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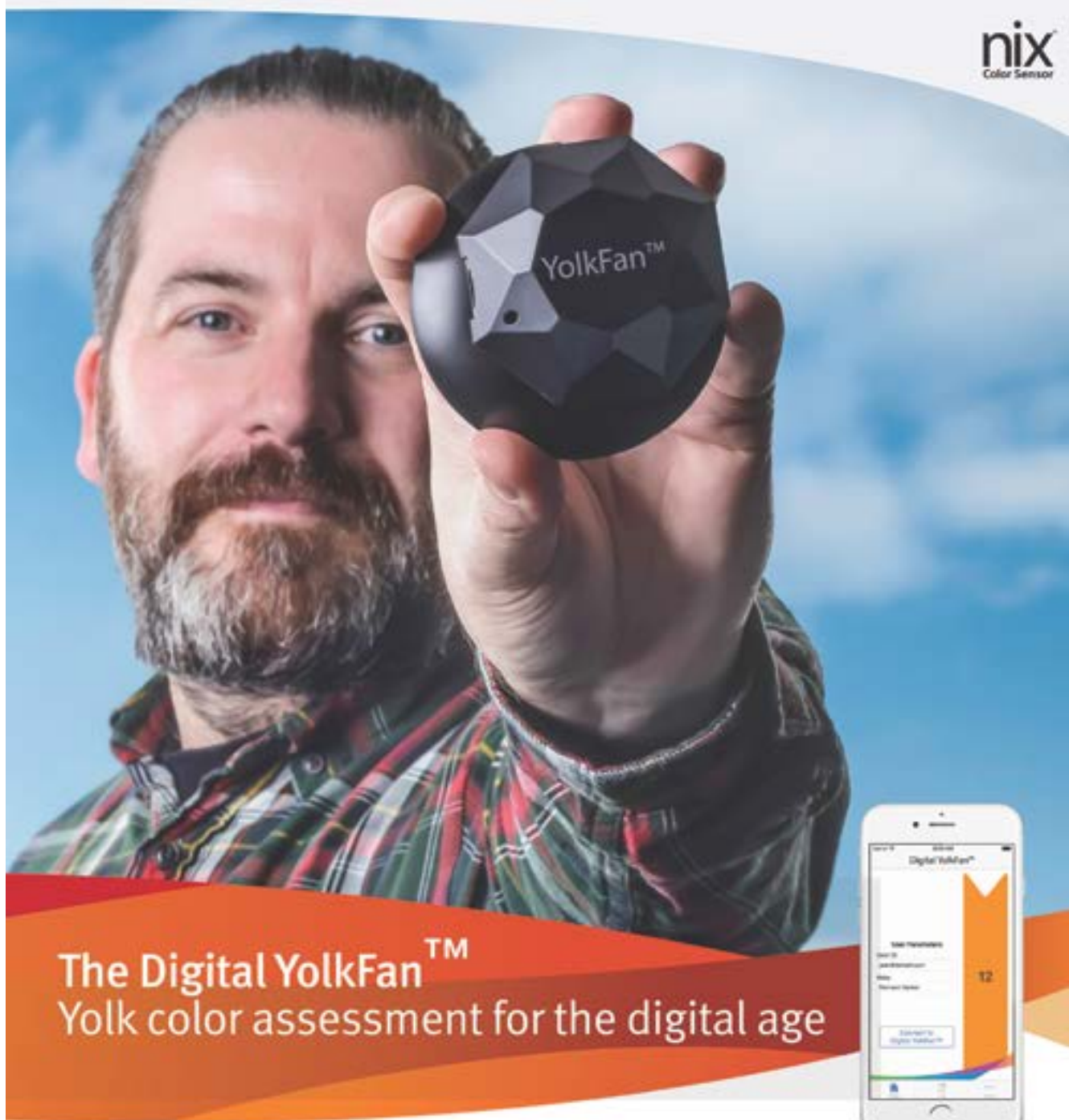
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- Editor



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Shaikh Imam, Chairman, Kasila Group, Khalid Shaik, greeting the bride Sharmila. Also seen M.A. Nazeer and Mohd Ghouse Pasha.

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Make more people pay tax – GST



M.A. Nazeer

Dear Readers,

The May 2017 issue of Poultry Fortune is in your hands. I wish to give brief highlights about various news, happenings, special features and technical articles on diseases, healthcare, nutrition, management etc by scientists and experts published in this issue of the magazine. Sometimes, I wish to share with readers relevant general aspects also which gives knowledge updation.

In the recent times, Indian government is working on doing a few good things like uniform taxation through Goods and Services Tax (GST), eradication of Corruption, making 'January to December' as the financial year, conducting elections to the Centre and States at a time, and to increase domestic production in agriculture and other sectors. Governments are looking at ways to increase the revenue and budget. Revenue to the government comes mostly through taxes from the citizens of the country. Although the idea of GST is good, the rate of tax should be reasonably lower at 4 to 10 per cent, so that majority of people come forward to pay taxes. Though the Prime Minister and most of the Chief Ministers in the country were present in NITI Aayog Governing Council's three meetings, no one discussed at lower taxes thereby involving more people to pay taxes.

It was a good step taken by Prime Minister Narendra Modi establishing NITI Aayog, the National Institution for Transforming India and it is a Government of India policy, established to replace the Planning Commission. The aim of NITI Aayog is to encourage involvement and participation in the economic policy-making process, with emphasis towards making the country a cooperative federalism. Established on January 1, 2015 its first meeting was held on February 8, 2015 with the Prime Minister as its Ex-officio Chairman. Its third meeting was held on April 23, 2017.

NITI Aayog started a new initiative called 'NITI Lectures: Transforming India', the aim of which is to invite globally-reputed policy makers, experts and administrators to India to share their expertise and knowledge in policy making and good governance with their Indian counter parts.

People will always like and support the government in its endeavour to do useful things to the society, but it requires sincere, committed and continuous efforts by the government at union and state level to succeed in its efforts.

In the Articles section, article titled "Heat Stress Management in Commercial Poultry" by Dr G. Balakrishnareddy, Dr N. Vamshi Krishna Reddy discussed Importance of heat stress • Management of birds during various stages • Use of paddy straw on roofs • Use fans and floggers in shed • Use of sodium bicarbonate and vitamin C in feed.

Another article titled "Ventilation Systems in Poultry Houses" by Meesam raza, Sudhir jaiswal, Bhoomika Shrisant, Veerendra kumar discussed Ventilation is one of the most common challenges in poultry house; various systems are designed to automatically manage this environment for poultry, especially during the brooding period. Whether you use a tunnel- or cross-ventilation system or a combination of both, ventilation is necessary to create the optimum environment that birds need to grow and develop during each stage of life. The right system not only ensures adequate air exchange throughout the poultry house, but also removes excess moisture from the litter, maintains oxygen and carbon dioxide levels, and regulates temperature within the house, which is of utmost important in housing management.

Article titled "A Layout on Egg Breaking Plant and It's Organization" Rabi Ranjan Naik discussed Eggs are fast finding themselves in Indian plates. The demand for this high-protein yielding food is going up sharply over the years. Economically, egg production is the most important facet of the entire poultry industry. India is ranked sixth among the top egg producing countries. Rapid urbanization, increasing population and its nutritional needs, economic factors affecting food demand has led to this shortage in the demand-supply chain. So, the advanced facilities of egg processing allow saving the energy value and nutrients contained in eggs and able to satisfy the needs of our customers in any amounts and any product range, which includes pasteurized and fermented dry and liquid egg products both chilled and frozen. So, it's needed to know about the egg breaking plant and its organization and reformed egg products to fulfill consumer demand.

Article titled "Functional Properties of Egg and their Applications" Dr O. P. Dinani discussed Understanding the functional properties of the eggs help to use as food items in various egg Products and non food items as industrial application of eggs. Damaged eggs can be utilized by many ways by understanding its functional properties. Egg storage and preservation does not alter the functional properties. Albumin, yoke and as a whole egg different functional properties are present in egg that can be utilized judiciously for maximum benefit from the eggs.


Article titled "Production of Quality Chicks and the Assessment" by G. K. Rathinam discuss Chick quality becomes more and more important and a hatchery must produce quality chicks in order to meet the optimal performance. Ventilation is key to producing a top quality chick. Oxygen, Air-exchange, and Air distribution and Extraction fans are essential so chicks get what they need to grow and develop according to their genetic potential.

Article titled "Semen Collection, Evaluation & Insemination in Chicken and Turkey" by R. Shirisha, M. Rajashri, K. Preethi discussed Increased mating ratio: In a flock it is usually one cockerel mated to six to ten hens. With artificial insemination it is claimed this ratio could be increased fourfold. • Elimination of preferential mating: When there is poor fertility caused by preferential mating it can be eliminated. • Use of older males from outstanding performers: Older male birds that have been flock improvers can be used for several generations. Whereas under natural mating their useful life is limited

Readers are invited to send their views and comments on the news, special feature and articles published in the magazine and would be published under "Readers Column". Time to time, we shall try to update you on various aspects of poultry industry. Keep reading the magazine regularly and update yourself.

M. A. Nazeer

Editor, Poultry Fortune
info@poultryfortune.com



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 all in 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 India through annual Awards presentation.

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

Electrolytes through Feed: A Preferred Approach

High temperature is a major limitation to growth and meat yield of broilers in tropical countries of the world. Reduced feed intake, growth rate, feed conversion, survivability, dressing yield, breast meat and total meat and increased abdominal fat are the immediate consequences of rearing broilers in a hot humid environment (Geraert, 1998). In layers, heat stress significantly affects feed intake, egg production and egg shell quality. Deposition of calcium and pigments in the shell are also reported to get reduced due to heat stress. Depleted performance and decreased profitability are aggravated when high temperature is associated with high relative humidity. This situation demands an economic and efficient means to improve the thermo-tolerance of broilers in hot humid environment.

Electrolytes play a crucial role in maintaining body's acid - base balance as well as osmotic pressure in body fluids. The role of each individual component present in electrolyte supplement is difficult to define without taking into consideration the rest of the elements.

The biological role of all these elements in normal metabolism during production of poultry is essential. Disturbances in their metabolism can result in toxicity. However, a combination of relevant quality control programs in the animal feed industry, as well as the adequate education, nutritionists can significantly reduce the risks associated with the

appearance of electrolytic imbalance and toxicities. While requirements for electrolytes have been clearly defined, there is currently an understanding of the need to achieve a balance between cation and anion supply (Lees on and Summers, 2001). The balance of dietary cations and anions is in close relationship with broiler performance, affecting the metabolism quite differently than the individual ions. Dietary electrolyte balance (DEB), also known as cation-anion difference (CAD), is calculated using only the monovalent ions (strong ions) of sodium, potassium and chlorine.

Electrolyte imbalance is quite rare in comfortable weather conditions, since body's buffering system provides maintenance of normal physiological pH value. The maintenance of this value is determined by three major factors – balance and ratio of electrolytes in feed, endogenous acid production and level of renal activity. Some examples of electrolyte imbalance include Tibial dyschondroplasia and respiratory alkalosis. Tibial dyschondroplasia in chicks can occur as the consequence of electrolytic misbalance. The condition is associated with a range of factors including administration of NH_4Cl in feed production (Lees on and Summers, 2001).

Respiratory alkalosis occurs at high temperatures consequent to excessive loss of carbon-dioxide induced by panting. The condition can result in

poor growth rate in meat industry and poor quality of eggshell that quite often affects highly-productive laying hens. Acid-base balance substantially affects the process of eggshell formation. The acid-base status of the intrauterine extracellular fluid strongly affects calcium solubility (precipitation). Electrolyte balance can affect the metabolism of numerous amino acids, especially lysine and methionine. It is well established that deficit of potassium in feed induces increased lysine accumulation in tissues. The accumulation rate correlates with potassium level. Such conditions of potassium deficiency result in decreased growth rate in chicks. High levels of sodium chloride, regardless of amino-acid balance, negatively affect the growth rate in poultry (Leeson and Summers, 2001). Feed formulations with low electrolyte balance in hot summer strongly require electrolyte supplementation. Electrolyte imbalance can be prevented by adding an appropriate electrolyte product and simultaneously balancing anion and cation ratio in poultry feed formulations. Electrolyte product should be sufficiently rich and at the same time it should not disturb the predetermined dietary electrolyte balance of the feed. Supplementing electrolytes through feed is a good strategy especially in integration models, rather than adding through water at the farm level, which is difficult to control and monitor. Providing electrolytes through water during summer season (which could be about 5-6 months long), especially in the Indian subcontinent, requires an extra effort and

constant attention. Not only this, there is a continuous flushing of fresh cool drinking water in farms in summer months which makes electrolyte supplementation at appropriate times consistently through water, a daunting task.

