

# International Poultry Production

Volume 32 Number 6 (2024)

Practical information for progressive poultry professionals

## FEATURED IN THIS ISSUE

Management and Other  
Differences of White  
vs. Brown Laying Hens

Sustainable Table  
Egg Production

Stamping Out  
Salmonella for  
Sustainable Egg  
Production

Early Feed Intake Helps  
Improve Overall Feed  
Efficiency of Broilers

Getting Chicks Started  
Right to Maximise  
Performance





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# Editor's Perch

**S**ustainable table egg production is an increasingly critical issue for the global poultry industry. As demand for eggs rises, producers must balance economic viability with environmental responsibility and social accountability, recognising that the long-term success of the industry depends on this.

Nutrition plays a pivotal role in sustainable egg production. The choice of feed ingredients not only affects the health and productivity of hens but has significant environmental implications. Are we optimising feed formulations to reduce our carbon footprint while maintaining egg quality and hen welfare?

The push towards using locally sourced, sustainable feed ingredients is gaining momentum, but how can producers ensure consistency in nutritional quality across different regions and climates?

Effective management practices are equally essential. From housing systems to waste management, every aspect of production impacts sustainability. The shift towards cage-free and enriched housing systems raises important questions

about the balance between animal welfare and productivity.

How can producers maximise egg output while minimising environmental impact and ensuring the welfare of their flocks, especially in the face of evolving consumer expectations?

Health management underpins both productivity and sustainability. Disease prevention, through biosecurity and vaccination, reduces the need for antibiotics and improves overall flock performance.

Are current health management practices robust enough to withstand the increasing pressures of climate change and disease emergence? Furthermore, how can veterinarians and producers collaborate more effectively to advance sustainable health practices that are adaptable to local challenges?

By critically evaluating and improving practices in nutrition, management, and health, the industry can move towards a more sustainable future. Are we prepared to meet this challenge head-on and ensure that our strategies are as dynamic and resilient as the challenges we face? ■

## Cover Picture:

### Sustainable production

(photo courtesy of Anpario- see page 10)



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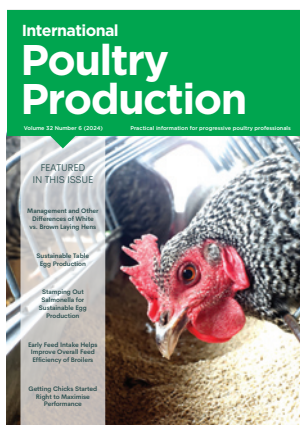


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# World Focus

An executive summary of key international issues

## UNITED KINGDOM

### Aldi meets cage-free egg commitment

Aldi has announced that it has achieved its goal of sourcing 100% cage-free eggs across all its stores a year ahead of schedule. Originally set for 2025, the supermarket chain now exclusively offers cage-free eggs in response to growing consumer demand for higher animal welfare standards. Aldi's commitment is part of its broader strategy to promote sustainability and ethical sourcing practices. This achievement positions Aldi as a leader in the retail industry, demonstrating that it is possible to accelerate change towards more humane food production practices.

## UKRAINE

### Power outages disrupt industry operations

Ukraine's poultry industry is facing significant challenges as ongoing power outages severely disrupt operations across the country. The outages, caused by damage to critical infrastructure have led to reduced production capacity, impacting everything from egg incubation to feed processing. Farmers are struggling to maintain optimal conditions for their flocks, resulting in lower productivity and increased mortality rates. The lack of consistent electricity also hampers cold storage and transportation, risking further losses. Industry leaders are urgently calling for support to stabilise power supplies.

## FRANCE

### Avian influenza detected

French authorities have confirmed the detection of avian influenza at a poultry farm in the southwest region of the country. The outbreak has prompted immediate containment measures, including the culling of affected flocks and the establishment of a quarantine zone around the farm. The strain detected is highly pathogenic, raising concerns about the potential spread to other farms in the region. This incident is part of a broader pattern of Avian influenza cases across Europe, leading to increased vigilance and biosecurity measures in the poultry industry to prevent further outbreaks.

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# Management and other differences of white vs. brown laying hens

For several decades, the egg market across much of Europe has been dominated by a preference for brown-shelled eggs.

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By Pavel Kolnik, Technical Specialist,  
Hendrix Genetics Layers  
[layinghens.hendrix-genetics.com](http://layinghens.hendrix-genetics.com)

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However, the growing recognition of animal welfare, the transition from cage to cage-free housing systems for laying hens, and the increasing focus on sustainability and carbon footprint calculations have opened the door to the greater utilisation of white laying hens in some countries that traditionally preferred brown eggs.

While one could speculate about the pros and cons of each type of egg layer, considering the biological production potential of white versus brown chicken breeds, it seems that the main driver will still be the consumer's preference for a particular eggshell colour, even though the shell is not consumed.

## A DIFFERENT APPROACH

Egg producers have realised that a different approach to management practices is necessary when switching between brown and white laying hens. These practices are usually informed by experience, tips spread within the poultry community, and sometimes sheer luck.

One apparent difference is the plumage

ISA Brown.



colour of the commercial laying hens, resulting from the different genetic backgrounds of the breeds used in industrial egg production—white hens coming from various lines of White Leghorns and brown hens from a combination of Brown and White Rhode Island lines. Consequently, white and brown laying hens have different temperaments, leading to different behaviours.

Egg producers quickly recognise that they must be more prudent when entering and working in the house with white laying hens, which typically do not "come to welcome them" as brown laying hens often do.

Although day-old chicks of both types are curious and tend to approach when "called," white hens usually reverse this behaviour as they grow, often trying to escape when someone enters the house.

The first week of life can be more challenging when starting with a flock of white egg-layer chicks. It is often recommended that the starting temperature for white chicks be 2–3°C higher than for brown chicks, at least for the first few hours.

Monitoring the cloaca temperature of the young chicks and adjusting the environmental temperature based on these measurements is strongly advised.

Once they are well started, white-laying hens tend to explore their environment better and faster and are easier to manage towards the end of the rearing period.

However, it is important to note that white-laying hens are more sensitive to pecking between 3 and 7 weeks of age, requiring full attention from the rearing farmer during this critical phase.

In contrast, brown laying hens are sometimes considered lazier and less inclined to seek out equipment, feed, and water.

## A COMMON MISTAKE

Some egg producers mistakenly believe they can house more white than brown day-old chicks, pullets, or laying hens on a given surface, assuming the lower body weight of

Dekalb White.







white hens allows for this.

This is incorrect and should not be practiced. To provide the best possible conditions for development and growth during the starting period, the same standards for stocking density, feed and water space, and ventilation per individual should be maintained for both white and brown chicks.

Easy and comfortable access to feed and water is essential throughout the chickens' lives, regardless of feather colour. However, if laying hens play with water and spill it (as whites are sometimes accused of doing), steps should be taken to manage this behaviour.

## IMPORTANCE OF LIGHTING

High light intensity is generally recommended and applied during the first weeks of life to stimulate activity in the laying hens, with no standardised differences for white or brown hens. If activity seems too high or nervousness increases, dimming the light is usually an effective way to calm the hens.

For laying hens prepared for a cage-free environment, particularly those intended for free-range systems later on, higher light intensities are recommended to avoid stress from a sudden increase in light intensity when they move from the controlled environment of the house to the winter garden or range during rearing or transfer.

The recommended lighting program does not need to differ significantly between white and brown laying hens.

If necessary, it can always be adjusted according to rearing goals, achieved body weights, and production type, which may have different egg weight requirements. Brown laying hens in cage-free systems might need longer day lengths to avoid laying eggs outside nests, especially since it may still be dark in the early morning when they start to lay.

White egg layers tend to start laying about two hours later than brown hens. This difference in laying patterns also leads to different recommendations for the ratio of coarse to fine particle size calcium

carbonate, with 70:30 recommended for brown hens versus 50:50 for white hens.

If housing both types together, it is recommended to maintain the 70:30 ratio.

As mentioned earlier, no less feeding and drinking space is required or recommended for white laying hens compared to brown ones during rearing and production. The aim is to provide both types with the best possible development during rearing and the start of lay, using well-balanced feed in the right amounts.

The main factors to monitor are body weight and flock uniformity. High-quality crumbled feed at the start should transition to good-quality mash feed of appropriate structure, which, combined with proper feeding management, can produce a uniform flock of high-quality pullets—the main goal of a reliable pullet rearer.

