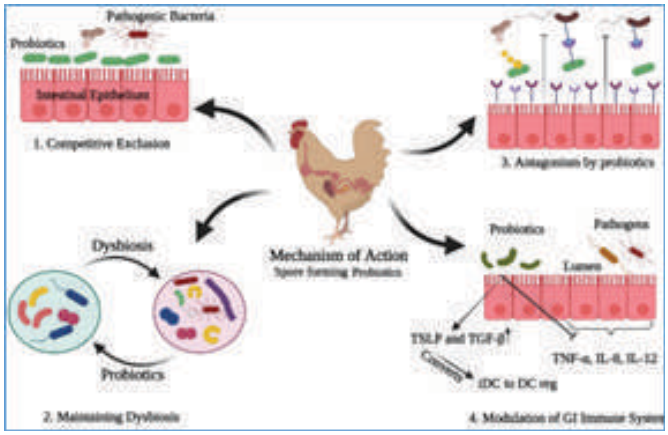

Fig 3. The mode of probiotic actions in poultry
(Source: Anam Khalid et.al.2022 Effect of Spore-Forming Probiotics on the Poultry Production: A Review. Food Sci. Food Sci Anim Resource 2022; 42(6):968-980)

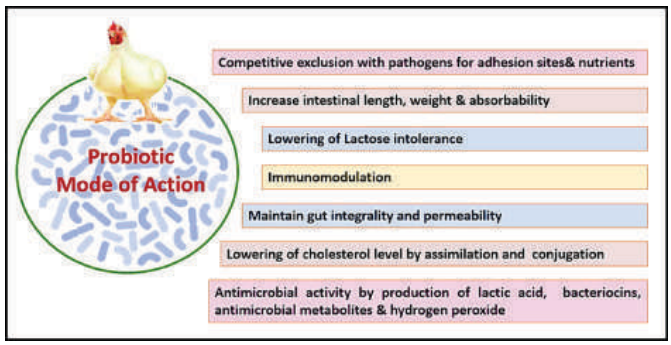

Fig .4. Probiotics mode of action
(Source: Mohamed E. Abd El-Hack et, al. Poultry Science, Volume 101, Issue 4, April 2022, 101696)

Prebiotics

According to FAO, prebiotics is defined as non-digestible food ingredients that benefit the host. They selectively stimulate the growth and activity of bacteria in the colon and thereby improve host health. They are supplying a substrate for beneficial microorganisms in the gastrointestinal tract. Although the previous definition has focused only on few carbohydrates, researchers have redefined prebiotics, including various oligosaccharides containing varying carbon lengths, and collectively designated them as non-digestible oligosaccharides.

Different molecules such as fructooligosaccharides, galactooligosaccharides, mannanoligosaccharides, inulin and isomaltooligosaccharide are among the non-digestible oligosaccharides that have beneficial properties as prebiotics.

Reports suggested that certain non-digestible oligosaccharides such as fructose oligosaccharides, inulin-type fructans, and mannanoligosaccharides can modulate gastrointestinal microbiota by increasing the Lactobacillus population while reducing harmful pathogens such as E.coli and Clostridium perfringens.

Synbiotics

Synbiotics are mixtures of probiotics and prebiotics. Synbiotics have always been an attractive choice for promoting the health of the gut microbiome, as they combine friendly bacteria, along with an appropriate food source for good bacteria, in one supplement. Studies have shown the beneficial effects of Synbiotics on reducing harmful bacteria such as Campylobacter jejuni and Salmonella typhimurium. Addition of symbiotic supplementation in drinking water helps to influence a healthy microbiota and improved immune response in the intestines of laying hens during a Salmonella challenge.

Postbiotics

Postbiotics is a product recently introduced into the poultry industry and are mainly derived from Lactobacillus, Bifidobacterium, Streptococcus, and Faecalibacterium species. The Postbiotics are derived from Aspergillus oryzae, a fungi largely used to ferment rice and soybeans in East Asia.Feeding a Postbiotics derived from Aspergillus oryzae (AO) can improve layer performance, productivity and egg qualityas well as reduce mortality. Their properties

including anti-inflammatory, immunomodulatory, antiobesogenic, antihypertensive, hypocholesterolemic, antiproliferative, hepatoprotective, and antioxidant led to the improvement of host health through enhancing several physiological functions.