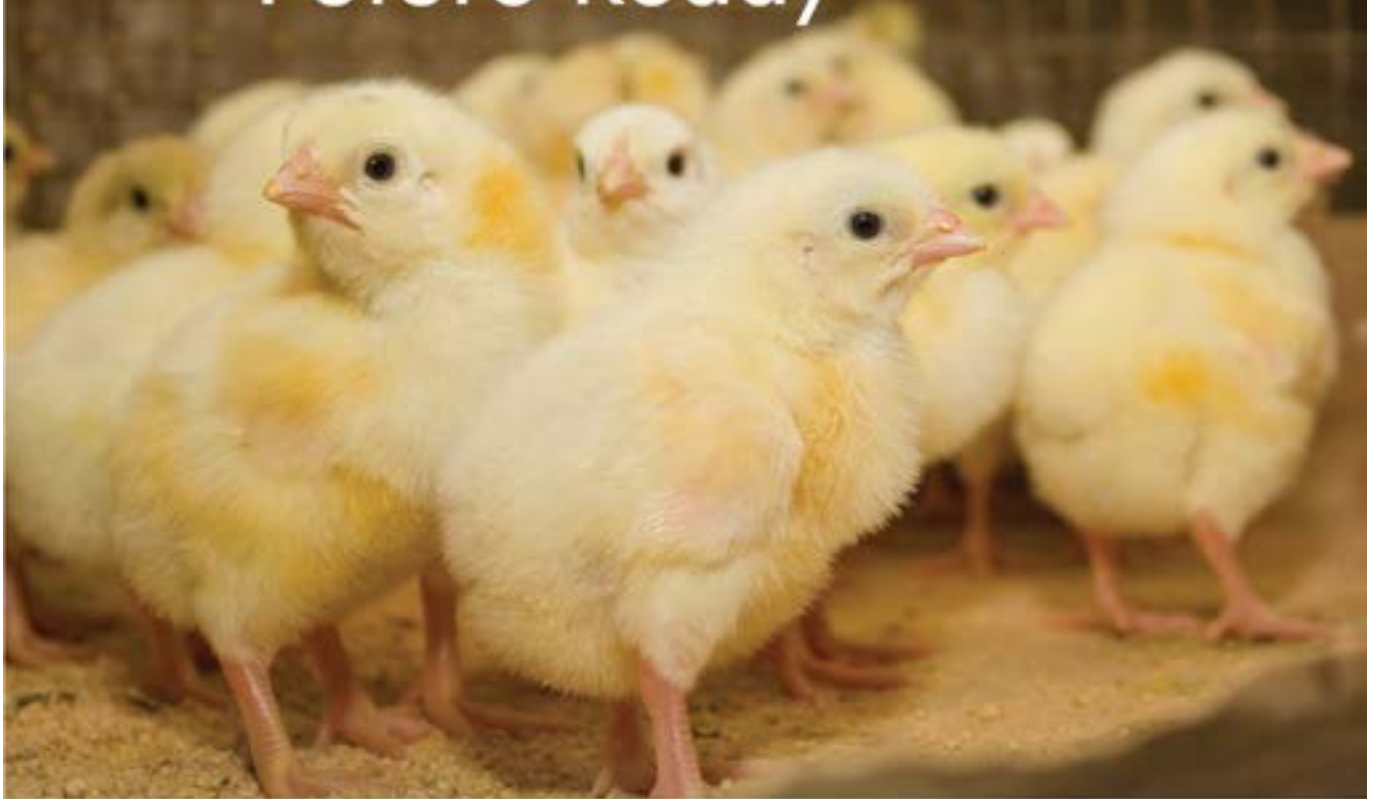
Adding a properly balanced and sufficiently rich electrolyte product into the feed, throughout the summer season, is the best way to ensure that there is sufficient level of electrolytes present in the bird's body all the time. This maintains a uniform level of electrolytes in the blood and body fluids continuously. An adequate regular supply of ions makes up the continuous loss of electrolytes happening due to heat stress. This also maintains a normal acid-base balance between extra-cellular and intra-cellular fluids.

Electrolytes also help in retaining water inside the body. Birds are able to maintain an optimum level of hydration throughout the season as there is sufficient electrolyte present in body fluids. With this strategy, not only a sustain dehydration but also an optimum performance can be maintained during the hot weather. Farmers as well as integrators, both can be rest assured that birds are getting necessary supplementation of electrolytes continuously, without putting any extra effort.

Avilyte-FS, an electrolyte product from Avitech, a unique rehydration formula designed by the nutritionists is specially meant for supplementation through feed. Avilyte-FS is the only product, containing all the ions in monovalent form, which provides the birds a faster rehydration and a swift recovery.

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Don't Sell Eggs Below 3, Farmers told

The National Egg Coordination Committee (NECC), Namakkal Zone, has assured poultry farmers that price of egg will not go below Rs 3 and asked them not to sell egg at lower price.

A special egg rate fixation advisory committee meeting was held here recently which was presided by its chairman Mr P. Selvaraj. With the drop in demand, the price of egg was fixed at Rs 3 on April 8 that caused fear among the farmers that price would go down further. However, it was decided at the meeting that floor price should not be reduced at any cost. Officials said that the average price of egg in January was Rs 3.54, February Rs 3.54, March Rs 3.43 and April Rs 3.12.

Farmers should follow bio-security measures at their farms to avoid losses arising due to death of birds because of heat. Farmers should cull birds above 72 weeks as the shell quality would be poor in aged birds. This will lead to drop in production which will result in increase in price of eggs. With Panguni Uthiram festival over in Tamil Nadu and the 45-day ban on deep sea fishing has begun, there will be more demand for eggs in the coming days. Hence, price of eggs will increase. Drop in exports and holiday for schools led to drop in sales of medium sized-eggs as large farmers started to store eggs in their own cold-storage facility. Hence, farmers were asked not to panic as price of eggs would go up.

Govt will double farmers' income by 2022: PM

Narendra Modi also exhorted farmers to adopt modern farming methods like drip irrigation and new technology as well to improve income. Exhorting farmers to adopt modern technology, Prime Minister Narendra Modi recently said his government has decided to double their income by 2022 when India would celebrate 75 years of Independence.

Modi made the announcement while dedicating the Rs 1,500

crore phase I of link-II pipeline canal of SAUNI (Saurashtra Narmada Avataraan Irrigation) project to the people and laying the foundation stone for Rs 1,694-crore phase II of link II of the project.

The phase II of the project envisages the construction of a 74 kilometer pipeline network connecting Bhimdad dam to seven other dams in Botad and Bhavnagar districts.

The SAUNI scheme would

take water from Narmada to 115 dams in the parched Saurashtra region. The PM asked farmers to adopt modern farming methods like drip irrigation and said his government has decided to double the farmers' income by 2022.

"Centre has decided to double farmers' income by 2022 by improving technology, increasing milk production, use of solar light, honey production. Fifteen years ago people would not have thought that we can come out of drought-like situation (in this region)," he said. "We will have to make it our nature to adopt modern technology. Entire government be it the Central government or the state governments and banks should come under your mobile phone," he said, while urging the people to download BHIM app and earn money by helping others to download it. Being a former CM, he understood farmers' issues better, he said.

"I am the first person to become the PM after serving as a CM for a long time. And that is why I know how much farmers are troubled when they do not get urea or water in time. For me, it is easy to understand people's problems," he said. "When as the Gujarat chief minister I would go to the Centre for meetings and say that we spend a large part of our budget on water, many would criticise me saying you cannot win elections that way. I don't work to win elections but to

serve the people of Gujarat. It is only water and not money that can make rural Gujarat progress," the Prime Minister said.

"Today Goddess Narmada herself has descended to bless the people here. Water is like God, we have no right to waste it," he said. Modi also praised Madhya Pradesh Chief Minister Shivraj Singh Chouhan for his 'Narmada Yatra' campaign.

"Gujarat farmers should be grateful to Chouhan government. To ensure that the Gujarat farmers do not face any water scarcity, the MP government has organised Narmada Yatra and asked people to plant trees along its (Narmada's) banks," he said.

"Shivraj Singh Chouhan government of the BJP is raising forests so that Mother Narmada does not go dry even after hundred years," Modi said. The project which Modi dedicated to the region today comprises a 51-kilometre network of underground pipeline to carry Narmada water from Limbdi-Bhogavo-II Dam in Surendranagar district to Bhimdad Dam in Botad district.

Last August, the Prime Minister had dedicated phase 1 of Link-I canal network of the project. SAUNI Yojana envisages channeling floodwater through Narmada Dam project by laying 1,126 kilometer network of pipelines to feed 115 reservoirs in Saurashtra and irrigate 10.22 lakh acres of land.

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Nationwide Campaign to Promote “Stress Free Summer” for Poultry Producers

Series of technical seminars, workshops and customer training sessions conducted across India



For more details on the Stress Free Summer
Please contact your Kemin representative Now!!
or Call in this way form to reach out to you.

Chennai, INDIA (April, 2017) Kemin Industries, a global nutritional ingredient company that uses science to create solutions for half the world’s population, has started a “Stress Free Summer” campaign to help poultry farmers learn how a holistic systemic approach to heat stress can improve production and profitability.

The stress of summertime heat can bring down egg production in layers and breeders, increase feed conversion ratio (FCR) in broilers and affect the overall performance of birds. Typically, poultry producers may see up to a 10 percent drop in production during summer months. With India’s current drought conditions and hotter-than-normal predicted temperatures, producers are expecting to see a 25 to 30 percent productivity drop this summer.

“At Kemin, we always work

in partnership with our customers. With our ‘Stress Free Summer’ campaign, we identified a challenge our customers face, and designed an educational campaign to help them strategically manage their birds’ health and productivity in the summer,” said Mr. R Kannan, Director of Marketing for Kemin Animal Nutrition and Health. The nationwide “Stress Free Summer” campaign has already covered the Southern, Eastern and Western regions of India. With five customer trainings and eight seminars, the Kemin team of experts including consultants Dr Jayaraman, Dr Prajapati, Dr R. K Pathak, and veterinarians Dr Saravanan, Dr Venket Shelke, Dr Narendra Reddy, have educated more than 750 customers.

What’s next? More steps on the campaign?

“Our technical team has been sharing insights in farm

management, feeding management, water management and disease management,” said Kannan. “These conversations provide actionable solutions to combat heat stress for a more productive, profitable summer.”

1. Farm Management

Well located and well laid out poultry farms, surrounded by trees and lawns receiving good breeze will have lesser problems in summer season. In addition, roof insulation plus increased ventilation by fans would help to withstand moderate hot weather. Care should be taken to avoid overcrowding and to provide shade to overhead water tanks and pipe system. In extremely hot weather, the above measures are not sufficient and evaporative cooling systems - sprinklers, foggers, or pad cooling - are necessary. These systems work very well especially if relative humidity is low and temperature inside houses can be brought down significantly. Use of fans without evaporative cooling system may be harmful in extreme hot weather since it is only hot air that is blown in to the house.

Feeding Management

Feed withdrawal from 9am to 4.30 pm is very effective in reducing heat stress mortality. Feed intake and digestion produce nearly 7% additional heat in the body which is maximum 4 to 5 hours after feed intake. This should not coincide with hottest part of the day (2 to 3 pm) Birds fasted in the day compensate intake in the night time and it should be seen that lights do not go off in night.

If biosecurity is poor, feed withdrawal may lead to coccidiosis, necrotic enteritis. Necessary medicines may be kept at hand in case such

eventuality arises. In summer, feed should be made denser with Nutrients, Vitamins and minerals to compensate for reduced intake. Thus as the hot season progresses it may be necessary to fine tune feed formula again in mid-summer. In addition following features, which have bearing on heat stress control, should be included in summer feed formula:

a) Crude Proteins. Crude Protein level in feed should not be increased and protein from only vegetable source should be used. Proteins in general and those from animal sources in particular have higher heat increment values i.e. produce more internal heat in the body. Secondly vegetable proteins (Soya, Sesame, Sun flower) are rich in Arginine. Under heat stress arginine absorption is low and that result in plasma amino acid imbalance, leading to increased catabolism of amino acids adding to body heat. Hence vegetable proteins are preferred in summer. While keeping protein levels same, crucial amino acids may be increased to compensate for reduced feed intake.

b) Fats: Fat should be increased by 2 to 3% at the cost of carbohydrates without changing ME. Fats are good in summer because their heat increment value is lesser giving better cooling effect in body

c) Vitamin C and Chromium: Because of the release of corticosteroids in heat stress, there is increased demand for Vit C by adrenal glands for controlled production of hormones needed for gluconeogenesis. In heat stress there is also reduced synthesis and partial depletion of Vit C. So if included in feed, there is no need to give in water again.