Despite different body weight growth requiring different amino acid and metabolisable energy (ME) intake for white versus brown hens, egg producers often successfully use the same feed for both types housed together. The key parameter to monitor is standard body weight and flock uniformity.

Often, uniformity achieved with white hens is 5 to 10% higher than with brown hens. Brown hens generally consume around 1,200 kcal more per pullet than white hens from day old until the point of lay, and this difference persists across various housing systems.

Proper feed distribution management is crucial for the development of the gastrointestinal tract. Good physical feed structure and correctly applied "empty feeder" techniques support the development of both white and brown pullets, preparing them for the necessary fast increase in feed intake at the start of lay.

As mentioned before, brown hens are heavier compared to white hens, leading to higher maintenance and total ME requirements throughout their lifespan. The higher average daily ME requirement for white hens versus brown increases, especially at the end of lay, due to their higher production rate and laying persistency.

## FEED CONVERSION RATIO

White hens typically achieve a lower feed conversion ratio (FCR) per egg or kilogramme of egg mass, requiring less feed to produce white eggs compared to brown ones. Higher laying persistency towards the end of production is one of the main reasons for extending the production cycles of white hens.

White egg layers also produce fewer eggs with meat and blood spots compared to brown hens, a trait generally well accepted. White hens are better able to maintain eggshell quality up to levels required by egg packers, partly due to their more consistent egg weight curve.

When listing the differences between



white and brown hens, it is important to note that white hens are generally considered easier to manage in cage-free systems. They move more easily in aviaries and tend not to crowd or smother as much as brown hens do, which is often cited as a reason for their higher use in cage-free systems. They also tend to produce fewer eggs outside nests, provided the litter layer is kept shallow.

A significant difference between white and brown layers is that with white hens in alternative systems, it is important to keep the litter quantity low to avoid triggering floor egg production. White hens rarely produce floor eggs, but they can start to do so if there is too much litter. Brown hens, once they begin laying in nest boxes, are less likely to be triggered to lay eggs on the floor.

Due to their more active temperament, visits and treatments of white flocks should be carried out with special attention to their behaviour. Additionally, the oviposition time of white hens is more concentrated compared to brown hens, creating a higher demand for nest space. Therefore, nesting space recommendations must be followed even more strictly for white hens than for brown hens.

Our overall advice is to never save money on nest space, as competition for nests should be avoided.

In conclusion, while there are distinct differences in the management, behaviour, and production characteristics of white and brown laying hens, these factors must be carefully considered by producers when choosing between the two.

The unique needs of each type of hen—ranging from environmental conditions and feed management to behavioural tendencies and egg production patterns—require tailored approaches to ensure optimal health, productivity, and welfare.

However, despite these technical considerations, the ultimate decision for egg producers will likely continue to be influenced by consumer preference for eggshell colour. As such, producers must balance the practical aspects of hen management with market demands to achieve successful and sustainable egg production.

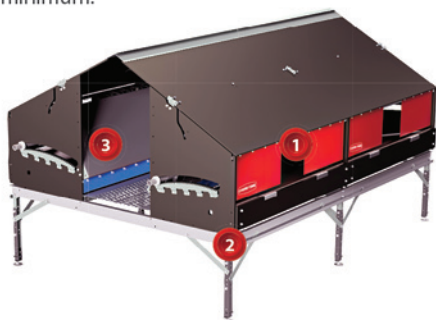


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# Sustainable table egg production

BioOx

[bioox.us/the\\_science](http://bioox.us/the_science)

**A**wareness of sustainable egg production has increased across layer farmers, breeders and consumers. Furthermore, some of the major factors considered for sustainable egg production are health and welfare, as well as the environment.

Their BioOx Air Cleaning System is a first-of-its-kind bioreactor that captures and destroys airborne pollutants. Their patented biotechnology improves air quality and can result in better health. BioOx was founded by the renowned research scientist, Dr. Sam Sofer, who worked in a Nobel Prize-winning laboratory and discovered ROx (reserve oxygen). As a result, the brand's Air Cleaning Systems are based on the science of ROx and the fundamental sciences of convection, molecular charge attraction (aerosols), and bio-oxidation, which create a dome of influence where all air is clean.

BioOx Air Cleaning Systems use the power of bio-oxidation, and there is not a single HEPA, UV or ionic-based system on the market that offers complete localised air decontamination like BioOx. While other systems struggle to filter out 0.3 microns, their bio-reactors offer complete contaminant destruction down to the 0.0001 microns and can clean air in large square footage facilities, such as poultry houses and other facilities used in animal agriculture.

## ROBUSTNESS

The egg industry is focused on further reducing its carbon footprint through continual improvement and environmentally responsible practices on the farm, with sustainable table egg production being a primary focus. There is a particular focus on hen health and welfare as the production period continues to extend longer and longer, which reduces the need for replacement layers and improves economics and sustainability. Keeping laying hens productive for 100 weeks can save breeding time and production costs.

These hens need to maintain a high health status and a high level of robustness to increase their chances to survive and remain productive for longer periods. Robustness often refers to a laying hen's ability to deal with many challenges, such as diseases or environmental stressors. It is critical that laying hens can deal with illness and other stressors as early as one day old.

A holistic approach will focus on how the health of animals is integrated with the conditions of the immediate environment. Bird health can be maintained with practices that prevent the introduction of diseases.

BioOx's strategy is to use the existing, natural way the planet cleans itself and apply it and bring it indoors to where animals are, where people are, as well as open-air farms; that is their main goal.

Chickens can go blind when the ammonia from

their waste reaches a high concentration. This can impact the quality of the layer hens' eggs, and ammonia is known to be a large contributor to mortality in poultry.

Ammonia is created when the nitrogen in poultry faeces is broken down by bacteria. Exposure to high ammonia concentrations negatively affects the development of the birds' immune system, as well as their intestinal histomorphology.

In their comprehensive, 20 day study with 20,000 chickens per house, the house with the BioOx Air Cleaning System running saw a 48% reduction of measured ammonia with the same vent time and vent box opening as the control house without their Air Cleaning System (both houses were identical in age and size).

Furthermore, the house that used their Air Cleaning system saw a 32% reduction in mortality over the control house without BioOx in their study. Overall, the house that used their BioOx Air Cleaning System saw a 32% reduction in mortality over the control house without BioOx in their study.

## ANIMAL WELFARE

Since consumers have expressed a strong desire for animal welfare to be considered in poultry production, including table eggs, there has been a noticeable shift in table egg farms moving from conventional to enriched cages. To support birds' behaviour and welfare, they also transitioned from raising their birds in cages to non-cage production systems.

These types of changes can have unintended consequences in the future, such as disease exposure.

The percentage of dirty eggs was higher in free-range production systems than in indoor cage systems. Although the free-range systems are beneficial for comfort bone and feather traits, they also have disadvantages, such as dirty eggs.

To address the concerns of disease, dirt, and air contamination, their bioreactors respond quickly to real viral and bacterial epidemiological outbreaks spread via air. Various experiments have proven that BioOx is effective with pathogen destruction (H1N1, Legionella, Influenza B, and MRSA were studied).

Furthermore, their BioOx Air Cleaning Systems also address the following contaminant categories: volatile organic compounds, gases, particulates, and ultrafine particles.

Overall, layer farmers and breeders need to be passionate about providing fresh, high-quality eggs while taking care of their animals, communities and the environment to make sustainable table egg production a priority. Improved air quality in hen houses, as well as reducing avian diseases, will lead to sustainable table egg production, and their BioOx Air Cleaning System is a tool to help you get there. ■





# Stamping out salmonella for sustainable egg production

Salmonella cases are rising again, reversing the downward trajectory of cases reported between 2008 and 2016.

**Dr Alexandra Desbruslais,**  
Senior Technical Product  
Manager, Anpario plc  
[www.anpario.com](http://www.anpario.com)

Salmonella remains one of the most important foodborne zoonoses in the world, with over 93 million cases of salmonellosis reported globally each year, causing upwards of 150,000 deaths (Fig. 1). Most of these cases are thought to be caused by food, with poultry meat and eggs implicated in many cases.

Sustainability is a huge buzzword at present, and every industry is under pressure to improve sustainability and reduce environmental impact. The term sustainable means "something that can be maintained at a certain rate of level."