Antimicrobial Peptides

The use of antibiotics promotes drug-resistant pathogens, leading to dysbiosis. Antimicrobial peptides (AMPs) a possible replacement for poultry antibiotics. AMPs are part of the immune system of every living organism. AMPs can target and kill a broad spectrum of pathogens and bacteria, including medically important antibiotic-resistant strains, without toxicity against animal cells. They can be formulated as additives in feed or water, topical products and for in ova injection. Like conventional antibiotics, AMPs do not trigger resistance to medically important drugs and don't persist in meat or wastewater, which could make them a safe alternative to preventing and treating bacterial diseases in the post-antibiotic era.

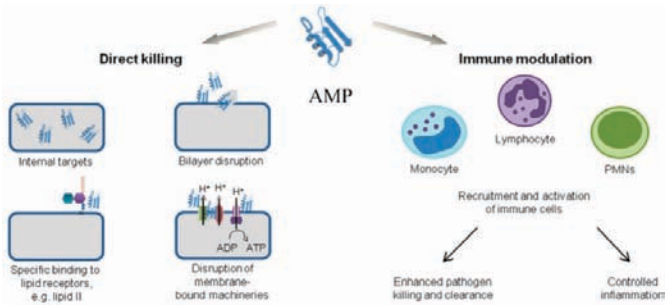

Fig: 5. Mechanism of action of antimicrobial peptides, *(Source: Prashanth kumar et.al, 2018 Antimicrobial Peptides: Diversity, Mechanism of Action and Strategies to Improve the Activity and Biocompatibility In Vivo,* **Biomolecules** *2018, 8 (1), 4).*

The non-ribosomal AMPs, mainly produced by bacteria, are synthesized by peptide synthetases and structural modifications. They include gramicidin, polymyxin, bacitracin, and sugar-peptide. Polymyxin is from B. polymyxin, playing bactericidal effect by destroying the bacterial cell membranes. It is effective against many Gram-negative bacteria, such as P. aeruginosa, E. coli, Klebsiella Antimicrobial peptides are classified into two categories, non-ribosomally synthesized Antimicrobial peptides(AMPs) and ribosomally synthesized AMPs, according to the peptide synthesis mechanismpneumoniae, Haemophillus, and Salmonella (fig5).

Phytogenic Products

Phytogenics, a group of natural growth promoters used as a feed additives andare another possible alternative to antibiotics. They are mainly something that is made from a raw extraction of plants and that are shown to have an effect on growth promotion. Recent studies show Phytogenics like chili powder, black pepper, ginger, turmeric, garlic, cinnamon, ginger and rosemary can positively impact both growth performance and antimicrobial effects in broilers. They are available as an oil, powder or liquid, depending on the plant extraction. These growth promoters can provide antimicrobial, anti-inflammatory, anti-diarrheal, hepatoprotective and diuretic qualities, depending on the plant used and the final product extracted. Phytogenics could improve welfare by decreasing environmental stress, morbidity and mortality.

Vaccines as Alternatives to antibiotics

Antibacterial Vaccines

Many bacterial infections are major health problems worldwide, in poultry and treatment of many of these infectious diseases is becoming increasingly difficult due to the development of antibiotic resistance, which is a major threat. Prophylactic vaccines against these bacterial pathogens are urgently needed. Traditional vaccines are generally classified into live-attenuated and inactivated/ killed vaccines. Bacterin is a suspension of killed or weakened bacteria used as a vaccine. Live-attenuated bacteria, replicating transiently in the host, are capable of expressing a full repertoire of antigens. Common vaccines available for bacterial infections in poultry are, Salmonella spp, E.coli, Fowl cholera, Mycoplasmal infections (fig 6.)