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If laying hens exposed to high ambient temperatures, the supplementation of chromium and ascorbic acid was found to improve the retention of minerals such as iron, calcium, phosphorous and zinc (Sahin and Sahin, 2002). In the same study, the authors also observed reduction in nitrogen excretion and have suggested the combination of chromium and ascorbic acid to be a protective stress management strategy. The reduction in loss of minerals was presumed to be due to the protective effect of chromium and ascorbic acid on pancreatic tissue against oxidative damage, thereby improving the secretion of digestive enzymes. Sahin et al. (2003) observed improved weight gain, feed intake and lower corticosterone, glucose, and malonaldehyde concentrations of birds on supplementation of chromium and ascorbic acid combination.

d) Sodium bi carbonate: It has positive effect of increasing water intake, and also reducing systemic acidosis. It can also be given through feed instead of drinking water. In vegetarian feed, inclusion of Sodabicarb at 0.4% (4 kg/ton) + Sodium chloride 0.25% (2.5kg/ton)

would properly balance sodium and chloride levels in feed.

e) Betain (osmolyte) in feed: Betain (0.5 to 1 gr/ton) helps in maintaining water balance in the body cells against extra cellular osmotic gradient. Electrolytes also have similar action and are better given through water.

f) Anti-oxidants: In heat stress there is excessive oxidative metabolism and release of free radicals in the body. Free radicals damage all types of biological molecules, and cells of vital organs more so of immune system. Vitamin C captures and neutralizes free radicals. Similarly, antioxidants namely BHA, BHT and EQ protects fats and oils in feed from oxidative rancidity.

Water Management

Cool Water (at 10-12o C) should be supplied continuously to birds. Watering space should be doubled. Overhead tanks and pipe system should be properly covered to keep the water cool. Birds reject warm water and that accentuates heat stress. Providing fresh cool water (5c) in noon time is very effective for internal cooling of body (heat sinks) and reducing symptoms of stress.

Disease Management

In summer season, apart from hot weather related ones, other associated problems could arise and following precautions are necessary to address them:

- i) Regular sanitization of drinking water, periodic cleaning of water tanks and flushing pipe system. This is necessary since bacterial counts in water increases in summer due to water table going down.
- ii) Use of Litter conditioner: In summer, since there is increased intake and excretion of water by birds there is wet litter and ammonia problems in poultry houses. Hence it is important to maintain litter dry.
- iii) Vaccination: Strict cold chain should be maintained during transport storage and administration of vaccines. Vaccination should be carried out during cool hours.
- v) Immunostimulants should be given for three days following each vaccination.

About Kemin Industries

Kemin (www.kemin.com) has been dedicated to using applied science to improve the quality of life for over half a century.

As a global company touching 3.4 billion people every day with its products, Kemin is committed to improving the quality, safety and efficacy of food, feed and health-related products to feed a growing population and be a resource for others in need. Committed to feed and food safety, Kemin maintains top-of-the-line manufacturing facilities where over 500 specialty ingredients are made for humans and animals in the global feed and food industries, as well as the health, nutrition and beauty markets. The company provides product solutions and options to customers in more than 120 countries.

A privately held, family-owned and operated company, Kemin has more than 2,000 global employees and operates in 90 countries including manufacturing facilities in Belgium, Brazil, China, India, Italy, Singapore, South Africa and the United States.

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Kemin Industries Acquires Unique Beta-Glucan Technology



Beta-glucan acquisition expands Kemin's gut health portfolio

Kemin Industries, a global nutritional ingredient company that uses science to create solutions and products, has acquired unique beta-glucan manufacturing technology from Algal Scientific, a company headquartered in Plymouth, Michigan.

“The acquisition of this beta-glucan manufacturing technology, developed by Algal Scientific, will provide Kemin with capabilities and products needed to further expand our antibiotic alternative portfolio for animals, and offer important scientific advancements for humans and pets,” said Dr. Chris Nelson, President and CEO of Kemin Industries. “We are focused on ways to rapidly impact our customers’ business through strategic acquisitions of differentiating technology.”

Headquartered in Plymouth, Michigan, Algal Scientific focuses on solutions for animal and human nutrition using a unique algae production system. This technology produces highly concentrated products to support gut health in both animals and humans. These products are available for sale in many regions globally, and Kemin will

work to expand product registrations immediately.

“As a start-up, Algal Scientific invented this technology and extensively researched the science behind the differentiated beta-glucan,” said John Tucker, CEO of Algal Scientific. “Kemin is uniquely suited to exploit this technology and offer advanced products to customers globally.”

Kemin welcomes the technology inventors and nearly a dozen new employees with expertise in both production and research to the Kemin team. Kemin plans to continue researching these products to further expand application of the technology.

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World Class Research Lab, Built At Over Rs 1 Crore, Turns Poultry Fodder Store

A world-class research lab of India's apex agriculture body has turned into a store for poultry fodder. Built at more than Rs one crore a few years ago, the lab in UP's Pilibhit was supposed to be used by PhD students and other research scholars of the Indian Council for Agricultural Research (ICAR). But instead, the lab has no other use but storing fodder for poultry. The reason: while constructing the world-class laboratory, ICAR and the Central Public Works Department (CPWD) didn't make provisions for power and water supply! On Monday, Parliament watchdog, PAC stumbled on a CAG report that alleged major lapses in the construction of the research lab. “Initially, the lab was planned in Delhi, but for reasons unknown, it was shifted to Pilibhit. But what

intrigued everyone in the panel is how government's two apex bodies (ICAR and CPWD) forgot to provide power and water supply,” said a member of the PAC. “There were no clear answers. And both the agencies were not forthcoming to take the onus for this disaster,” said another member. At the PAC meeting, some members even asked why the lab was shifted from Delhi to Pilibhit. The process led to escalation of costs by almost 100%, the CAG remarked in its report. Both, ICAR and CPWD have been asked to explain how public money was wasted even as the key educational infrastructure was not built. According to sources, ICAR decided to not to incur more money for power and water supply as the expenses had already hiked sharply. Scientists have often



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highlighted that India lacks world-class facilities in higher education and scientific research. There have been allegations of shortage of

funds too. The latest episode, however shows how resources have been squandered while the scientific community derived little benefit.

BIOMIN Mycotoxin Survey Indicates Higher Mycotoxin Risks in Corn and Feed in 2017

Mycotoxin-related threats to livestock production have risen in most regions of the world over the first quarter of 2017. More than 14000 analyses were conducted on 3715 finished feed and raw commodity samples sourced from 54 countries from January to March 2017 as part of the BIOMIN Mycotoxin Survey.

Main trends

Recent rise in mycotoxin contamination levels observed for corn, finished feed and soy.

Deoxynivalenol (DON), detected in 80% of samples, is the most prevalent mycotoxin worldwide, followed by fumonisins (FUM), found in 71% of samples. 76% of feed and raw commodity samples contained two or more mycotoxins.

Heightened risk

Reported mycotoxin occurrence data has shown that contamination levels in corn and finished feed samples have risen considerably in Europe and throughout the Western hemisphere. Risk levels in Asia remain elevated.

“Corn, or maize, constitutes a major proportion of animal feed and so trends in finished feed risk tends to match corn risk over time,” explained Dr Timothy Jenkins, Mycotoxin Risk Management Product Manager at BIOMIN.

Main culprits

The most prevalent mycotoxin in world feed is deoxynivalenol,

a type B trichothecene produced by *Fusarium graminearum* and *F. culmorum*. Easily observed symptoms include reduced feed intake and feed refusal. Two-thirds of samples contained deoxynivalenol in excess of 150 parts per billion (ppb): the risk threshold for effect on sensitive animals.

47% of samples contained *F. verticillioides* -produced fumonisins above 500 ppb: the risk threshold for effect on sensitive animals. Research has shown the combination of deoxynivalenol and fumonisins severely impair vaccine response and gut health.

Multiple mycotoxin presence

More than three-quarters of samples contained two or more mycotoxins. Multiple mycotoxin contamination of feed presents additional problems, as certain combinations of mycotoxins are known to have synergistic effects that aggravate the negative consequences for animals.

“The main *Fusarium* mycotoxins are frequently related to subclinical symptoms which are not very obvious on the surface but usually have a greater economic impact for the industry.” observed Dr Jenkins. “The presence of several mycotoxins at low levels can silently impair productivity with poorer feed

efficiency and low growth rates,” he added.

Industry solutions

“Avoidance of contaminated feed and attention to feed storage conditions are logical approaches to reducing the mycotoxin risk,” stated Dr Jenkins.

“However, mycotoxin contamination of feedstuffs occurs despite the most strenuous efforts on prevention. The most reliable approach is to combine prevention and detection with regular

application of additives proven to adsorb or deactivate toxins in the intestinal tract of animals,” he advised.

About the survey

The annual BIOMIN Mycotoxin Survey constitutes the longest running and most comprehensive survey of its kind. The survey results provide insights on the incidence of the six major mycotoxins in the agricultural commodities used for livestock feed in order to identify the potential risk posed to livestock animal production.

Rebranding Reinforces Kemin Nutrurance Promise to Customers



Pet food division launching new visual identity and communications strategy

DES MOINES, Iowa— Kemin Nutrurance, the pet food and rendering technologies division of Kemin Industries, is launching a new visual identity and communications strategy to showcase its innovative product range, industry-leading technical expertise and unparalleled commitment to pet food manufacturers, renderers and ingredient suppliers worldwide.

“The rebrand theme is built around the promise that Kemin Is Assurance throughout every step of the pet food manufacturing process,” said David Raveyre, President of

Kemin Nutrurance. “We are committed to assuring customers around the globe that with Kemin Nutrurance, they will experience consistency and excellence across our portfolio of stability, palatability and food safety solutions.”

The updated positioning statement, tagline, brand imagery and product logos will have far-reaching impacts worldwide, as Kemin Nutrurance products and services touch 1.3 billion lives annually. The new communications strategy and redesigned visual identity will



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be reflected throughout the division's marketing initiatives including advertising, social media, global tradeshows, symposiums and website content at www.kemin.com/assurance.

"While Kemin Nutrisurance is already a leader in the pet food industry, our rebranding efforts will help better differentiate our complete portfolio of product and service solutions," said Steve Malone, Director of Marketing for Kemin Nutrisurance. "We are excited to use strategic cross-channel messaging to elevate the benefits of our partnership with customers around the world."

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Poultry Row: US blocks India's plea for compliance panel at WTO

The US has blocked India's request for a compliance panel on its revised guidelines on poultry imports, taken up by the WTO's Dispute Settlement Body (DSB).

"The US said it saw no valid legal basis for India's assertion of compliance and those inconsistencies found by the WTO in its original rules remain. A compliance panel at this time would not contribute to a prompt resolution of the dispute," an official familiar with the details of the meeting told Business Line.

The setback to India, however, is only temporary, as its second request for a panel cannot be blocked. "It was expected that the US would block India's request as, by asking for a panel, India is trying to bring to an end the controversy that has been created around its sanitary and phytosanitary rules. The country's new guidelines on avian influenza (bird flu) are in strict adherence to the WTO's decision on the matter and it would now want a formal decision on the matter," a trade expert from a Delhi-based research body said.

New Delhi had lost a case at the WTO in 2015 filed by Washington against restrictions that prevented American industry from selling poultry products, including chicken legs, in the Indian market.

Specific concerns

Last year, India made changes in its rules on bird flu to bring it in line with the DSB's ruling. It made further changes in its rules after its discussions with the US, to take care of specific concerns including recognition of disease-free and low pest areas.

Under the revised rules, India gave recognition to the concept of disease-free areas and areas of low pest or disease prevalence.

This means supply of poultry can continue from a disease-free area of a country even

if the disease is prevalent in another area of that country. Moreover, areas of low pest or disease are also not to be treated at par with high pest regions.

The US, however, continues to be dissatisfied with the changes made by India and want the rules to be further refined to give more comfort to its poultry industry to do business in India.