For commercial egg production, this means that we need to maximise the output of eggs while minimising inputs. It is no secret that a salmonella outbreak is very

costly, both in terms of loss of production and the costs required for additional testing, treatment, sanitisation, etc. As such, Salmonella significantly reduces the sustainability of the poultry industry each year.

Birds can become infected with salmonella in several ways. Salmonella can survive in the environment for long periods and under very harsh conditions, including freezing temperatures and very dry and high-salt environments.

As such, it can persist in poultry housing and infect birds for long periods if not properly sanitised.

It can be spread both vertically and horizontally from other birds and animal vectors, such as rodents. One of the primary transmission routes is via infected feed, and this is far harder to both detect and control.

Many strains of Salmonella are non-pathogenic to poultry, and most birds will be asymptomatic, making identifying an outbreak challenging for producers.

Once present, the bacteria generally colonise the intestinal tract with particular affinity to the epithelial cells of the caeca and ileocaecal junction.

Some strains (particularly S.

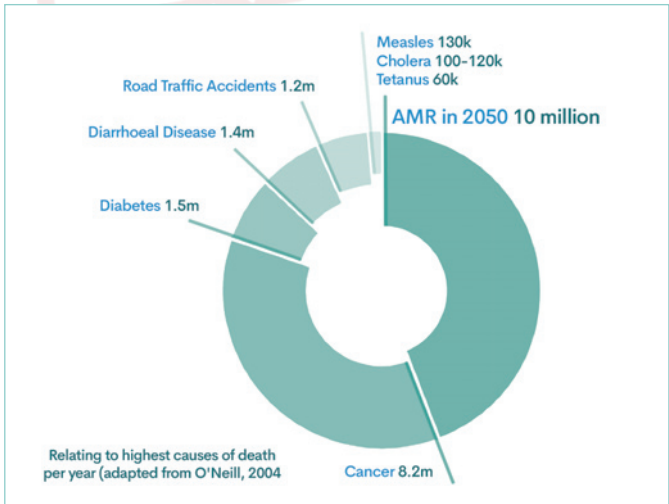


Fig. 2: Predicted causes of death by 2050.

enteritidis) can penetrate intestinal cells, translocating into the bloodstream, where they can then multiply and colonise various organs and bones, including the ovary.

This then leads to infection of the eggs, transmitting the bacteria into the human food chain.

### CHALLENGES IN IDENTIFYING INFECTION

With so many possible transmission routes, it can be difficult to identify positive vectors.

In feed, salmonella contamination is notoriously

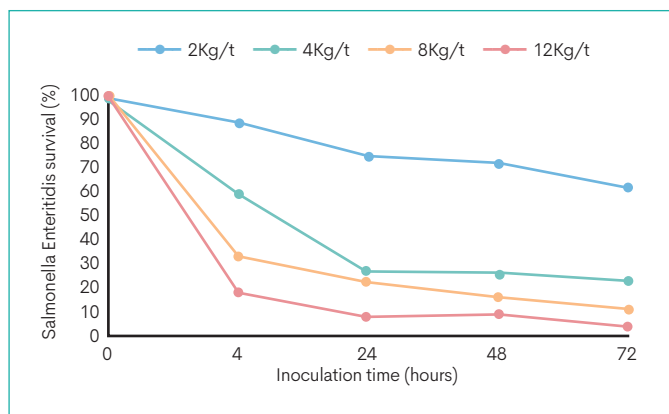


Fig. 1: The impact of Salmonella adapted from data from the World Health Organisation (2023).

Table 1: Comparison of organic acid forms.

	Liquid	Salts/Powder	Encapsulated	
Handling Guidelines	Skin corrosive	Eye/respiratory damage	Dust-free, easy to use	Dust-free, easy to use
Odour	Extremely strong, pungent odour	Low odour	Solid in fat no odour	Low odour
pH	2.3 – very acidic, caustic and corrosive	8.0-9.02	Neutral	4.0-4.5
Inclusion Rate	High-Up to 7kg/t	High-Up to 6kg/t	High-up to 6kg/t	Moderate 1-4 kg/t
Efficacy in Animal	Rapid gastric absorption	Neutral pH rapidly digested	Lipase required for acid release	Entire gut efficacy
Zone of Activity	Feed & upper gut	Proventriculus/upper gut	None	Preservative/Preventative
Comments	Dangerous	No net acid effect	Often not heat stable, it can be lost during pelleting.	Heat stable and effective throughout





**Fig. 3: Reduction in Salmonella burden in complete feed following Salkil application.**

difficult to detect as colonisation is highly ununiform.

This means that even when several subsamples are tested, infection can be completely missed.

While feed sampling remains an important part of any salmonella control protocol, an insurance policy is essential.

Detecting infection in live birds can be equally challenging. Faecal shedding is intermittent for up to 15 weeks post-infection and, as such, has the potential to be mismanaged.

Likewise, the environmental burden can be hidden in unreachable areas of the bird's environment, escaping standard sanitisation.

A multifactorial approach of regular testing alongside implementing a program of sanitising the feed and exerting an antimicrobial effect in the intestinal tract of the bird is essential to reduce the possibility of human exposure.

This ensures that the bacterial burden coming into the bird is as low as possible, and the antimicrobial effect within the gut ensures infection is controlled.

## MITIGATION STRATEGIES

### Vaccines

Salmonella vaccines have been available for some time. However, there is varying data on efficacy, and the European Food Standards Agency has published an opinion that states that vaccines are an additional measure to mitigate salmonella and cannot replace good hygiene of the feed and environment.

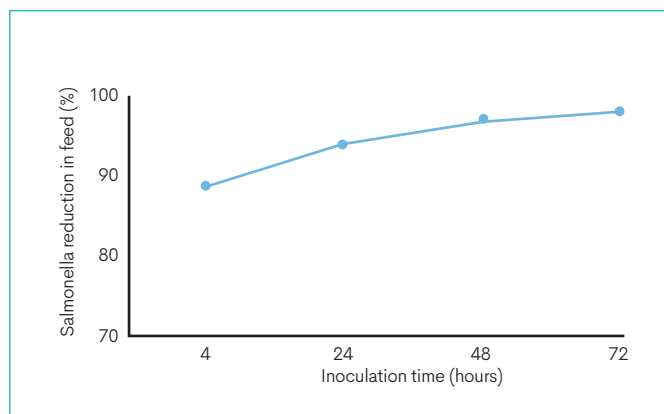
Faecal shedding can still occur with vaccines, leading to a greater environmental burden for the bacteria.

### Antibiotics

Historically, salmonella infections have been treated with antibiotics such as tetracyclines; however, increasingly we are seeing salmonella strains that are resistant to antibiotics. Antimicrobial resistance is predicted to be the biggest cause of human deaths by 2050 (Fig. 2). So, to prevent Salmonella infections in humans, we need to be looking at ways to prevent infection before it reaches the food chain.

### Organic Acids

Organic acids are widely used



**Fig. 5: Salmonella reduction in feed.**

across the animal production industry.

Organic acids are available in several forms. Liquid acids such as formic propionic and acid salts have been proven to effectively sanitise feed, and protected acids (encapsulated) have been widely demonstrated to exert a strong

and hydrolysis before the acid can be released, they are not able to sanitise the feed (Table 1).

Salkil is a novel way to supply liquid organic acids in a unique carrier system, whereby the surface acid sanitises the feed, and once in the aqueous environment of the gut, the liquid

Treatment	Artificial Salmonella infection in feed (cfu/g)	Salkil addition in feed (kg/t)
1. Continuous Infection (CI)	1,000	0
2. CI + Salkil	1,000	4
3. Initial Infection (II)	0	0
4. II + Salkil	0	4

**Table 2. Dietary treatments from Week 4-10.**

antimicrobial effect in the intestinal tract without the need for antibiotics.

Unfortunately, whilst liquid acids and acid salts are highly effective at sanitising feed, they are rapidly absorbed in the gut, making them ineffective at mitigating bacteria in the intestinal tract.