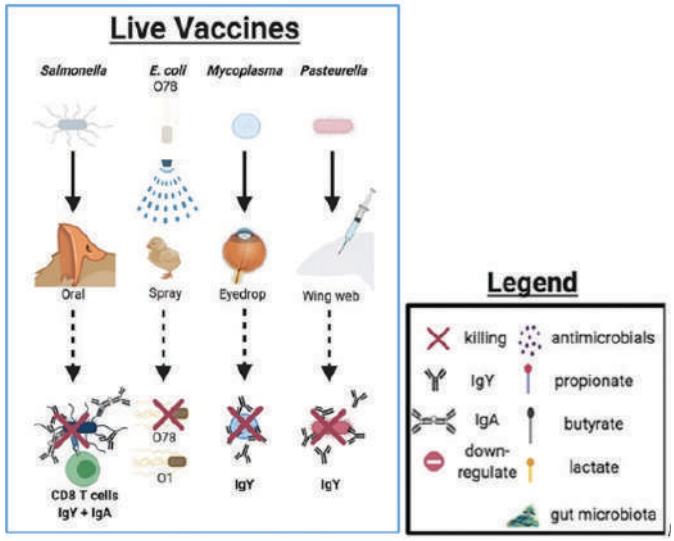

Fig 6. Action of vaccines on important Bacterial infections *(Source: Gram Redweik et.al.2020 Live Bacterial Prophylactics in Modern Poultry. Front. Vet. Sci. Volume 7 – 2020 | https://doi.org/10.3389/fvets.2020.592312).*

Immunomodulators

Immunomodulators mainly immunostimulants are able to non-specifically enhance the innate immune function and to improve the host's resistance to diseases. The use of immunotherapy in infectious diseases may resulting in modulating the immune response to a microbe (e.g., by using cytokines and cytokine inhibitors), modifying a specific antigen-based response (e.g., using interferons) and minimizing end-organ damage using non-specific anti-inflammatory agents (e.g., steroids); β-Glucans, bacterial products, and plant constituents could directly initiate activation of innate defense mechanisms acting on receptors and triggering intracellular gene(s) that may result in the production of antimicrobial molecules (table1)

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Table 1. Classification of immunostimulants

S.No	Category	Variety
1	Mineral substances	Selenium, Zinc etc.
2	Vitamins	Vitamin A,E,C etc.
3	Amino acids	Arginine, leucine, Ubenemex etc.
4	Chinese Herbal Medicines	*Astrgalus,Echinacea* etc,
5	Plant polysaccharides	*Astrgalus polysaccharide, lentinan, algal polysaccharide, polyposaligosaccharide,chitosan etc.*
6	Oligosaccharides	Manon oligosaccharide,fructooligosaccharide etc.
7	Microbial preparations	BCG vaccine, Corynebacterium seedings, Lactobacillus,Choleratoxin Bsubunit, Mycobacterium pheli, muroetsin, Prodigiiosin etc.
8	Immunologic adjuvants	Aluminumadjuvant, propolis, liposome, Freund's adjuvent
9	Hormones and hormone like substances	Growth hormone,
10	Nucleic acids preparations	Polynucleotide, immune ribonucleic acid etc.
11	Anthelmintics	Leomesole, metronidazole etc.
12	Chemical synthetics	Levomesole, cimitidine, sodium huttuyfonate, imiquimod, ubenemex, tilorone, polinosinic acid
13	Bacterial extracts	B-Glucan, peptidoglycan, liposaccharides etc.
14	Biological(cytokines)	Interferon, transfer factor, interleukin, immune globulin etc.
15	Others	Beepollan, bursaextracts, globulin, heatshock protein, polyIC glycyrrhizin etc.

Bacteriophages, endolysins and hydrolases

Bacteriophages

Bacteriophages are highly species-specific viruses that kill bacteria by the producing endolysins and the subsequent lysis of the bacterial cells. Bacteriophages can be considered safe antibiotic alternatives as they exhibit no activity against animal and plant cells. Phages most likely will never replace antibiotics completely; however, they will be valuable in the treatment of infections caused by multidrug resistant bacteria. Antibiotics will still remain the main treatment for the majority of infections, especially the acute ones, for a long time.

Endolysins and lysozymes

Endolysins and lysozymes are hydrolases. Hydrolases are enzymes that degrade peptidoglycans, the main building block of the bacterial cell wall, and thereby kill bacteria. The hydrolases can be derived from a number of different sources, including bacteriophages, as well as animals, plants, bacteria and insects with varying specificity for target bacteria.

Lysozymes and autolysins

Lysozymes and autolysins are hydrolases generated by eukaryotic organisms (i.e., animals and plants) and bacteria, respectively. In humans, lysozymes are an important component of the innate immune system and naturally present in the skin and secreted into saliva, urine, milk, and other bodily fluids.157 Lysozymes in particular tend to have activity against a broad spectrum of bacteria and are known to effectively break down the carbohydrate component of peptidoglycan layer of bacteria. They are also known to be effective against viruses and other pathogens.158 Lysozymes and autolysins are promising alternatives to antibiotics, although they share many of the limitations discussed under endolysins.