If India lifts import restrictions on poultry, it could open the doors for cheap chicken legs from America and significantly impact the local industry.

According to industry estimates, the US could potentially take away 40 per cent of the market of domestic breeders, who produce 3.5 million tones of chicken annually.

Avitech organises seminar for leading Nepal Nutritionists



Avitech team members.

Avitech Nutrition Pvt Ltd organised a "Nutrition Workshop" in Gurgaon from April 5 to April 7, 2017, that was attended by leading nutritionists of Nepal. Experts on animal nutrition gave general management tips for the poultry industry with a focus

on broilers and breeders. Dr V R Reddy, an authority in animal nutrition, spoke in detail about the importance and management of gut health in poultry. He conducted several sessions covering topics like general management tips for poultry; finer aspects



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of broiler, breeder and layer nutrition; and feeding to get a better performance.

There was also an open discussion on poultry disease challenges especially in relation to H9N5 in Nepal, conducted by Dr S C Gupta, a famous name in area of poultry pathology. All the sessions were quite interactive and enlightening.

Mr MV Koushik, President-Sales & Marketing at Avitech, emphasized on the quality and reliability of Avitech's Trace Mineral premixes for the poultry sector.

All the consultants found the program extremely useful. Dr

Ananta Dahal, a leading nutritionist of Nepal said, "It has been a wonderful experience to attend this seminar. Learning is a continuous process and this seminar has given us an opportunity to interact with the experts and know about the latest development in the areas of nutrition and management".

"Avitech is a company with focus on quality which makes it a reliable partner. Nepal market is a very welcoming market. Avitech with its wide range of products and services has a very bright future in Nepal" added Dr Umesh Dahal, another expert from the Himalayan state.

Vietnam, South Korea Suffer Avian Flu Consequences

More than one quarter of the layer population in South Korea has been lost in six months. Among Asian and African countries, only Vietnam has reported any new outbreaks of highly pathogenic avian influenza (HPAI) in the last week to the global animal health agency, the World Organisation for Animal Health (OIE). More than one quarter of the layer population in South Korea has been lost to the disease in just six months.

New HPAI outbreaks in Vietnam

According to the ministry of agriculture and rural development's latest reports to the OIE, there have been two confirmed outbreaks of HPAI caused by the H5N1 virus in Vietnam in the last week. These occurred in what are described as "backyard" flocks in the northeastern province of Cao Bang, and in Dak Lak in central Vietnam. In total, almost 2,500 birds died or were destroyed as a result of the disease.

With the last HPAI outbreak caused by the H5N6 virus one month ago, the ministry in Hanoi has informed the OIE that this disease situation is "resolved." Since mid-February, there have been five confirmed outbreaks caused by this virus variant. The veterinary authority in the central African state of Cameroon has reported no new outbreaks of H5N1 HPAI in its latest weekly report to the OIE. The first outbreaks in that country occurred one year ago.

South Korean egg sector counts the cost of avian flu

In South Korea, more than 37.8 million poultry have been culled to control the spread of HPAI, which first hit the country in November last year, reports the Yonhap news agency. Included in this figure are 25.2 million hens, bringing the country's population of egg-layers down by more than 26 percent to 51.6 million, as of March 1.

Sharmila weds Fayaz

The wedding celebration of Meer Sharmila, M.Tech, daughter of Mr M. A. Nazeer, Editor, Poultry Fortune with Mohammed Fayaz, B.Tech, Tech Head, Cognizant Technology Solutions, son of Mr Mohammed Ghouse Pasha, a union government officer



in railways, was held on 21 April 2017 in Hyderabad. Sharmila, Masters in Engineering with computers as specialisation involved in Poultry Fortune & Aqua International publications and in organising the annual event Poultry CEOs Forum India & PF Awards.

Prominent persons from poultry and aquaculture sectors, relatives and friends graced the occasion and blessed the bride and bridegroom.



Shaik Imam, Chairman, Kasila Group, Khalid Shaik, greeting the bride Sharmila. Also seen M.A. Nazeer and Mohd Ghouse Pasha.



Suresh Rayudu Chitturi, Managing Director, Srinivasa Hatcheries Group, Mr P. Venkata Rao, a prominent poultry farmer and Cine Artist Kasi Viswanath with the bride Sharmila.



Fayaz and Sharmila for a photo after their Nikah.

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Poultry Farm Incomes Fall as Farmers Battle Lower Prices



UK - Poultry farm income fell 16 per cent to average £107,000 per business in 2016, according to latest statistics from the Farm Business Survey. Falling broiler and free range egg prices hit bottom lines across the sector and forced businesses to take an even closer look at productivity.

Income for free range laying farms fell by 10 per cent to average £34,000 per business last year, and broilers saw a similar hit to incomes, falling back 9 per cent to average £348,000 per farm. Yet the value of poultry products leaving farms hit £3.2 billion as farmers continued to increase output and efficiency.

Nationally, the free range laying sector saw egg prices fall by 11p to just 88p per dozen during the last financial year, according to Defra. Yet Rachel Lawrence from the Farm Business Survey explains that there is a huge variety in prices received: “producers seem to use a range of different marketing channels and we see variability in prices of up to 20 per cent between producers. It’s also important to remember that national egg consumption actually increased by 2 per cent last year, just as farm gate prices were falling.”

Broiler units were also hit by falling prices, with average

broiler prices dropping by 23p per bird during the year. But farms responded by boosting productivity, output increased from an average of 7.2 to 7.4 crops of birds per year.

Across the sample huge savings were made as the feed bill per bird fell by 15 per cent and producers cut running costs by 7 per cent. In particular, farms cut back on the labour bill, with lower spending on both permanent and casual staff resulting in a 19 per cent reduction in total labour costs.

“This closer attention to spending, combined with higher throughput, has helped businesses to counter the worst of the falling prices. Lower input prices can also help to drive profitability, with our broiler producers being boosted by a fall in chick prices, which fell 8 per cent over the course of the year,” explains Ms Lawrence.

“Volatility is nothing new to poultry producers, and something that farmers are becoming increasingly adept at handling. Over the last 10 years poultry farms have seen incomes fluctuate by up to 70 per cent. Yet the national poultry flock is at its highest level in almost 10 years and consumer demand continues to increase; poultry now accounts for 42 per cent of UK meat consumption and is a vital part of the UK agriculture sector; totalling 13 per cent of gross agriculture output.”

“In this time period we’ve also seen farmers look to diversify their income streams. In 2016, 28 per cent of poultry farm business income was from diversification, up from just

11 per cent five years ago. Looking to the future the signs of a strong poultry sector are already there, the trend of diversification continues to bolster farm businesses,” continues Ms Lawrence.

Poultry businesses also continue to be some of the most profitable in the farming sector says Ms Lawrence. “The average poultry farm income in 2015/16 was £75,000 higher than the national farm average. And the proportion of loss making businesses is also a lot lower- just 8 per cent of poultry farms lost money in 2016 compared to 22 per cent of all

farms nationally. The sector also represents some of the highest earning farms in the country; last year only 9 per cent of farms nationally earned more than £100,000 compared to 28 per cent of poultry farms.”

The Farm Business Survey is always looking for new participants to help make national poultry statistics as representative of the sector as possible, and encourage you to take part if contacted by your local FBS centre. Poultry Production in England 2015/16 is available to download for free from the Rural Business Research website.

Turning Chicken Waste, Weeds into Biofuel

US - Chicken is a favorite, inexpensive meat across the globe. But the bird’s popularity results in a lot of waste that can pollute soil and water.

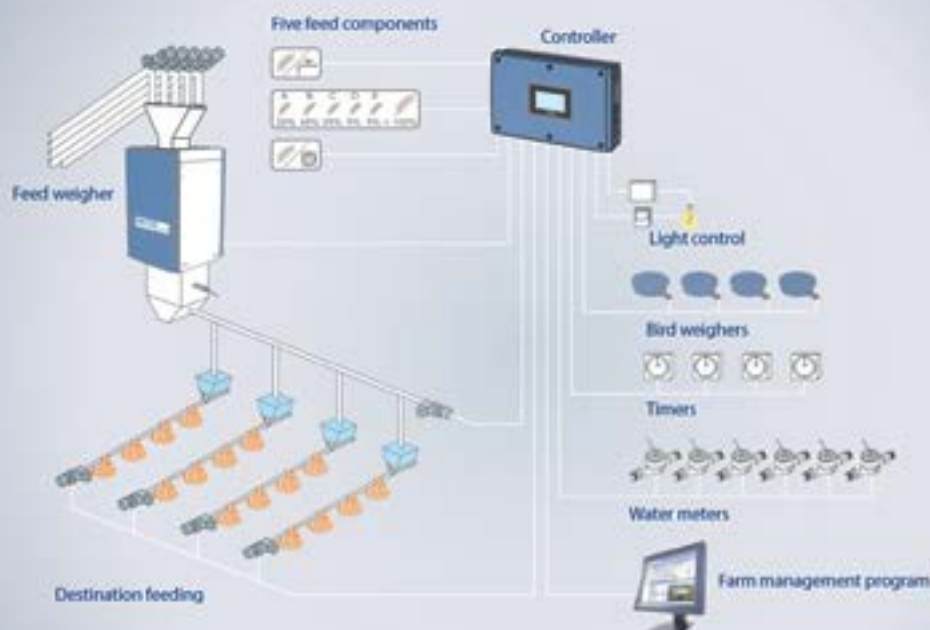
One strategy for dealing with poultry poop is to turn it into biofuel, and now scientists have developed a way to do this by mixing the waste with another environmental scourge, an invasive weed that is affecting agriculture in Africa. They report their approach in ACS’ journal *Energy & Fuels*. Poultry sludge is sometimes turned into fertilizer, but recent trends in industrialized chicken farming have led to an increase in waste mismanagement and negative environmental impacts, according to the United Nations Food and Agriculture Organization.

Droppings can contain nutrients, hormones, antibiotics and heavy metals and can wash into the soil and surface water. To deal with this problem, scientists have been working on ways to convert the waste into fuel. But alone, poultry

droppings don’t transform well into biogas, so it’s mixed with plant materials such as switch grass.

Samuel O. Dahunsi, Solomon U. Oranusi and colleagues wanted to see if they could combine the chicken waste with *Tithonia diversifolia* (Mexican sunflower), which was introduced to Africa as an ornamental plant decades ago and has become a major weed threatening agricultural production on the continent.

The researchers developed a process to pre-treat chicken droppings, and then have anaerobic microbes digest the waste and Mexican sunflowers together. Eight kilograms of poultry waste and sunflowers produced more than 3 kg of biogas - more than enough fuel to drive the reaction and have some leftover for other uses such as powering a generator. Also, the researchers say that the residual solids from the process could be applied as fertilizer or soil conditioner.



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Heat Stress Management in Commercial Poultry

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Introduction

Summer is one of the most critical periods for the poultry farmers. Heat stress is commonly observed in summer months and requires due care to avoid loss in production and body weight. High temperature above 35°C in poultry sheds creates problem in adjusting body temperature. Poultry maintain their body or core temperature at about the same level over a wide range of ambient temperature. The body temperature of the adult fowl varies, but only slightly, around 41 to 42°C depending on various factors such as breed, bird size, age, sex, nutritional status, feathering conditions and activities well as environment.

As the birds lack sweat glands, control by excess body heat will radiate from the birds warmer body another bird, without the use of medium. So that heat stressed birds will try to cool their bodies by touching water pipes or digging into litter to come into contact with cool floor. Light breeds have a higher core temperature than heavy breeds and therefore better able to with stand hot environment. male broilers have a higher metabolic rate at higher temperatures than female broilers. activity increases heat production . when the ambient temperature tends to rise, birds attempt to increase their sensible heat loss, heat we can sense through conduction, convection, radiation. They try to achieve this by postural changes and by movements of feathers. Birds change to standing position with their wings open and their necks outstretched when it is warm. Radiation is an important form of sensible heat loss, at least under normal temperature climatic conditions about 75 % total heat loss.

High environmental temperature is one of the most serious factors affecting production performance of broilers and layers by reducing their feed intake, lowering BW, increasing mortality, lowered egg weight, low egg production, poor egg shell quality and disturbing acid-base balance . An increase in ambient temperature beyond the thermo neutral zone of the bird causes the birds to start panting, as a physiological mechanism for controlling body temperature. Hyperventilation results in dehydration and loss of carbon dioxide from blood and tissues. In turn, the lower concentration of hydrogen ions causes a rise in plasma pH and, ultimately, respiratory alkalosis (Borges et al., 2007).