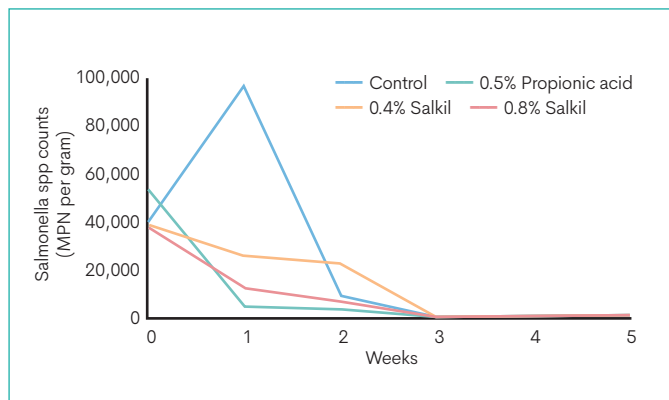
Conversely, protected acids (encapsulated) are effective at managing the gut environment, but as they require digestive enzymes

acid is released from the carrier, exerting its antimicrobial effect on the gut. Salkil is extremely effective in reducing salmonella burden in the complete feed (Fig. 3) and raw materials prone to salmonella, such as fish meal (Fig. 4).

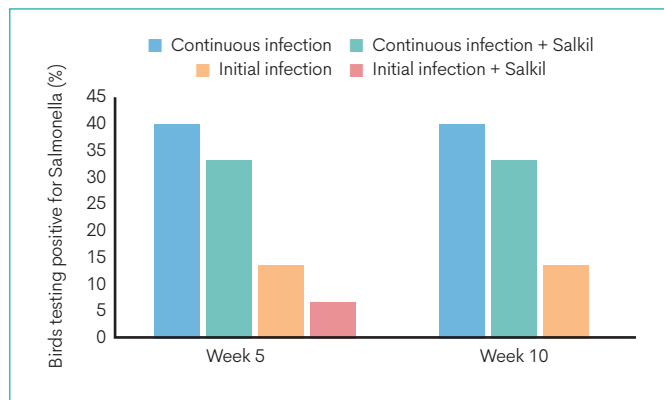
A recent study was conducted in laying hens to investigate the efficacy of Salkil in reducing salmonella excretion in challenged birds.

*Continued on page 12*

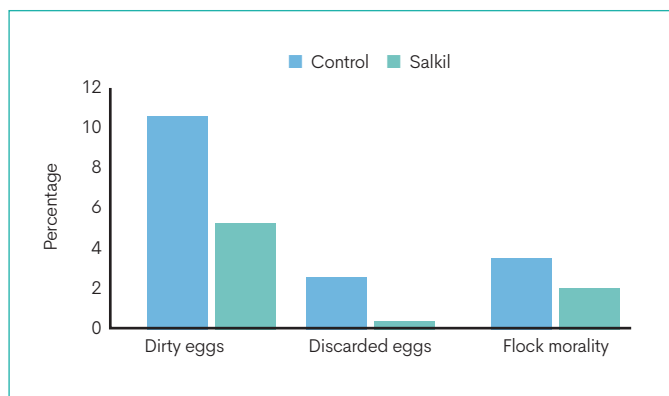
**Fig. 4: Reduction in Salmonella burden in fish meal following Salkil application.**



**Fig. 6: Percentage of birds testing positive for salmonella on weeks 5 and 10 of the study.**







**Fig. 7: The incidence of dirty and discarded eggs and overall flock mortality (with and without organic acids).**

*Continued from page 11*

## STUDY DESIGN

The study was performed at a research facility in Spain and used 60 commercial laying hens at 20 weeks of age. All birds were fed salmonella-infected feed at 1,000 cfu/g from weeks 0–3 before the start of the trial (week 4). Birds were monitored individually up to week 10. Cloacal swab sampling was conducted each week to confirm Salmonella excretion. All birds were confirmed as Salmonella negative at the start of

the trial at week 3. From week 4, birds were split into 4 groups of 15 birds per treatment (Table 2).

## RESULTS

The study found that the application of Salkil was effective at reducing the salmonella burden in the feed (Fig. 5). The cloacal swab results found that the application of Salkil significantly reduced the percentage of birds testing positive for salmonella (Fig. 6). Due to the organic acids managing the microbial



environment of the gut, birds fed Salkil also experience a significant reduction in the incidence of dirty eggs, and eggs seconds and an overall reduction in flock mortality (Fig. 7).

## SUMMARY

An Acid-based Eubiotic (ABE) such as Salkil can substantially reduce the incidence of salmonella, both within the feed and the bird, dramatically reducing the incidence of positive swabs in highly challenged birds. By creating a positive change in the gut environment, the beneficial microbial communities facilitate better gut health and therefore better faecal consistency and mortality rates, reducing downgrades at packing and overall

economic losses. Unlike an acid in liquid, salt or encapsulated forms, ABEs such as Salkil reduce the need for two separate products as both the feed and bird are covered with a single application, presenting excellent value for money for the producer. As such, Salkil can substantially improve the sustainability of egg production by not only reducing the incidence of Salmonella outbreaks but also by reducing the need to manufacture, transport and apply two separate additives.

With Salmonella cases on the rise, the simple application of Salkil can help "Stamp out Salmonella," optimising animal health and welfare as well as protecting economic profitability and improving the overall sustainability of the egg production industry. ■



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# Early feed intake helps improve overall feed efficiency of broilers

With ever-increasing commodity prices chipping away at profit margins, broiler producers need to continually find ways to optimise flock performance to remain competitive. With feed costs accounting for up to 70% of total production costs, feed efficiency becomes the most important factor in broiler production. A slight improvement in feed efficiency can increase the cents per kg payoff.

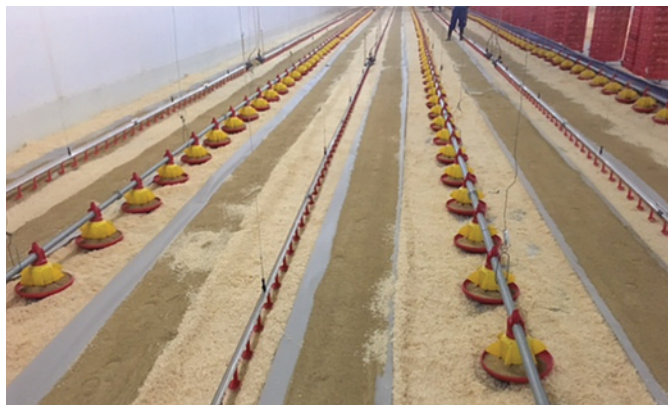
by Brendan Graaf,  
Broiler Specialist,  
Cobb Europe  
cobbgenetics.com

## MEASURING FEED EFFICIENCY

Feed efficiency is generally defined in two ways: feed conversion efficiency (FCE) and feed conversion ratio (FCR), the latter being the most common and well-known term used in broiler production. FCR is calculated by the amount of feed per kg of body weight gain, with the goal of FCR being as low as possible.

Throughout the broiler production period, the best FCR occurs in the first five to seven days due to low or almost no heat production in chicks during the first five days.

Place rows of paper on each side of each drinker line and distribute 75g feed per chick on the paper to promote early feed intake.



As a result, chicks have low caloric expenses and body weight maintenance costs, meaning more nutrients are available for growth. FCR during this period can be lower than one, meaning the birds put on more body weight relative to feed intake. Fat and protein from the yolk sac also contribute to the low FCR.

However, if early feed consumption is limited, chicks will need to use the protein from the yolk sac for energy instead of growth, negatively impacting FCR.

## MAXIMISING EARLY FEED INTAKE

It is therefore essential to provide the ideal environment during brooding to maximise early feed consumption.

Supplementary feeding to ensure adequate access to feed during brooding is critical.

The most important part is to provide sufficient feeding space and feed. Growers may be reluctant to place 75g of feed per bird on the paper since the waste of feed from supplementary feeding is approximately 15 to 20%.

However, growers need to appreciate that, at the start, each gramme of feed consumed increases body weight by one gram or more.



Provide correct feed and water access so the chicks do not have to search for either.

Within any given population of chicks, there will always be stronger chicks who can easily find feed. Likewise, there will also be a percentage of smaller, weaker chicks that rely on sufficient supplementary feed to achieve good early intake.

Improving average first-week body weight, decreasing first-week mortality and culls, and improving flock uniformity are best achieved by ensuring these smaller, weaker chicks get off to a good start through good early feed consumption and brooding management.

## RETURN ON HIGH EARLY INTAKE

Attaining high seven-day body weights generally leads to high body weights at the end of the flock, good uniformity, low final mortality, and low final FCR. Interestingly, there are often minimal improvements in FCR when the seven-day body weight ranges from 150 to 170g.

However, seven-day bodyweights ranging from 170 to 200g have big improvements in FCR.

This improvement in FCR far outweighs any feed waste from supplementary feed placed in the first few days. Factoring in high final body weights, low

mortality/culls, and good uniformity, providing sufficient supplementary feed pays dividends back to the farmers.