Conclusion

There is a growing demand for poultry and by-products due to an increase in the human population globally. Farmers utilize feed additives and antibiotics to enhance growth and alleviate diseases to meet this increasing demand for meat and meat products. Although antibiotic use as growth promoters (AGPs) in the livestock industry has brought about a positive increase in production, the industry has also been negatively affected by the development of bacteria resistant to antibiotics and the presence of chemical residues in meat and excreta. This has risen a concern as this poses a health risk in humans. Resistant bacteria can be transmitted to humans by consuming meat from antibiotic-fed animals or environmental spread from animal wastes. Therefore, action is required to curb this issue by addition of alternatives that have the potential to replace antibiotics for food safety, health and environmental reasons.

CULTURED MEAT AND ITS CURRENT TREND

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Email: vigneshpoultry2298@yahoo.com

CURRENT SCENARIO OF WORLD POPULATION:

The current population of World is 8,045,311,447, it is 0.88% increase from 2022.In 2050, the world's population is going to be 10 billion and feeding this population with the current food system is impossible. In future sure there will be a Climate Disaster and there is deficit in supply of good quality protein to human population is impossible, it advocated that innovation in food technology is very essential for our future generation. This write up will outlook the role of culturing meat.

CULTURED MEAT:

Cultured meat, sometimes called lab-grown, clean, or cultivated meat, is grown in a well facilitated lab with the help of few animal cells. Cultivated meat is meat that is grown in a facility and not on an animal's body. Cultivated meat is made from the same cell types arranged in similar structure as animal tissue and tastes, looks and feels like the meat people eat today.

In the glance of ethics, this process doesn't require animals to be slaughtered the way traditional meat does.

HISTORY:

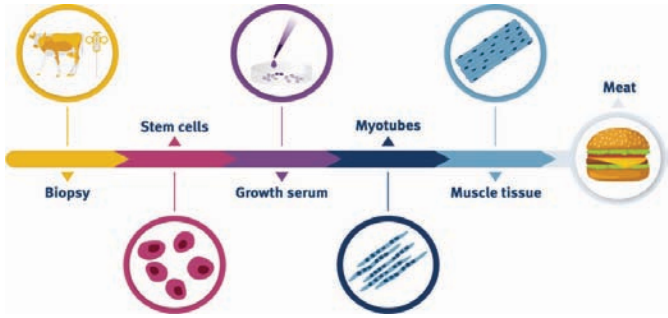
1950 - Dutch researcher Willem van eelen independently came up with the idea for cultured meat. As a prisoner of war discovery of cell lines provided the basis for the idea.

1971 - Pathologist Russel Rosscultured muscle fibers from guinea-pigaorta

2001- NASA began conducting cultured meat experiments, with the intent of allowing astronauts to grow meat instead of transporting.

2013-The first cultured beef burger patty was created by Mark Post at Maastricht University.

NUTSHELL OF CULTURED MEAT PRODUCTION:



Cultured meat (including fish and seafood) is made by growing animal cells in a lab. To take a cell sample, a biopsy is done on a live animal under local anesthetic, and then the harvested stem cells are fed a growth medium containing amino acids, glucose, salt, vitamins and other nutrients and grown in a bioreactor. The cells multiply creating muscle tissue, which are then turned into the scaffolding of the final product, for instance a beef steak or a burger.

The scaffolds are predominantly collagen and gelatin and help give the final product its texture and structure.Togrow beef, a cell sample must be taken from a cow, to create cultivated chicken meat; it must be taken from chicken, lab-grown salmon needs cells from salmon and so forth. Those who've tasted cultured meat and fish say that they are exactly like their counterpart from slaughtered animals. In terms of nutrition, they contain similar macronutrients and micronutrients, depending on the cultivated Product. The final product can be obtained within 2-8 week.