Management in Housing

Open houses should be generally oriented from east to west so that less direct solar radiation it receives. Well ventilated room for proper air flow. Water sprinkling on roof .by pacing the paddy , wheat straw ,maize straw we can use on roof. by using reflective low-emissivity paint, preferable white by use of aluminium roofing sheets with high reflectivity and low emissivity. Planting tress and shrubs around the house provide some shade and absorbs some heat During hot summer mechanical ventilation, with evaporative coolers should be functioning from 10 A.M. to 6 P.M. by placing the side curtains to open sides of sheds with attaching drip water system.

Water Management

In most of the areas scarcity of water is seen during hot period water is flushed .these flushing water is collected in tanks near the sheds and this water is used for cooling of sheds by dripping or foggers of shed. Water tank and pipe line should cover with gunny bag

Feeding Management

Feed intake reduced by 1.25% for every 10°C increase temperature. In order to encourage the feed intake of birds during summer, reduce the energy content of the feed by about 10% Since feed consumption generate more body heat, avoid feeding broilers over four weeks of age, during hot weather. Wet mash feeding is preferable but need to be care may get spoiled so good quality toxin binder should be used. Providing extra vitamins and trace minerals in feed formulations. Nearly 10 to 15% of the calories (energy) in the feed, of carbohydrate and protein origin, may be replaced by fat /oil energy, by adding 2 to 3% oil or fat.

Drugs and chemicals like electrolytes, ascorbic acid, sodium bicarbonate, tranquilisers, sodium salicylate, paracetamol, chlorpromazine hydrochloride, cyproheptadine hydrochloride may be administered through feed or water, to make the birds

to withstand hot weather. the birds should be fed in the morning and evening hours Increase the use of fat as compared to carbohydrates as well as synthetic amino acids (decrease formula protein by 0.5%) to reduce the heat by digestion. Addition of antioxidants like vitamin E(250mg/kg of feed) and vitamin C (400mg/kg) to feed, improve the performance and reduce the mortality during heat stress.

Highlight Points

- Importance of heat stress
- Management of birds during various stages
- Use of paddy straw on roofs
- Use fans and floggers in shed
- Use of sodium bicarbonate and vitamin C in feed

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Procurement of Chicks

Receive chicks from good hatchery by provided mareck's vaccinated. Transport of chicks during early hours or evening hours of the day. In case of hot period heavy mortality takes place in hot summer due to dehydration immediately after receiving chicks try to uncover the chick boxes and providing cold water or water melon pieces to the chicks.

Management in Young Ones

This temperature range which is suitable one for younger birds it starts with 32 -35 on first day and gradually decreases to 20°C at four weeks of age. Higher temperatures reduce feed intake and consequently their growth rate. brooding in deep litter system is far better than cages because cages may reduce the possibility of heat dissipation through convection. stocking density is very important by providing proper space. check the height of nipple drinkers as far as possible try to use chick drinkers. replace the wet bedding material. Addition of electrolytes and glucose and vitamin supplements is very use full. Vaccinations during this period take care about the live vaccines by maintaining proper cold chain. Preferred vaccination followed by hatchery recommendations. Shifting and debeaking is avoided during hot period of the day.

Management During Pullets

Low feed intake depresses the growth rate and low body weight can also delay the sexual maturity. Try to maintain uniformity over the flock body weight maintain around 1.2 kg/bird

Management During Laying

A reduction in feed intake as well as egg number, in most cases caused by inadequate supply of protein, minerals and vitamins. In way it adversely affects production performance and inhibits immune function M.M Mashaly et al.(2004). Continues fresh clean cold water to be supplied during hot period of the day. flushing of water continued

In feeds inclusion of vitamin E 125 IU/Kg and vitamin C 200 mg/Kg to reduce heat stress, increases immune response and antioxidant status Dr A. K panda et al.(2008). Addition of sodium bicarbonate 1 kg /tonne feed or 1 g /litter of water we can add. While using sprinklers or foggers maintain adequate pressure to form mist like fine water particles to be produced. by taking care about wet litter problems by using this. to prevent wet litter by sprinkling the limestone powder or bleaching powder on wet litter.

Egg Quality

Eggs should be collected more often and cooled down immediately in a properly equipped egg storage room to maintain internal egg quality. Extra care should be taken in handling the eggs in hot weather, due to reduced shell quality

Some of Symptoms in Affected Birds

- Panting/rapid respiration
- More intake of water
- Reduction of egg production
- Poor egg shell quality
- Less body weight gain in broilers
- Reduced feed efficiency
- Increase in body temperature
- Death

Post-mortem Lesions

- Dehydrated carcass
- Mucoid exudates in mouth and nostrils
- Pale/cyanotic combs
- Pale breast muscles
- Pin point haemorrhages seen on breast muscles
- Congestion of liver, spleen, kidney and lungs.
- Fluid contents in intestines.
- Rapid decomposition of carcass
- Do not confused with other viral infections as the lesions are similar



Chick Drinkers



Combs



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Pin point haemorrhages seen breast muscles



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Roof covered with paddy straw



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Ventilation Systems in Poultry Houses

Meesam raza, Sudhir jaiswal, Bhoomika Shrisant, Veerendra kumar

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Ventilation air removes excess heat, moisture, dust and odours from the building and, at the same time, dilutes airborne disease organisms. Properly designed winter systems also conserve energy by utilizing heat generated by the birds. Providing proper ventilation to poultry is an art but it can be mastered by any determined and willing poultry grower. It is a challenge, however, since poultry houses are different and ventilation requirements change with time of day, season, temperature, humidity, wind, bird age and density. If air is not replaced in an enclosed building where poultry is confined, the air composition changes. The concentration of carbon dioxide, ammonia and other harmful gases will increase to unacceptable levels. Below are given the level of some of the gases that research has shown to be critical and the level that is desirable. As the ventilation system exchanges the air in the building, it brings in the oxygen needed to sustain life and carries out the harmful gases and undesirable odors caused by respiration and waste decomposition. The system also dilutes airborne disease organisms and keeps them at a tolerable level for the birds' health.

• **Critical level of gases in poultry house**

Gas	Lethal	Desirable
CO ₂	>30%	<1%
CH ₄	>5%	<1%
NH ₃	>500ppm	<40ppm
H ₂ S	>500ppm	<40ppm
O ₂	<6%	>16%

1. Natural ventilation

This system does not use any fans for moving air, but depends on the natural draught in the building. The sidewalls are usually open and can be controlled with curtains or other material, whilst the ridge is open and can sometimes also be controlled. Hot air rises and leaves the building through the open ridge. Fresh, cooler air enters through the sidewalls. When there is no wind and temperatures are high, results can be very poor.

2. Mechanical ventilation

This system uses fans and the air is forced through the building. The most common type is roof ventilation.

a) Roof ventilation

Fans are placed in airshafts in the ridge of the roof to suck the air out of the stable. Air inlets are placed in both sidewalls.

b) Cross ventilation

For cross ventilation the fans are placed on one side of the long wall of the building, whilst the air enters through adjustable inlet flaps in the other sidewall. The fans have diameters of 122 or 90cm and depending on type displace 16,000-45,000 m³ of air per hour. These fans can be installed in groups, but also divided across the full length of the building. They are controlled in stages, where in turn one or two fans start running at full speed. For minimum ventilation a time function can be set or a variable speed can be used.

c) Length ventilation

This ventilation system is to a large degree similar to cross ventilation. The fans are the same, but are now placed in the front wall. Both sidewalls are provided with adjustable inlet flaps. In principle, the system works the same as for cross ventilation.

d) Tunnel ventilation

This system is similar to length ventilation, only for tunnel ventilation special air inlets are used, that are placed opposite the fans at the other end of the building. This creates a so-called tunnel effect, as a result of which the air speed inside the building can be 2.0-2.5 m/sec. This has a positive influence on the wind-chill factor for the animals. On hot summer days, the wind-chill factor can thus be 6-8 degrees lower. For tunnel ventilation, all other inlets are closed.

Cooling system

When a tunnel ventilation system is in place, it is relatively easy to add a cooling system. For this purpose so-called pads are used. Water is pumped across these pads and fans draw air through them. The resulting airflow

Highlight Points

Ventilation is one of the most common challenges in poultry house; various systems are designed to automatically manage this environment for poultry, especially during the brooding period. Whether you use a tunnel- or cross-ventilation system or a combination of both, ventilation is necessary to create the optimum environment that birds need to grow and develop during each stage of life. The right system not only ensures adequate air exchange throughout the poultry house, but also removes excess moisture from the litter, maintains oxygen and carbon dioxide levels, and regulates temperature within the house, which is of utmost important in housing management.



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makes the water evaporate and cools down the hot air. This cooler air is then drawn through the building. Depending on outside temperatures and humidity, the temperature can be lowered by 10-15 degrees. The pads are mounted inside a housing and placed in front of the tunnel inlets on the outside of the stable. An even better solution is to provide a small extension that simplifies maintenance and catches any water loss. Excess water is received and recirculated by a water pump.

Combination System

Combined systems can be used for great differences between winter and summer temperatures.

Ventilation Systems	
Roof	
Cross	
Length	
Tunnel	

A Layout on Egg Breaking Plant and It's Organization

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Plant layout refers to the arrangement of physical facilities such as machines, equipment, tools, furniture etc. in such a manner, so as to have quickest flow of material at the lowest cost and with the least amount of handling in processing the product from the receipt of raw material to the delivery of the final product.

General facilities for egg breaking plant:

- Have adequate supply of water.
- Hot water facilities for cleaning the plant and equipment.
- Hand washing facilities with cold and hot water, soaps and towels nearer to the processing area.
- Dressing room for the employees.
- Department inspector for monitoring the equipment sanitization.
- Egg breaking room.
- Floors, walls, ceilings, partitions, posts, doors made of impermeable material with proper drainage facilities.
- Prevents the entrance or harboring of vermin and insects.

Egg products processing includes breaking eggs, filtering, mixing, stabilizing, blending, pasteurizing, cooling, freezing or drying

and packaging. Egg products include whole eggs, whites, yolks, and various processed and pasteurized blends, with or without non-egg ingredients. These egg products may be available in liquid, frozen, and dried forms.

The processing of egg products includes:

- Receiving shell eggs
- Washing/sanitizing/candling eggs
- Breaking eggs
- Handling liquid egg product (filtering, blending, mixing)

- Cooling
- Pasteurization
- Freezing or drying
- Packaging
- Storage
- Shipping

Rooms in egg breaking plant:

- Shell egg holding room
- Chill room
- Transfer room
- Candling room
- Egg Breaking room
- Freezer and sterilizer room
- Shell room
- Inspectors office, laboratories
- Draw off room

Processes in egg breaking plant:

Receiving Eggs

Eggs are transported to the plant directly from either laying hens or contract flocks,

Highlight Points

Eggs are fast finding themselves in Indian plates. The demand for this high-protein yielding food is going up sharply over the years. Economically, egg production is the most important facet of the entire poultry industry. India is ranked sixth among the top egg producing countries. Rapid urbanization, increasing population and its nutritional needs, economic factors affecting food demand has led to this shortage in the demand-supply chain. So, the advanced facilities of egg processing allow saving the energy value and nutrients contained in eggs and able to satisfy the needs of our customers in any amounts and any product range, which includes pasteurized and fermented dry and liquid egg products both chilled and frozen. So, it's needed to know about the egg breaking plant and its organization and reformed egg products to fulfill consumer demand.

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or both. When eggs come directly from the egg-laying farm to the egg breaking or processing plant, they are called in-line operations. There is a very short time between when the eggs are laid and when they reach the egg processing plant. Most new complexes are in-line systems designed to move eggs directly on conveyors from laying houses to the processing area. The eggs presented for breaking in these operations are called “nest run”. The nest run are eggs that have never been sized, washed, or graded. A high percentage of the eggs gathered by this method are first-rate quality, if good flock-management practices are in place.

Another way of delivering eggs is in filler-flats (off-line systems) that come from contract flocks. Contract flocks are chicken houses that the company contracts to furnish eggs. The eggs from off-line systems can come from multiple chicken farms and there may be a lot of variability (hours to days to weeks) in the age of the eggs. Eggs are packed in plastic filler-flats, palletized, and transported to the processing facility. These plastic flats are to be thoroughly cleaned, sanitized, and dried after each use to avoid cross-contamination and the creation of insanitary conditions. The proper handling of eggs is important, as it helps to prevent egg damage, minimize any quality loss, and avoid compromising the safety of the egg.