## EVALUATING MANAGEMENT

To measure the effectiveness of brooding preparations and supplementary feed, a simple crop-fill evaluation can be performed. Sample 100 chicks from across the brooding area. If checked 8 hours after placement, a minimum of 85% of chicks should have both feed and water in their crops. A minimum of 95% should have filled crops 24 hours after placement. Adjustments to brooding management or supplementary feeding can be implemented if targets are not achieved.

## SUMMARY

To take advantage of the modern broiler chick's genetic potential, they should never have to search for feed.

Ensuring sufficient feeding space and feed availability will support maximum consumption at an early age, resulting in a high seven-day body weight while providing the foundation for the best feed efficiency. ■



# Options for

## Innovative synergistic gut care solution for poultry

Carus Laboratories launched a synergistic combination of gut-specific probiotics, natural betaine, and organic zinc for the first time in India to ensure total gut care in the form of GutFed WS.

[www.caruslab.com](http://www.caruslab.com)

The new product is meticulously formulated to address the critical aspects of poultry gut health.

The synergistic blend of gut-specific probiotics, natural betaine, and organic zinc offers a multifaceted approach to enhance digestion, boost immunity, and promote optimal growth and productivity in poultry.

"We are excited to introduce this innovative solution to the market. Our team has worked tirelessly to develop a product that not



only addresses the current challenges in poultry gut health but also sets a new benchmark for future innovations" Avinash Kharat, General Manager of Poultry at Carus Laboratories told International Poultry Production

"We are committed to advancing poultry health through innovative solutions and high-quality products." added Dr Arun Pilani, Managing Director of Carus Laboratories.

This pioneering product is expected to set a new standard in poultry gut care, offering a holistic approach to managing gut health and improving the overall performance of poultry flocks.

By addressing multiple aspects of gut health, Carus Laboratories aims to support poultry farmers in achieving better health outcomes and higher productivity.

## Postbiotics with the power to perform from hatch to harvest

The desires of consumers and retailers are driving changes in the global poultry industry. Producers must meet the challenge of maintaining poultry health and nutrition while supporting productivity under all conditions for all markets.

[diamondv.com](http://diamondv.com)

In both conventional and non-antibiotic production systems, Diamond V poultry feed additives\* work naturally\* with the biology of the animal to maintain immune strength and promote digestive health.

Whether you're raising broilers, layers, breeders, turkeys, or backyard birds, from hatch to harvest, it's possible to give poultry the power to perform. Diamond V's Original XPC postbiotic feed additives support the bird's immune system to optimise animal health and wellbeing, promote production

efficiency, support preharvest food safety, and maintain resilience and overall performance.

The dual-action functionality of AviCare postbiotic, used in poultry drinking water, helps support immune function and digestive health.



## Improvements in hen performance, egg quality

Alltech has released data from a new meta-analysis that demonstrates that dietary supplementation with Bio-Mos at 1.0kg per ton improved the production performance of laying hens and reduced their carbon footprint, enhancing the sustainability credentials of egg production.

[www.alltech.com](http://www.alltech.com)

Additionally, the results of feeding Bio-Mos included increased hen day production (by 1.76%), and a decreased feed efficiency rate (by 26.64g of feed per kg of eggs produced). Enhanced protein output was also observed, as the egg mass increased by 0.95g per day per hen and produced an overall better-quality egg, as the eggshell thickness increased by 0.05mm. Overall, the study shows that profitability increased from feeding Bio-Mos to laying hens.

"A strong focus on optimising the gut health of birds is crucial to enable egg producers to navigate the increasing production challenges threatening their birds' productivity and bottom line," Dr Saheed Salami, research fellow at Alltech told International Poultry Production.

"This meta-analysis has confirmed that Bio-Mos is an effective nutritional solution for improving gut health and egg production efficiency while contributing positively to the sustainability performance of egg production."

Feed and total emission intensities were used as metrics for quantifying the environmental performance of feeding Bio-Mos. The simulated lifecycle assessment revealed that supplementing Bio-

Mos decreased the feed and total emission intensities of egg production by -1.3% and -1.5%, respectively. The environmental benefits associated with the study are equivalent to a reduction of 890 tons of CO<sub>2</sub> equivalent for 62 weeks of egg production from a flock of one million birds. This carbon emission savings is equivalent to 583 fewer cars on the road, 1,035 intercontinental return flights, and 600 houses' use of electricity.

The sustainability benefits of Bio-Mos, as illustrated by the meta-analysis, include:

- Improved animal production efficiency and increased edible protein output
- Reduced food loss
- Improved welfare through improvements in gut health
- Reduced arable land use and other agricultural inputs for feed crop production
- Increased profitability and economic livelihood for animal producers
- Reduced carbon footprint of egg production

Bio-Mos is a unique product derived from a select strain of *Saccharomyces cerevisiae* yeast using a proprietary process developed by Alltech and is incorporated into birds' diets to support their overall performance. Effective during all phases of growth, Bio-Mos is designed to feed the gastrointestinal tract, thereby maximising performance and profitability. Meta-analysis studies reaffirm that feeding Bio-Mos offers unique production performance and economic and environmental benefits to laying hen productions while positively impacting the food supply chain and supporting a Planet of Plenty.

### Launch of industry-leading poultry solutions in the EU

IFF has announced EU-wide regulatory approval for two of its groundbreaking feed solutions for poultry.

[animalnutrition.iff.com](http://animalnutrition.iff.com)

Axtra XAP, a multi-enzyme blend and Syncra AVI, an enzyme-probiotic complex from Danisco Animal Nutrition & Health, IFF's Health & Biosciences business unit, are formulated to deliver measurable performance improvements.

Axtra XAP, a high-performance xylanase, amylase and protease enzyme combination, increases energy efficiency and improves bird performance in corn-based and mixed-grain diets.

Through optimised nutrient availability, this unique feed solution enables greater flexibility

in dietary formulations, significantly reduces feed costs, and improves profitability.

Additionally, Axtra XAP allows producers to adapt their operations to meet consumer demands and industry trends, including free-range production and all-vegetable dietary ingredients.

Syncra AVI combines two proven technologies – enzymes and probiotics – known to optimise gut health and maximise performance in poultry production. The synergistic combination of enzymes and probiotics in Syncra AVI helps to create a favourable nutraceutical state that supports flock health, wellness, and productivity.

Nutribiosis is the interplay between nutrition, microbiome, gut and immune function where they interact in the host.

### Pioneering the promotion of a healthy microbiome

Kemin Industries, a global ingredient manufacturer that strives to sustainably transform the quality of life every day for 80% of the world with its products and services, is celebrating two decades of Clostat, its flagship probiotic product for managing intestinal health in poultry and livestock.

[www.kemin.com](http://www.kemin.com)

Kemin's probiotic solution has pioneered the promotion of a healthy microbiome to drive intestinal resilience, manage gut health challenges, and improve animal productivity. Clostat offers a practical and comprehensive solution that supports the development of balanced gut microbiota, enhances immune function, and reduces antibiotic use – all while safeguarding animal

health, welfare, growth, and performance.

Clostat has been used by poultry producers in more than 50 countries to help achieve better feed efficiency, growth rate, and profitability since its launch in 2004.

Building on the success of Clostat, Kemin launched Enterasure in 2022, to address the changing needs of animal producers. Enterasure expands on the scientifically proven efficacy of Clostat's *Bacillus PB6* against *Clostridium perfringens* by also managing the growth of *Escherichia coli* and other Enterobacteriaceae, such as *Salmonella*. With a proprietary blend of probiotic *Bacillus* strains, Enterasure offers a comprehensive solution for managing gut health challenges and improving animal productivity.



### Meeting the demands of modern farming

Consisting of the natural and fast-growing spore-forming *Bacillus CECT 5940*, Evonik Animal Nutrition's range of Ecobiol probiotics empowers poultry producers to meet the demands of modern farming while enhancing growth, welfare, and sustainability in their operations.

[animal-nutrition.evonik.com](http://animal-nutrition.evonik.com)

Stabilising the gut flora for optimal performance and health has become one of the most critical factors for profitable and sustainable poultry production, especially in the shift towards more conscious use of antibiotics.

Many challenges result in a malfunctioning gut, which is an essential organ to ensure strong immunity, maintaining homeostasis and overall well-being. It helps provide the body with nutrients and energy, ultimately leading to high-quality meat and egg products.