SWOC ANALYSIS OF CULTURED MEAT:

STRENGTH	WEAKNESS
• Highly skilled ambitious professions eager to develop the technology • Existing business models such as New Harvest and Modern Meadows • Interest from some investors • Existing patents skills and information for stem cell culture grow • Competitive, new, innovative technology • Profitable due to high demand	• Lack of funding and investments for further research • Difficult, challenging and time consuming.Further advancements needed. • Limited existing knowledge both from researchers and potential funders • Still small scale and very expensive to produce • Technology is not yet marketable

OPPORTUNITY	CHALLENGES
• High demand for meat products, growing middle class and population growth • Potential to become affordably priced • Potential to minimize environmental impacts compared to existing methods of production • Can become 'healthier' than conventional meat products (limit saturated fat, less hormonal and antibiotic inputs) • Higher levels of food safety, traceability and transparency for the consumer • Less land use and better management of resources • Animal welfare • Humanitarian concerns such as right to food and efficiency of use of land and food improved • Political decisions made could favour more support for facilitation • Many technologies can eventually been accepted by society if there is a perceived benefit to the customer	• Technology ownership may breed oligopolies • Not accepted by the novel food legislative actions or other political decisions • Food safety testing and questions • Time constraints • Lack of societal acceptance; food is not technology therefore challenging to gain acceptance • Alternative technologies covering the same market gap available sooner and cheaper • Trend to move toward more plant based diets, based on political push and communication (health and/or environmental arguments)

CURRENT TRENDS ON CULTURED MEAT:

The Singaporean government has a "30 by 30" goal which is an effort to meet 30 per cent of the city state's nutritional needs locally by 2030.

In Israel, Prime Minister Benjamin Netanyahu tasted cultivated meat and went on to provide government support to the alternative protein sector.

Educational institutes in the Netherlands and the United States have developed university courses in this sector. The alternative protein sector holds great promise for the world. According to management consultants A T Kearney, the plant-based meat sector is expected to be $370 billion by 2030.

In February 2019 the Maharashtra state government signed a MOU with Good Food Institute (of USA) for cell-based research and production of meat.

Animal welfare organization Humane Society International (HSI) India and the Centre for Cellular and Molecular Biology (CCMB) in Hyderabad have joined hands to develop lab-grown meat in India.The partnership looks to promote the technology to develop clean meat while bringing start-ups and regulators together under the same roof. Internationally, clean meat is available in some countries, but in India, we expect it to be available by 2025.

CONCLUSION:

Developed countries move towards consuming such plant-based meats while recognizing that developing countries will take some time to develop such products. Data shows that cultivated meat uses 95 per cent less land, 78 per cent less water, causes 92 per cent less global warming and 93 per cent less air pollution, comparatively. Cultivated meat has made great progress in the last six months; Singapore has permitted the sale of cultivated chicken meat. Recently people become more aware of cultured meat products and many companies involved in culturing. Thus results in bringing down the production cost and soon will reach at every nook and corner.Additionally,it will aids in creating strong foundation of research community to profilerate in developing new technology, reduce cost and speed up the commercialization.

INTERESTING FACTS ABOUT CULTURED MEAT:

1. Bio artist **Oron Catts** served the ever first thin frog streaks of cultured meat at dinner in museum, France during 2003.
2. The first burger from beef was prepared by**Chef RICHARD MC GEOWN** and tasted by two food critics **HANNI RUETZLER AND JOSH SCHONWLAND** in London.
3. The first cultured meat was made of about **tens of billions lab- grown cell** and consist of **20,000** separate **protein strands.**
4. The commercial sale of lab grown meat was first approved by Singapore government to the U.S start -up EATJUST in **December 2020.**
5. As per the consumer survey of 2017, **65.3%** are interested to attempt the lab grown meat.
6. Culture meat is not a **vegan** as it involves some animal based stuff for growing.
7. The nutrient profile in lab grown meat can be altered as per the patient diet.
8. Firstly, the lab grown meat appeared in **white** and made red by adding **myoglobin** in order to resemble like real one.
9. According to Oxford University study (2011), **96%** of green gas emission can be cut off by cultured meat.

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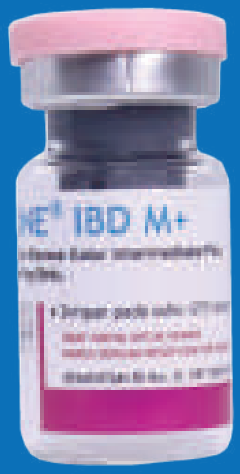

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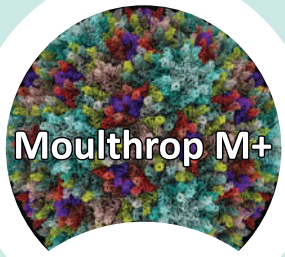

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