In egg-breaking plants, the production starts with the loading of eggs as either in-line operations or off-line systems. In off-line systems, once the egg filler-flats or nest-run eggs arrive in the transfer room, flats of eggs are loaded to the off-line conveyors and moved to conveyor spools going through the egg washers.

Holding room

- ▶ The shell egg room should hold enough shell eggs to operate a plant for 5 to 10 days.
- ▶ If the eggs are held up to 1 week, the temperature should be 55°F, if over 1 week 45°F storage is recommended

Washing Eggs and Sanitizing

Before candling eggs are washed and sanitized. The temperature of the water should be 90°F or 20°F warmer than egg. Chlorine used for sanitization of not less than 100 ppm or not more than 200 ppm.

Shell eggs, when presented for breaking, must be clean. Modern egg washer uses pressure sprays, rotating brushes, and an egg-spinning device that increases contact between the egg and the brush and minimizes damage to the eggs. Plant personnel segregate shell eggs ineligible for breaking during the candling operation. Shell eggs continue on the conveyor to the breaking room.

Candling Eggs

In the candling process, eggs are mechanically rotated several times over a bright light to examine the internal quality of the egg. The primary function of the candling procedure is to remove the dirty or cracked, and ineligible eggs before the breaking step. This is a critical step in the

processing of the shell eggs. Egg products plants may have more than one candling area (before and after the washer), depending on the segregation procedures, eggshell quality and classifications, and conveyor speed.

Plant employees sort, classify, and segregate the eggs to ensure that only eggs eligible for breaking enter the breaking room. During segregation, the employees will remove inedible eggs. To prevent interruption of the breaking operation, employees may replace any dirty, leaker, inedible or loss eggs with a sound shell eggs that have been cleaned.

Incubated, ruptured membrane, diffused bloody, crusted yolks, stuck yolks, sour or musty, mouldy, containing foreign matter other than removable blood and meat spots, with embryos are separated.

Breaking Eggs

In breaking room facilities and operations, shell eggs are broken and the liquid is separated from the shells. After the egg is broken, the breaking machine can separate the yolk from the white.

Egg breaking room

- Connected with the candling and the sterilization room.
- Should be well ventilated.
- Eggs shall be broken by metal detachable knives or mechanical breakers.
- Inedible eggs is broken the affected equipment must be cleaned and sanitized immediately.

Components of egg breaking machine:

- ▶ Cracker assembly : the mechanism that receives, cracks, and opens the shell egg and retains the shell until it is ejected
- ▶ Cracker knife : the part of the cracker assembly that penetrates the shell and assists in retaining the open shell
- ▶ Receiving cup assembly : the mechanism that receives the shell egg content from the cracker assembly for inspection; it may also separate whites and yolks.
- ▶ Product trays : trays that collect liquid egg and deliver it to the collection vats
- ▶ Cup rinse : a mechanism for rinsing the receiving cup assemblies
- ▶ Processing air : filtered air used in contact with the product for an organoleptic inspection.

Liquid Egg Product Handling

After breaking, the liquid egg flows into collection vats (balance tanks) by gravity. A perforated plate contained within the vat serves as a filter to remove eggshells. The liquid egg is pumped through a filter and then is pumped to the cooling system. After cooling, the liquid egg is pumped to a storage silo for further processing.

Shell room

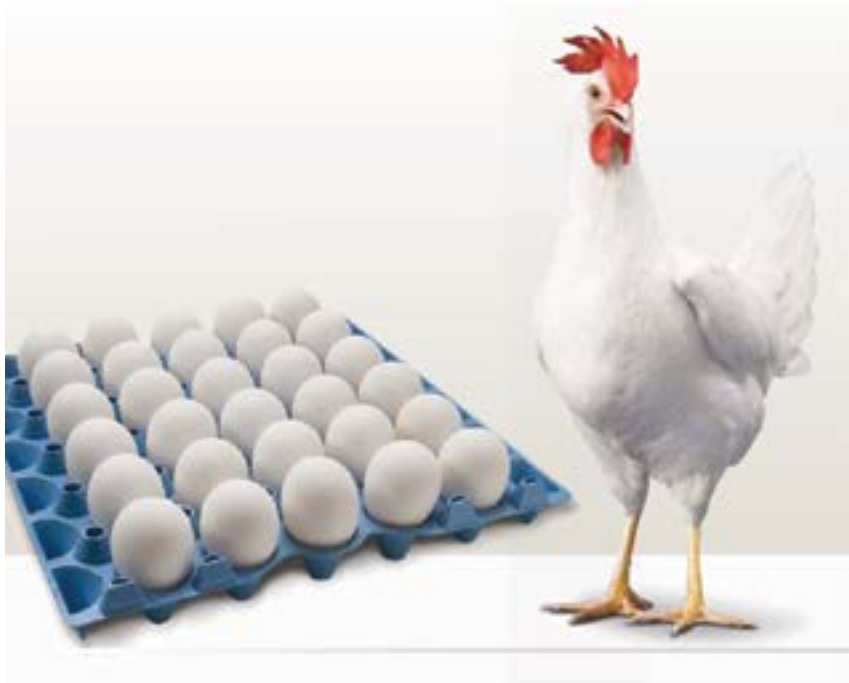
- The shells from the breaking room are conveyed to the shell room.
- These shells are centrifuged to recover the adhering egg white is then sold as the technical albumen.

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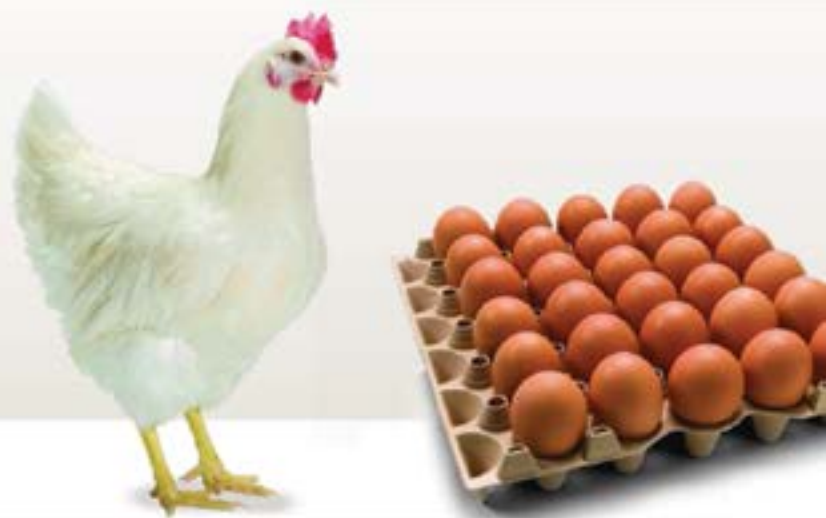
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Draw off room

- Products of the primary processing plants is packaged and frozen in the plant to prevent the post contamination of the pasteurized product.
- The temperature should be 10°F or lower within 60 hours from time of breaking.

Cold storage

- ▶ This is the best and most efficient method for commercial storage.
- ▶ Eggs for cold storage must be clean, unbroken and free from fungus and other infections.
- ▶ A temperature of 0°C or 30-32°F and relative humidity of 85-90% - to preserve them for 5 to 8 months.
- ▶ For short period of preservation of 2 to 3 months, eggs can be stored at 10-12°C or 50-55°F with a relative humidity of 60-70%.

Pasteurization

The Egg Product Inspection Act requires that all egg products distributed into commerce be pasteurized. Pasteurization involves rapidly heating the product and holding the product at a minimum required temperature for a specific time. The reason for pasteurization is to destroy Salmonella without affecting the characteristics of the final egg product.

Two common types of pasteurization are high temperature-short time (HTST) pasteurization and batch pasteurization. In this training, we will focus on HTST pasteurization. Batch pasteurization is no longer used.

After pasteurization, it is essential to handle the pasteurized egg product in a sanitary manner to prevent cross-contamination. The pasteurized liquid product may be handled as follows:

- ▶ Packed in containers (plastic buckets, bag-in-box, packages, milk containers, etc) to be marketed.
- ▶ Further processed (add ingredients post pasteurization, freeze or dry).
- ▶ Shipped in tankers to another egg products plant or distributor.

Plate pasteurizers

- To reduce the bacterial content and to eliminate the eventual presence of Salmonella,
- The products are pasteurized at a temperature of 65.5 °C for whole egg and egg yolk, with a holding time of about 3.5 min.
- After pasteurization the products are cooled to about 2 °C for whole egg and 4 °C for egg yolk (sometimes the yolk will not be cooled).

Batch pasteurizers

- The liquid egg is poured in and heated to the temperature required for the pasteurization of about 64 °C.
- At the same time a homogeneous mixture is obtained.
- The liquid egg is then cooled to the desired temperature.

Freezing

Frozen egg products include separated whites and yolks,

Egg product	Minimum pasteurization temperature	Minimum pasteurization time	Maximum cooling temperature
Liquid whole egg	64°C	2.5 minutes	≤ 7°C
Liquid egg yolk	60°C	3.5 minutes	≤ 7°C
Liquid egg white	55°C	9.5 minutes	≤ 7°C

whole eggs, blends of whole eggs and yolks, and whole eggs with added ingredients. They are produced from pasteurized liquid egg products by using a blast freezer at temperatures of -10°F to -40°F. Frozen egg products have a long shelf life when kept at less than 10°F.

Eggs can be stored for 2 to 3 weeks covered in the refrigerator, so freezing is usually unnecessary. If you have an excess of fresh eggs, however, freezing is the best way to preserve them. They cannot be frozen in the shell because expansion of the white and yolk will cause the shell to break. Hard cooked eggs cannot be frozen because the white becomes rubbery. The recommended length of freezer storage for frozen eggs is 9 to 12 months.

Select fresh, chilled eggs, and break each separately into a clean saucer. Examine each egg for freshness, and remove any pieces of shell before mixing with other eggs. Freeze eggs in amounts that will be used in recipes. Add sugar or salt in proportions given below according to the kind of recipe in which eggs will be used. For example, add salt to eggs for scrambling and sugar to eggs to be used in desserts. It is necessary to add sugar or salt to whole eggs or yolks before freezing to prevent gumminess.

Whole eggs

Stir eggs with a fork to break yolks and mix them well with the whites. Do not whip in air. Add 1.5 teaspoons sugar or 1/2 teaspoon salt for each cup of whole eggs. Package, leave headspace, seal and freeze. Label package with quantity and amount of sugar or salt added. A convenient method of freezing whole egg mixture is to measure 3 tablespoons of egg mixture into each compartment of a clean ice tray. Freeze until solid. Remove frozen cubes, package in moisture vapor proof containers, seal and return to freezer immediately. One cube of the egg mixture equals one whole egg.

Egg yolks

Separate eggs. Stir yolks with a fork to break them. Add 2 teaspoons sugar or 1 teaspoon salt for each cup of egg yolks. Package, leave headspace, seal and freeze. Label package with quantity and amount of sugar or salt added.

Egg whites

Strain whites through a sieve. Do not add sugar or salt. Package, leave headspace, seal and freeze without stirring.

Thawing and preparation

Frozen eggs should be thawed in the refrigerator and used within 1 to 2 days. They can be used exactly like freshly broken eggs in baked products, casseroles or egg dishes. Be sure to account for the extra sugar and salt added to the



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eggs before freezing.

Approximate equivalents for large eggs:

1 whole egg = 3 tablespoons whole egg mixture

1 yolk = 1 tablespoon yolk

1 white = 2 tablespoons white

5 whole eggs = 1 cup whole mixed eggs

10 whole eggs = 1 pint (2 cups) whole mixed eggs

16 whites = 1 pint (2 cups) stirred whites

16 yolks = ½ pint (1 cup) stirred yolks

Drying

Industry has developed a variety of dried egg products, including dried egg white, dried plain whole egg and yolk, and specialty dried egg products. Powdered eggs are fully dehydrated eggs.

Egg products fall under two basic categories when considering their drying characteristics:

*egg white products

*whole egg and yolk products

Before the liquid egg products go through the drying process, industry uses processing techniques to achieve the desired finished product. These techniques alter the composition of egg components by changing the lipid or sugar composition, concentrating solids, or separating egg components (e.g., lysozyme and avidin). The two common methods that industry uses to produce dried egg products are:

- Spray drying – atomized liquid egg product is sprayed into a stream of hot air, collected and packaged. This is the predominant method used by the dried egg product industry. Spray drying does not kill microorganisms. However, it does extend product shelf life.
- Pan drying or albumen flake process – unpasteurized egg whites are dried on pans to produce a flake-type or granular material. This method is used for the confectionary industry.