Balancing the intestinal microbiota is a complex task, and stressors can make poultry more susceptible to diseases, leading to underperformance and putting their well-being at risk. Medications often disrupt the microbial balance, underscoring the need for natural alternatives like probiotics.

Whether you're integrating it into feed with Ecobiol or delivering it through water with Ecobiol Fizz, these solutions enhance microbial balance, preventing issues like diarrhoea and necrotic enteritis, which can

impact growth and lead to economic losses.

Ecobiol is a feed additive specifically designed to support gut health in poultry. It enhances microbial balance, preventing issues like diarrhoea and necrotic enteritis that can impact growth and profitability. Stable under feed manufacturing conditions, Ecobiol reduces production costs through improved feed conversion and a shorter time to slaughter. It is also compatible with other feed additives, making it easy to integrate into existing farm operations.

Ecobiol Fizz is an innovative effervescent tablet for direct application in water lines, offering a rapid and convenient way to stabilise the gut flora during critical periods when feed intake is low.

The soluble tablet ensures a homogeneous distribution of spores in the water, delivering fast effects on microbial balance, particularly during stressful periods.

Ecobiol Fizz is flexible, compatible with various water conditions and feed additives, and avoids sugar-based carriers, reducing the risk of biofilm formation in water tanks and drinking lines.

Studies consistently demonstrate the benefits of both Ecobiol and Ecobiol Fizz, such as improved feed conversion ratio, better performance in broilers, lower mortality, reduced occurrence of hock burn, and higher quality meat.





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# Getting chicks started right to maximise performance

Veterinarians, nutritionists, and growers alike all agree that the first days on a poultry farm are the most critical time for their development. Those first days on the farm mark their transition from the hatchery and eggs to the open environment.

**T. J. Gaydos, Sabrina Hurst-Proctor,  
Bill Johnson and Mike Rincker**  
DPI GLOBAL  
[www.dpiglobal.com](http://www.dpiglobal.com)

This is a difficult transition, and it is critical to give the birds the best chance to thrive in their new environment. Until this point, they are given their genetics, yolk nutrition, and immune system from the hen.

From there, it is the job of producers to capitalise on that potential by providing the chick or poult with the most opportunities for success.

The key to brooding poultry is to prioritise the basics of animal husbandry; there are no secrets to successful starts.

## ENTERING THE FARM

When poultry are placed, they leave the relative cleanliness and climate control of the hatchery and enter a farm where there is a greater opportunity to encounter pathogens and a challenging environment.

The most important husbandry technique to improve the immune status of poultry is to reduce the immunosuppressive effects of stress. Young poultry are not able to regulate their body temperature; thus, providing an environment with the correct temperature and humidity that is free of drafts is critical.

A low-ammonia environment with well-managed litter will also help the birds have a strong start. Easy access to clean water and well-manufactured feed is another area of focus to reduce stress.

The defences of the young bird to pathogens are provided by both the innate immune system and the adaptive immune system of the hen. An appropriately matched maternal vaccine programme is an important part of managing the early health of all species.

These systems are supported by vaccines



administered at the hatchery or early in the life of the bird on the farm.

From a nutrition perspective, several key factors must always be of concern when starting baby chicks properly. The nutrient package must be more than adequate for the first 10 days. Consideration of specific ingredients that are ideally suited to the young animal because of their available nutrient profile can also be given.

If accessible, animal protein sources at 3–5% in the first feed are an excellent source of essential amino acids.

The use of this highly digestible ingredient minimises the need to rely on soybean meal to provide 100% of the essential amino acids required at that age. Other alternative ingredients that are both nutrient-dense and highly digestible can be used, but consideration should be given to the quality and consistency of the nutrient profile.

## GRIND SIZE

Another very important nutrition issue is the grind size of the corn, along with pellet quality. Some preference is given to a coarser grind of the corn if the pellet quality is not ideal. If the pellet is poor, then the resulting crumble can be of poor quality as well, which results in powdery feed for the young bird and can reduce early diet intake. Once a quality feed is formulated and

manufactured, the next issue for consideration is feed availability throughout the house. Adequate supplemental feed, approximately 40g per chick should be provided either on paper or feed lids to ensure chicks can find the feed and get off to a great start.

## RESULTS VARY

While results will vary with genetics, some industry data suggests that birds consuming 1.0 lbs of feed by 13–14 days of age will indicate that they are off to a good start.

Early intake can be measured by checking crop fills. After 24 hours, more than 95% of chicks should have full crops, with 100% crop fill by 48 hours.

Turkeys have a target crop fill of greater than 80% at 8 hours. Chickens have the same target, but the earlier focus on the crop fill in turkeys speaks to the difficulty and extra care needed when starting poults.

Crop fill is not only a measure of feed availability but also of bird comfort.

The health and performance of birds can also be supported by feed and water additives that promote health, such as prebiotics, probiotics, and plant extracts. These types of additives interact with varying modes of action with the bird, pathogens, or microflora to promote health.

*Continued on page 19*



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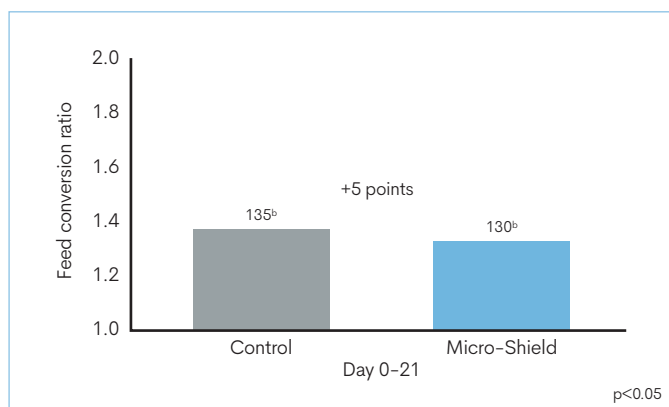


Fig.1. Feed conversion ratio.

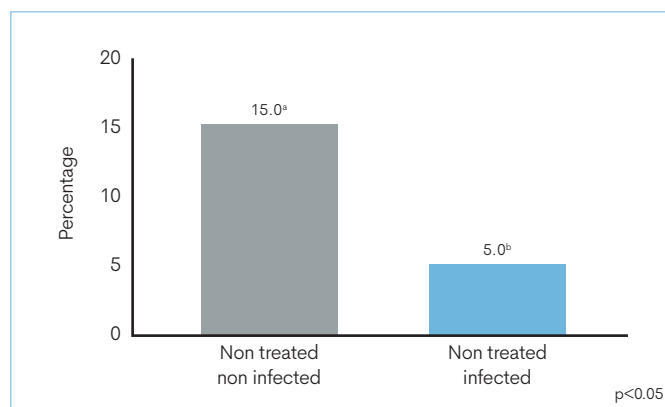


Fig.2. Necrotic enteritis mortality.

Continued from page 17

## AUGMENTATION IS KEY

The purpose of these additives is not to replace animal husbandry, biosecurity, or a well-designed vaccine programme but to augment it.

Phytogenic feed additives (PFAs) are a broad category of bioactive compounds derived from various plants that are then added to poultry diets at recommended levels to improve bird health and performance.

These PFAs are composed of various spices, fruits, herbs and other plant parts that serve as sources for the bioactive ingredients (e.g., saponins, polyphenols, flavonoids, etc.).

The interest in PFAs coincides with a growth in the production of antibiotic-free (ABF) poultry that has occurred over the last decade within the industry as nutritionists search for alternatives to antibiotic growth promoters.

Studies have shown that select saponins aid in maintaining a healthy balance in the gastrointestinal microbiota, which allows for ideal nutrient use, enhances gut health, and improves animal performance, especially during

challenges presented by pathogenic bacteria and protozoa. Polyphenols prove to be powerful antioxidants by preventing oxidative stress, resulting in improvements in both animal health and performance.

Antibiotic-free production has presented a whole new set of challenges for managers in all aspects of production.

Quite simply, the management of these flocks presents greater disease control challenges.

As a result, field treatment of birds that have broken with disease via the drinker/water medication system has become a common management practice.

Given that many of these PFAs are also available in liquid form, plant-based solutions that can be administered through the drinking lines present a rapid and effective treatment solution during health challenges or outbreaks.

Research by DPI GLOBAL, a leader in the development of phytogenic technologies since its beginning in 1965, with two of its key technologies, Micro-Shield and Micro-Aid, has consistently demonstrated a positive impact on chick performance and health during those early stages of growth.

## GASTROINTESTINAL HEALTH

Micro-Shield is an all-natural technology composed of select botanicals that are rich in saponins and polyphenols and contain antioxidant properties.

This powerful blend promotes gastrointestinal health and reduces the effect of free radicals due to a variety of stressors, especially in young chicks. Micro-Aid is a more concentrated source of bioactive saponin compounds that have been proven through extensive research to benefit the health, performance and environment of the bird.

Fig. 1 shows a positive impact on broiler feed conversion during the early stages of growth was observed when Micro-Shield was included in the diet. In more specific health challenges, Micro-Aid supplementation to the broiler diet minimised the mortality of birds due to necrotic enteritis (Fig. 2). Having everyone aligned to achieve a quality start for chicks and poults is key to maximising performance throughout the entire growth cycle.

Prioritising the basics of animal husbandry as they relate to management, nutrition, and health will get them started right! ■

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# Focus on Research

## An approach to describe salmonella serotypes of concern for outbreaks

Over 40% of all U.S. Salmonella illnesses are attributed to consumption of contaminated meat and poultry products each year. Determining which serotypes cause the most outbreak illnesses associated with specific meat and poultry types can inform prevention measures. In this study (**J. Food Prot. Vol. 87, Issue 9, September 2024, 100331 Marshall, Cui, Gleason, Hartley, Wise, Bruce, Griffin**) we developed an approach to categorise serotypes using outbreak illness burden (high, moderate, low) and trajectory (increased, stable, decreased).

We used data from 192 foodborne Salmonella outbreaks resulting in 7,077 illnesses, 1,330 hospitalizations, and 9 deaths associated with chicken, turkey, beef, or pork during 2012–2021.

We linked each meat and poultry type to 1–3 serotypes that we categorised as high outbreak illness burden and increased trajectory during 2021. Calculation and public display of outbreak illness burden and trajectory annually could facilitate the prioritisation of serotypes for prevention by federal and state health and regulatory agencies and by the meat and poultry industry.

### Quantitative metabolomic analysis of yolk granules from different poultry eggs

A systematic comparison of the nutrient composition of yolk granules from different poultry egg sources may provide a reference for the development of nutritionally balanced foods with high protein, low fat, and low cholesterol content. In this study (**Microchem. J. Vol. 206, November 2024, 111434 Zhang, Xie, Chang, Li, Huang, Harlina, Wang, Geng**) the metabolomic profiles of chicken, duck, and quail egg yolk granules were analysed quantitatively using UPLC-MS/MS.

A total of 820 metabolites were identified, with amino acids and their metabolites (2 3 2), glycerophospholipids (1 2 1), and organic acids and their derivatives (96), representing the three most abundant metabolite classes in egg yolk granules. The quantitative results demonstrated that amino acids and their metabolites, as well as glycerophospholipids (GP), exhibited significant differences among the three egg yolk granules. A total of 13 coenzymes and vitamins were identified in the three egg yolk granules, with the majority belonging to the B vitamins and their derivatives.

A total of 11 bile acids were identified in the three egg yolk granules, including four primary and seven secondary bile acids. A total of 20 significantly different metabolites were preliminarily identified

as potential markers for the differentiation of poultry egg yolk granules. This information provides crucial insights into the nutritional composition of egg yolk granules from diverse sources.

### Valorization of poultry slaughter wastes via extraction of three structural proteins (gelatin, collagen and keratin): A sustainable approach for circular economy

The burgeoning demands for protein with the increasing population is not only for its nutritive value but also for its physicochemical and functional characteristics.

To address these growing demands for protein, a rapid surge in the poultry sector occurred which resulted in the production of huge quantities of poultry slaughter wastes on a daily basis. The conventional methods of dealing with these wastes are incineration, composting, fertiliser manufacturing and bird or fish meals production, which were reported to have deleterious effects on the environment like air and water pollution, greenhouse gas emission and eutrophication.

Furthermore, the scientific community is looking for some alternatives to the mammalian sources of protein to sustain the growing world population in the face of climate change. Poultry slaughter wastes present a potential alternative which can be explored to address the above-mentioned issues. This review

# An innovative segment anything model for precision poultry monitoring

In recent years, artificial intelligence (AI) advancements have greatly influenced the agricultural industry, particularly with the emergence of large foundation models. One such model, the Segment Anything Model (SAM) developed by Meta AI Research, has revolutionised object segmentation tasks.

While SAM has demonstrated success in various agricultural applications, its potential in the poultry industry, specifically regarding cage-free hens, remains largely unexplored. This study (**Comput. Electron. Agric. Vol. 222, July 2024, 109045 Yang, Dai, Wu, Bist, Subedi, Sun, Lu, Li, Liu, Chai**) aims to evaluate SAM's zero-shot segmentation performance for chicken segmentation tasks, including part-based segmentation and the utilisation of infrared thermal images. Additionally, it investigates SAM's ability to predict weight and track chickens. The results highlight SAM's superior performance compared to SegFormer and SETR for both whole and part-based chicken segmentation. SAM demonstrated remarkable performance improvements, achieving a mean intersection of union (mIoU) of 94.8% when using the total points prompts.

Furthermore, SAM-based chicken segmentation provides valuable insights into weight prediction, as well as behaviour and movement patterns of broiler birds. These findings contribute to the understanding of SAM's potential in poultry science, paving the way for future advancements in chicken segmentation and tracking using large foundation model.

(**Trends Food Sci. Technol. Vol. 152, October 2024, 104667 Talha, Tanveer, Abid, Maan, Khan, Shair, Tanveer, Mustafa**) explains the characteristics of structural proteins (collagen, gelatin and keratin) extracted from poultry waste with respect to extraction methods. Additionally, this study elaborates the applications of extracted proteins in various industrial sectors and presents a potential approach in line with the concept of circular economy.

Key findings and conclusions: Poultry wastes are a potential source to be explored for the extraction of proteins. The proteins extracted from poultry wastes are similar or better to their bovine counterparts in terms of thermal stability, nutrition, amino acid content, physiochemical, rheological and functional properties.

## Conditions contributing to the incidence of floor eggs in commercial cage-free egg production in Australia.

Commercial laying hens have been housed in conventional caged systems in Australia for many years where they have achieved maximum production through close management of temperature, lighting, diet, waste removal, automated egg collection, and secure food safety.

However, the birds were limited in expressing natural behaviours including perching, nesting, and dust bathing. Increased public awareness of hen welfare prompted a shift in the housing type and there is now a predominance of cage-free housing including barn and free-range systems in Australia. In these houses the designated egg laying nesting areas are included in the indoor area and are designed to keep eggs clean while facilitating automatic egg collection. However, some hens choose to lay their eggs outside of the designated nesting areas. These eggs, referred to as mislaid, ground or floor eggs, cost the farming operation as they must be collected manually and are downgraded. This study (**J. of App. Poult. Res., July 2024, 100464 Ciarelli, Groves, Muir**) was an opportunistic investigation into the putative risk factors for floor eggs from 69 commercial Australian brown egg-laying flocks. Two contexts of floor egg production were evaluated: where the farmer was concerned with the level of floor eggs or, where floor eggs were  $\geq 2\%$  production at peak lay.

Flocks housed with cool white lighting or, that had experienced feather pecking, were associated with the farmer being concerned with the level of floor eggs. One strain of brown egg-layer contributed to  $\geq 2\%$  floor eggs at peak lay.

These findings can assist farmers with operational decisions to minimise the number of floor eggs.

## Development and use of Biocheck. UGent scoring system to quantify biosecurity in conventional indoor and free-range poultry farms

To assess and enhance the application of biosecurity measures in poultry farming, an objective measurement tool (Biocheck.UGent) was already available for broilers and layers. This study (**Prev. Vet. Med. Vol. 230, September 2024, 106288 Amalraj, Meirhaeghe, Caekebeke, Creve, Dufay-Lefort, Rousset, Spaans, Devesa, Tilli, Piccirillo, Zbikowski, Kovács, Chantziaras, Dewulf**) describes the development, validation and application of a risk-based weighted scoring tool for breeder, turkey, duck, free-range layer and free-range broiler production. In collaboration with an expert panel ( $n=38$ ), five different questionnaires were developed, following the format of the existing Biocheck

UGent scoring tools. Weights were attributed to external (7–9 subcategories) and internal (3–4 subcategories) biosecurity categories, as well as to the corresponding individual questions within each subcategory. The biosecurity measures were prioritised and weighed based on their relative importance in preventing disease transmission. Upon completion of the questionnaire, and upload of all answers to the Biocheck.