Another method of drying is the Refractance Window drying system. This operation is a low temperature drying technique, which removes moisture from high moisture products that generally vary in solid content between 3% and 70%. Briefly, the operation consists of:

- ▶ Slurry of liquid is evenly applied to the top surface of a continuous sheet of transparent plastic.
- ▶ This continuous plastic film slowly moves across a hot water reservoir (210° F) which provides an infrared energy source (i.e., infrared energy and conducted heat) permitting the rapid drying at atmospheric pressure rather than under vacuum.
- ▶ Results in dry flakes on the opposite end and the process provide retention of the egg product's functional properties and nutritional value.

The dried egg product must be handled aseptically during packaging. Other advantages include smaller usage of storage space, low transportation costs and lack of need for refrigeration. Powdered eggs can be used without rehydration when baking, and can be rehydrated to make

dishes such as scrambled eggs and omelettes.

Desugarisation

The removal of glucose from liquid white in industry uses two types of processes

- ▶ The fermentation process with appropriate strains of bacteria or yeast
- ▶ The enzyme system using glucose oxidase and catalase, or strains of microorganisms producing these enzymes.

Fermentation of egg white by naturally present microorganisms is the traditionally used method of removing glucose from liquid egg white. Experiments with addition of some bacterial strains were carried out since the forties, but the outcome could be affected by acidification of the egg mass during fermentation. The used strains must not contain organisms producing proteolytic enzymes, to avoid proteins being digested. The bacterial fermentation process has been preferred for many years because the finished egg powder has excellent whipping qualities, solubility, odor, and taste. Special bacteria single strain cultures or mixed cultures are used in this process. Yeast fermentation for which very specific kinds of yeast are used has not been too popular. The reason is that a yeasty flavor or odor is usually evident in the product. In the fermentation process glucose is converted into alcohol and carbon dioxide. These elements are volatile and will escape during the drying. Therefore, for industrial purposes of de-sugaring procedure, enzymes are chosen. Such process is faster and easier to control. The temperature ranges from 2°C to 15°C and in this low temperature range rapid bacterial development is avoided. Moreover, the hydrogen peroxide is an effective bactericide.

Glucose oxidase is a highly specific 'enzyme from the fungi *Aspergillus niger* and *Penicillium*, which catalyses the oxidation of beta-glucose to glucono-1, 5-lactone (which spontaneously hydrolyses non-enzymatically to gluconic acid) using molecular oxygen and releasing hydrogen peroxide. Because at higher concentrations of hydrogen peroxide, oxidation can degrade the protein molecules and inhibit further enzymatic oxidation of glucose, it is necessary to combine glucose oxidase with catalase.

The pH-value is reduced to 6.5-7.3 before the fermentation. Limited amounts of hydrogen peroxide are added continuously to the albumin under the fermentation process, which is completed within 10-16 hours. After the fermentation process the egg white is filtered, and pasteurized. The main disadvantages of de-sugaring by enzyme preparations are higher costs and risk of oxidation of proteins, especially at the level of the amino acids cysteine and methionine. The free glucose oxidase allows the glucose removal in egg white only with batch ordering and enzymes remain in substrate as contamination. About 60% of the water and 40-50% of glucose can be removed before the dehydration.

Additional effects:

- ▶ Removal of glucose increases also resistance of powder

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against microorganisms (low content of direct substrate) and extends the shelf life of dried egg white.

- ▶ Typical yeasty smell and taste of the albumen after de-sugaring by baker's yeast or by special strains of yeast
- ▶ The bacterial fermentation process provides the finished egg powder with excellent whipping qualities, solubility, odor, and taste
- ▶ The bactericidal effect of the hydrogen peroxide - risk of oxidation of proteins and amino acids cysteine and methionine during the enzymatic treatment
- ▶ Bacterial strains used in fermentation or yeast have to be cultivated before the de-sugaring on a complex nutrient medium, which increases the cost of the process.
- ▶ The multiplication of contaminating microflora can occur in de-sugared egg white
- ▶ Egg white treated with glucose oxidase and catalase showed sometimes higher foaming ability than natural egg white, but foam stability decreased.



FLOW DIAGRAM OF EGG PROCESSING PLANT



Functional Properties of Egg and their Applications

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Eggs are fragile and perishable commodity. Egg quality is maximum when it is laid. Functional Properties of egg means attributes of eggs which make them useful ingredient in food such as cake, candy noodle, mayonnaise etc along with non food items.

Properties of Albumen

Coagulation and Foaming properties used in Angle cakes, sponge cake, Candy, Custards, Meringues, Scrambled & poached eggs products preparation.

Properties of Yolk

Colour, Emulsification and Flavour properties used in Mayonnaise, Salad dressing, Cream puffs eggs products preparation.

Coagulation

Change from fluid to get state or change from fluid to

sold/semisolid state is known as as coagulation. Change in structure of egg protein leads to loss of thickening & solubility brought about by heat, mechanical means acid/ alkali/ salt/ urea. Urea addition in ovalbumin causes unfolding & aggregation of protein with the formation of Hydrophobic bond, H- bond and disulphide bond causes insolubility. Coagulation is measured by thickening & solubility test.

Heat Coagulation- Reaction between protein & water followed by separation/ agglutination of protein.

Factors affecting coagulation-

Heat / Temperature, Dilution, Addition of Acid/ Alkali Salt, Sugar, Urea etc.

1. Dilution & sugar addition decreases rate of coagulation.
 2. Heat / Temperature - increases rate of coagulation
- Albumin begin to coagulate @ 620 C. 191- 200 times with rise



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in 10 C and 635 – 600 times with rise in 100 C.

3. Dilution- The temperature required for coagulations of eggs is increased by dilution.

4. Acid/Alkali/Salt-Coagulation is favoured by adding acid/alkali/ Salt to the water in which they are cooked.

5. Sugar- increases the temperature required for coagulation. Effect is greater when pH of albumen is above 8.5.

Foaming Property

Foam is a colloidal dispersion in which gas phase is dispersed in liquid phase.

During foam formation, unfolding of protein occurs result in loss of solubility/ coagulation which collects at the liquid- air interface. Foaming power is attributed to low surface tension. This quality allows creation of large surface essential for foaming. Ovomucin is component of egg white that forms the foam.

Measurement of foaming properties

Measured in form of volume & stability of foam.

- i. Volume angle cake used as critical test of foaming property measured by seed displacement/ polar planimeter.
- ii. Photographs- provide permanent record, used for comparing texture & volume of cake.
- iii. Ink print.
- iv. Specific gravity- Indirect measure of the volume of foam. Lower the specific gravity larger the volume.

Factors affecting foaming property

- i. Beating- Depend on Methods & extent of beating. Increasing beating time improves volume of foam but volume does not altered.
- ii. Blending- Increases beating rate & volume of cake
- iii. Homogenization- Decreases volume and whipping time.
- iv. Temperature - Foam produce quickly at room temperature than refrigerator temperature. Beating & holding of albumen at 58°C decreases both volume & stability of foam.
- v. Added Ingredients – Water /salt/sugar/oil Water- Dilution of 40% or above increases volume of foam & decreases stability. Salt/Sugar/Oil/butter fat - decreases both volume & stability along with increases whipping time.
- vi. Use of stabilizer/ surfactants- Anionic surfactant- Carboxy methyl cellulose (CMC) and Guar gum increases foam formation & stability with/ without adding yolk. Addition of sodium laryl sulphate/tri ethul citrate increases foaming efficiency & Volume by decreasing whipping time. Cationic Non- ionic surfactant is detrimental for foaming property.

Emulsification

It is a mixture of two immiscible liquid phase one of which

Highlight Points

Understanding the functional properties of the eggs help to use as food items in various egg Products and non food items as industrial application of eggs. Damaged eggs can be utilized by many ways by understanding its functional properties. Egg storage and preservation does not alter the functional properties. Albumin, yoke and as a whole egg different functional properties are present in egg that can be utilized judiciously for maximum benefit from the eggs.

dispersed as small droplets (dispered phase) into other (continuous phase). In Yolk, oil droplets are in continuous phase. Lecithin favours formation of oil in water emulsion. Cholesterol form water in oil emulsion. Emulsifying property is measured by mobilo-meter.

Factors affecting Emulsification-

1. Addition of water/aqueous Phase- decreases emulsion formation.
2. Adding sugar/ spices- hold water, thus prevent excessive free water increases

emulsion formation.

3. Adding Phospholipids- decreases emulsifying ability.

4. Surface active agents- essential for emulsion formation but do not contribute to stability of emulsions.

Colour

Xanthophylls, luten & zea- xanth in imparts colour formation in yolk but beta carotene & crypto- xanth in are very little important for colour formation.

Flavour

Light, medium & dark coloured yolk is similar in aroma, flavour & taste. However, Dark coloured yolk having stronger flavour in sponge cake & have gummy feeling. Popular egg products are- Omelette, Boiled, Poached and Scrambled eggs. Others products including Egg powder, Yolk granules, Albumen flakes, Egg omelette mix, Egg scrambled mix, Angel cake, Sponge cake, salted chicken egg, Albumen rings, Egg Roll, Egg crepe, Egg waffles, Delivered egg, Egg nag (milk + Egg), Mayonnaise, Egg crepe, Egg patties, Egg crepe, Egg patties, Egg rasmalai. Instant emu egg noodle, Canned egg curry and Vinegar/ Oil based Egg pickle

Industrial Use of Egg

1. Pet animals and lab animals diet formulation
2. Synthetic diet/purified diet formulation
3. Biological uses as culture media
4. Medicinal-semen diluter
5. Pharmacological and histological
6. Manufacturing industries- Paint, Photography, Printing, Dye Cosmetics

Conclusion

Thus, it is concluded that foaming property of egg albumin is mainly due to ovomucin content, ovo-globulin of albumin and live in of egg yolk impart coagulation property, emulsifying property of yolk is mainly due to phosholipid (lecithin), colour of egg yolk is due to xanthophylls pigment. Functional properties of egg make them useful ingredient in food along with non food items for diversified purpose in economic way. □

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- 13) Best Motivator for Better Egg Price Award 2017
- 14) Best Poultry Products Promotion Award 2017
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- 16) Best Broiler Hatchery / Breeder Award 2017
- 17) Best Layer Hatchery / Breeder Award 2017 (Chicks Producer Award)
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Production of Quality Chicks and the Assessment

G.K.Rathinam

Hatchery Specialist, Technical Consultant, India.

In a hatchery – particularly in the setter and hatching trays – ventilation is key to producing a top quality chick. The following four components are essential so chicks get what they need to grow and develop according to their genetic potential:

1. Oxygen. Throughout incubation, chick embryos must have an adequate supply of oxygen so that they can develop fully and properly. Oxygen enters through the shell while carbon dioxide (CO₂) escapes in the same manner.

2. Air Exchange. Eggs emit CO₂ as they develop, but embryos need oxygen to survive and hatch. Therefore, the air inside a setter must constantly be replaced – bringing in fresh oxygen and removing excess CO₂.

3. Air Distribution. It's important that the air flows evenly so that each room receives the right amount of cool air and oxygen at all times. If you have a unit distributing a certain number of cubic feet per minute (CFMs), placement of the air conditioning unit and ductwork is crucial to make sure fresh air reaches each room at the same rate. There is a register in each setter machine ensure air is distributed in the correct amount of air at all times.

4. Extraction Fans. When chicks hatch, they produce even more CO₂ than during incubation. This must be removed from the hatching area via extraction fans. The exhaust goes into a plenum (a small, attached room) where it then exits the building.

If a hatchery is bringing in 40,000 CFMs, for example, it must also exhaust 40,000 CFMs to achieve a perfect air exchange, because hatcheries operate 24 hours a day, the staffs are always able to monitor the air exchange and catch any glitches right away, before they become larger issues.

Each of these four components helps determine whether embryos will hatch and grow to their genetic potential. With

proper oxygen and air exchange, baby chicks are able to thrive and develop correctly.

5. Indicators of Overheated Chicks:

Traditional chick -grading standards do not always pick up damage due to overheating. Because overheated chicks hatch earlier than they should, they are often smaller, weaker and more prone to infections as well as a host of other health problems.



Chicks Quality Assessment

To properly assess chicks and establish if they have overheated, check for the following characteristics:

a. Colour and Strength

Chicks should be bright yellow. Overheated chicks have poorly absorbed yolk sacs and hence pigments are whiter than normal. Also, chicks should be active and be able to stand up right away. If placed on their backs, they should turn over within seconds.

b. Yolk-free Body Mass (YFBM)

Overheated chicks are smaller and have bigger, non-absorbed yolk sacs. The more serious cases of poorly absorbed yolk sacs translate in unhealed navels. Some yolk is left as chicks need that for nutrition during their very first hours. This is quickly absorbed and should be gone about the time chicks'

transition to feed/water. If there is too much yolk, however, live chick weight is lower and indicates a weaker chick.

c. Chick/Shank Length

Overheated chicks are smaller since they used available protein during incubation as an energy source, rather than fuel to grow muscle. This is apparent when the chicks' shank length falls below the established target, as indicated in the chart below.

Highlight Points

Chick quality becomes more and more important and a hatchery must produce quality chicks in order to meet the optimal performance. Ventilation is key to producing a top quality chick. Oxygen, Air-exchange, and Air distribution and Extraction fans are essential so chicks get what they need to grow and develop according to their genetic potential.



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Breeder Age (in weeks)	Target cm (in)	Too Small cm (in)
26-35	19-21 (7.5-8.25)	<17.5 (6.9)
36-45	19.5-21.5 (7.68-8.46)	<18.0 (7.1)
>45	20-22 (7.85-8.65)	<18.5 (7.3)

prevention includes good hygiene of hatching eggs and good hygiene in the hatchery. Contaminated hatch debris and chick fluff in the hatchery are major sources of bacterial infection.

It is also important to follow good hygiene during waste disposal. Properly disinfecting the hatcher trays will kill bacteria and prevent E. coli.



d. Feathering

Good feather development is synonymous with good chick development during incubation. Chicks should look dry and fluffy soon after hatching. However, excess development of the wing feathers does indicate early hatching – and most likely overheating – due to prolonged time in the hatcher baskets.

e. Disease Control

One consequence to overheating embryos is they are more susceptible to Colibacillosis, or E. coli. Colibacillosis

Semen Collection, Evaluation & Insemination in Chicken and Turkey

R. Shirisha (Ph.D Scholar), **M. Rajashri** (Ph.D Scholar), **K. Preethi** (Ph.D Scholar)

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Assisted Reproduction Technologies (ART's), such as Artificial Insemination (AI) contribute to increase poultry production, as it allows a wider use of genetically superior cockerels with a high productive performance. Adoption of A.I in poultry species has increased in popularity, mostly used by poultry research and breeding centres. In broilers, the males have extreme body conformation, broad bodies and short legs, which hinder natural mating. Thus, AI may become effective in solving compatibility problems (Reddy, 1995). Also, as the selection for faster growth rates in broilers is intensified, fertility in males is likely to decline due to the negative relationship between growth and fertility. Application of AI in such scenarios is cost effective in broiler breeding management. In addition to its breeding significance, AI is important in controlling venereal diseases and allows for better use of the cage feeding system in hatchery operations, especially when dealing with large number of females that are required to

lay fertilized eggs. It also allows high genetic merit of one male for a particular trait of interest to serve more females therefore, increases the number of offspring per cock compared to natural mating which is limited to a mating ratio of 1:10 (male: female). Basically it is a two step procedure: first, collecting semen from the male and second, inseminating the semen into the female.

Highlight Points

- **Increased mating ratio: In a flock it is usually one cockerel mated to six to ten hens. With artificial insemination it is claimed this ratio could be increased fourfold.**
- **Elimination of preferential mating: When there is poor fertility caused by preferential mating it can be eliminated.**
- **Use of older males from outstanding performers: Older male birds that have been flock improvers can be used for several generations. Whereas under natural mating their useful life is limited.**

Semen collection from a chicken

Collection of semen from a chicken or turkey is done by stimulating the copulatory organ to protrude by massaging the abdomen and the back over the testes. This is followed quickly by pushing the tail forward with one hand and, at the same time, using the thumb and forefinger of the same hand to “milk” semen from the ducts of this organ. The semen may be collected with an aspirator or in a small tube or any cup-like container.

Procedure

For this operation two people are needed, one for holding

and collecting the semen (holder), the other (operator) to stimulate the control flow of semen. The holder rests the male bird's keel on the palm of his right hand in a horizontal position so that the head is between the holder's side and elbow. It is important to hold the male bird loosely to gain the desired result. The holder's left hand is used to collect the semen. The operator holds the rooster's legs in his right hand and strokes the back of the bird from neck to tail with his left hand. After a few strokes; the male organ swells and protrudes outwards and downwards. The semen is milked down by firm finger pressure either side of the vent into the collecting tube.

Precautions

Males should be separated from the females at least once in a week before an attempt is made to collect the semen. Feathers should be plucked off from the vent. Semen should be collected thrice a week so that maximum no of spermatozoa can be obtained.

Evaluation of semen

Immediately after collection semen should be evaluated for quality. Chicken and turkey semen begin to lose fertilizing ability when stored >1 hr. Liquid cold (4°C) storage of turkey and chicken semen can be used to transport semen and maintain spermatozoal viability for 6-12 hr. When using liquid cold storage for >1 hr, turkey semen must be diluted with a semen extender at least 1:1 and then agitated slowly (150 rpm) to facilitate oxygenation; chicken semen should be diluted and then cooled. Several commercial semen extenders are available and are routinely used, particularly for turkeys.

Evaluation of poultry semen

1. Volume and concentration: The ejaculate volume of semen was evaluated immediately after collection and expressed in microlitre (µl). The volume of semen that can be collected from a single cock ranges from about 0.7 to 1.0 ml, with a spermatozoon concentration of 3 to 4 billion/ml.
2. PH: The optimum semen pH ranges between 7.0 and 7.4.
3. Color - milky thick if mixed with urine color changes to yellow. For evaluation of motility, one drop of the diluted semen was placed on the slide and covered with glass cover.
4. Sperm motility was estimated by microscopic observation. To evaluate mass activity, a drop of undiluted semen was placed on a slide without cover slip and examined under compound microscope (100X) and scored into 1-5 scales as represented in Table No. 1 and the motility patterns of sperm from sub fertile or infertile cockerels is represented in Table No. 2.

Table No. 1: Grading of sperm motility pattern

S.No	Findings	Score
1.	All dead sperm	0
2.	No perceptible motion	1+
3.	Few spermatozoa move without forming any waves	2+
4.	small slow moving waves	3+
5.	Vigorous movement with moderately rapid wave and eddies	4+
6.	Dense, rapidly moving waves and eddies	5+

Table No. 2: Motility patterns of sperm from sub fertile or infertile cockerels

S.No	Pattern of sperm motility	Sperm tail	Sperm tail	Sperm movements and progression
1	Vibratory circular	Slow or rapid quivering from side to side, vibrations of various types and frequency bent in curved shape, immotile	Immotile or vibrating in one place	Motility without progression, perpendicular, oblique or horizontal clockwise or counter clockwise motion
2.	Darting	Vibration with high velocity	Irregular, propelling, rotation	Minimal and erratic, no wandering path
3.	Rotating	Undulations of small amplitude pass down tail	Whole sperm rotates around its axis periodic flashing effect	Rapid forward progress in a straight line
4	Asymmetric head and / or flagella	Amplitude of tail wave is asymmetric at both sides	Irregular, propelling, usually no rotation	Circular orbits if rotational motile is absent

Sperm livability

To determine the percentage of live sperm, Eosin-Nigrosin stain was used. Briefly, a 10µl drop of fresh semen was mixed with 200µl of eosin-nigrosin stain on a glass slide followed by making a thin smear of it.



Figure showing livability of sperm by Eosin-Nigrosin stain

Insemination of the Hen

The hen is held by the left hand being placed over the breast with the bird's back forced against the holder's body, the head pointing to the ground. The right hand is placed over the vent so that the thumb is above and forefinger below the vent. A sudden pressure exerted around the breast area and, at the same time, using the thumb and forefinger to spread apart the cloaca, resulting in the turning of the cloaca inside out. The operator, with 0.1 ml of semen or 0.2 ml of diluted semen (in PBS or saline) drawn up in the inseminating tube, places this tube as far as possible in the exposed oviduct opening seen at the left side of the intestinal opening. The semen is introduced at the same time as the holder releases the pressure and the cloaca returns to its normal position. During insemination, the volume of semen required is generally less than 0.1 ml, within a minimum of 100 to 200x10⁶ viable sperm per insemination within the hen's vagina (Gordon, 2005). Usually the semen from 1 rooster can be used for 40-50 hens. Inseminations should be carried out on two consecutive days the first week and then once each week thereafter while fertile eggs are required. It is a good idea to carry out the operation at the same time each day, the

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best time being between 2.00pm and 4.00pm. The reason for this is that during the morning, most hens have an egg in the oviduct, thus obstructing the free passage of semen to the ovary.

Semen Collection in Turkey

Artificial insemination is a routine practice in the turkey breeder industry. It was originally implemented in order to control diseases such as Mycoplasma meleagridis and also inability of toms to consistently transfer semen to the hen at copulation. The increased frame size and body weight of today's male turkey adds difficulty to capturing and collecting semen due to extra maneuvering that is required before and during massage.

For semen collection usually requires two people. The first person (the operator) holds the bird's legs and operates the semen collection apparatus. The second person (the milker) massages the area around the cloaca. Place the tom on its chest in a vertical position with its neck under one thigh of the milker and its legs over the milker's other thigh. The legs of the bird are held firmly in place together by one hand of the operator. The protrusion of the phallus is brought about by massaging the soft part of the abdomen with the free fingers and thumb of the left hand. At the same time the tail is pushed back over the tom's back with the heel of the right hand. The tom can be further stimulated with the palm passing gently over the vent in the same sequence. In a series of simultaneous movements, the operator maintains the pressure on the tail head until the thumb and index finger of the left hand are in position to squeeze behind the phallus. The pressure applied will also determine the flow of semen. Do not stroke the tom more than twice. After two strokes risk of injury to the cloacal area increases, with minimal additional semen being gained Semen is then collected only off the end of the phallus. Good quality semen has a thick consistency and a pearly white color. When the toms first begin to produce semen, some may produce semen that has a yellow color. If this persists after 2-3 collections these toms should be culled from the flock. Yellow semen has a high content of defective and/or under developed spermatozoa resulting in lower fertility. Yellow semen should never be used. Semen with a reduced number of spermatozoa is grayish in color and watery in appearance, and concentration of spermatozoa is very low. In turkeys, the volume averages ~0.35-0.5 mL, with a spermatozoon concentration of 6 to >8 billion/mL.

Advantages of AI

1. Able to use an injured bird: Valuable male birds that have been injured in the leg can still be used for artificial insemination.
2. Laying cages can be used: Laying cages are no longer a problem when fertile eggs are needed. Selected hens can be inseminated and remain in the cage. The exact pedigree of the chickens hatched from these fertile eggs is known.
3. Successful cross breeding: Usually cross breeding is very successful under natural conditions, but sometimes there is a kind of colour discrimination: some hens will not mate with a male of a different colour unless they have been reared together.



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USAGE

- To protect and overcome the ill effects of heat stress and to prevent heat stress related morbidity & mortality.
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- To optimise and maintain normal physiological functions alongwith improved FCR, increased weight gain in broilers and optimum egg production and shell quality in layers during heat stress and other stressful conditions.
- To maintain immuno-competence in heat stressed birds.
- To maintain fertility and hatchability in breeder birds.

FEED INCLUSION RATE

100 gm per ton of feed or as advised by the nutritionist.

WATER INCLUSION RATE (per 1000 birds)

20-40 ml or as advised by poultry consultant.

PRESENTATION

Powder : 1kg, 5 kg & 25 kg pack

Liquid : 1 Ltr. & 5 Ltr. pack

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(Water Soluble Concentrate for Stress Management)

USAGE

- To provide optimum supplemental source of salts and energy.
- To ensure adequate water intake and to avoid dehydration.
- To protect and overcome the ill effects of heat stress.
- To avoid transportation & vaccination stress.
- For optimum health and production performance.

FEED INCLUSION RATE:

500 gm - 1 kg per ton of feed.

WATER INCLUSION RATE:

50 gm per 100 litre drinking water for 7-10 days or more, as required.

PRESENTATION:

1 kg pack.

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