UGent website, the algorithm generates a biosecurity score varying between "0" which equals the total absence of any biosecurity measure up to "100" which refers to full application of all biosecurity measures.

On average, the overall biosecurity score (mean  $\pm$  std. dev) was  $78 \pm 7\%$  for breeders,  $73 \pm 11\%$  for turkeys,  $71 \pm 8\%$  for ducks,  $73 \pm 8\%$  for free-range layers and  $70 \pm 13\%$  for free-range broilers. There were significant differences ( $p < 0.05$ ) in biosecurity (both at the overall and subcategory levels) across different poultry types.

The overall farm biosecurity score for breeders was significantly higher than that for turkey ( $p < 0.001$ ) and duck production ( $p = 0.001$ ). External biosecurity levels were highest in breeders in comparison to turkeys ( $p < 0.001$ ), ducks ( $p = 0.008$ ) and broiler free-range ( $p = 0.005$ ). There was a notable difference in internal biosecurity

*Continued on page 22*



# Focus on Research

## Molecular detection of avian pathogens in poultry red mite in Algerian layer farms as a potential predictive tool

The poultry red mite *Dermanyssus gallinae* is a hematophagous ectoparasite of layer hens. Infestations with poultry red mites pose an increasing threat to the egg production industry, causing serious problems to animal health and welfare, directly or indirectly as a vector of several infectious agents. In this study (**Acta Tropica Vol. 258, October 2024, 107345 Klichha, Schiavone, Djemai, Samarelli, Aissi, Pugliese, Khoualed, Camarda**) we aimed to investigate common avian pathogens in mites.

The mite samples were collected from 58 poultry farms in 7 regions accounting for more than 70% of the national egg production in Algeria. The presence of 13 avian pathogens was detected using DNA and RNA samples from mites collected. Results revealed significant associations between PRM and potential pathogens such as *Escherichia coli*, *Salmonella enterica*, fowlpox virus, and gallid herpesvirus 1.

Pathogen detection in *Dermanyssus gallinae* could serve as an early diagnostic or a risk analysis tool for infectious diseases in poultry farms, facilitating effective disease management strategies.

Despite further research being necessary to address uncertainties, such a strategy could be used to enhance the integrated management of poultry health.

*Continued from page 21*

levels between duck and turkey ( $p = 0.041$ ) production as well. The study contributed to the poultry biosecurity database which allows benchmarking of the biosecurity levels of the users' farm results to national or international averages, indicating room for improvement and aiding to motivate stakeholders to enhance their biosecurity levels.

### Comparison of egg-shape equations using relative curvature measures of nonlinearity

A 2-dimensional (2D) egg-shape equation can be used to construct a 3D egg geometry based on the hypothesis that an egg is a solid of revolution, which helps to calculate egg volume and surface area.

The parameters in the 2D egg-shape equation are potentially valuable for providing a clue to the ecology and evolution of avian eggs. In this study (**Poult. Sci. Vol. 103, Issue 10, October 2024, 104069 Lian, He, Ratkowsky, Chen, Wang, Wang, Yao, Shi**) the 5-parameter Preston equation (PE), the 4-parameter Troschianko equation (TE), and another 2 egg-shape equations, were compared in describing real 2D egg-shape data of 300 *Gallus gallus*

domesticus eggs and additional 50 eggs that represented the variation in avian egg geometries.

Adjusted root-mean-square error was used to quantify each equation's prediction error. Given that the 4 equations are nonlinear, relative curvature measures of nonlinearity were used to assess the extent of nonlinearity in each equation.

PE was found to be the best among the 4 equations in terms of adjusted root-mean-square error and minimising nonlinearity. The empirically determined egg volumes using a graduated cylinder were compared with the predicted egg volumes using the formula for a solid of revolution based on 2D predictions from the 4 egg-shape equations.

There were negligible differences in the predicted egg volumes and surface areas among the 4 equations, indicating that these equations are all valid in calculating egg volume and surface area. In addition, we proposed a 5-parameter TE and found that it outperformed the above 4 equations in describing the 2D egg shape of *G. gallus*, but was less general than PE for other egg shapes.

This work provides statistical evidence to show which equation is the best for describing the geometry of avian eggs and nondestructively calculating their volume and surface area, helping to

classify poultry eggs into different grades according to the morphological characteristics of the eggs

### Firmicutes primarily drive odour emission profiles in poultry manure treatments

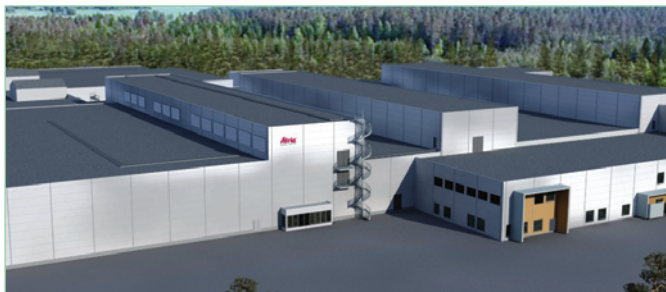
Odour emission during livestock manure treatment poses a threat to the environment and human health. However, the odour emission profiles and related factors of commonly employed poultry manure treatments have rarely been studied. Here (**Poult. Sci. Aug. 2024, 104250 Chen, Han, Xu, Cao, Chen, Jing, Peng, Wang, Liao, Wu, Wen**) we explored the odour emission profiles of three common poultry manure treatments in China, namely, ectopic fermentation beds (EFBs), annular composting troughs (ACTs) and air-drying rooms (ADRs). The results revealed that the total odour concentrations in the EFB, ACT and ADR groups were  $2407.67 \pm 512.94$ ,  $13444.00 \pm 1269.92$  and  $621.33 \pm 59.27$ , respectively. The ACT had the greatest number of odorants (31), followed by the ADR (27) and the EFB (24). Methyl mercaptan, acetic acid, acetaldehyde, hydrogen sulphide, ammonia and acrolein were the key odorous compounds detected in all the treatments. ACT contained the greatest number of key odorants (11) and exhibited an extensive co-occurrence relationship with the bacterial community.

The three poultry manure treatments exhibited significant differences in the beta diversities of the bacterial community. The phylum of most bacteria associated with key odorants was Firmicutes, and *Enterococcus* and *Oceanobacillus* were significantly positively correlated with methyl mercaptan. The bacterial functional groups were enriched in carbohydrate metabolism, amino acid metabolism and energy metabolism, and the functional genes shaped the odour emission patterns in the poultry manure treatments.

Redundancy analysis demonstrated that odour emission in the three treatments was positively correlated with Firmicutes abundance, pH, electrical conductivity and moisture. Thus, our study provides a good understanding of odour emission profiles in poultry manure treatments and data for precise odour emission control during livestock production.

Research is reprinted with permission of Elsevier.

# International News



**Atria** - one of the leading food companies in northern Europe - will build a new €155 million production facility in Finland. NIRAS has assisted in creating the masterplan for the project and has also been involved in the process part of the conceptual design and digital simulation reviewing of the new plant. Atria is one of the biggest poultry companies in Finland, and their new €155 million processing plant facility represents one of the largest investments in the Finnish poultry industry. In 2019, Atria decided to make a strategic overhaul of its production capacity to adjust to the increasing demands of the growing poultry market. The company contracted NIRAS to assist in developing a masterplan for the new facility. NIRAS' expert was involved in developing process layouts and carried out analysis of cost estimate (CAPEX) and investigated different options for the new plant. Atria opted for a greenfield solution at the company's existing site in Nurmo in Western Finland.

[atria.com](http://atria.com)

## Optimise the value of your birds



A broiler can be divided in many ways. There are more than 100 options for dividing a broiler. Every part of a broiler has a different value in the market. In addition, the value of a part of the broiler also partly depends on its weight.

This makes it virtually impossible for a slaughterhouse to decide which dividing method is most profitable for a broiler of a certain weight. To this end, PoultryPlan has developed the OptiValue solution.

### Efficient planning

OptiValue assists the planner in the slaughterhouse in selecting the optimal method for dividing broilers to maximise their value. One of the key benefits of OptiValue is that it assists planners in selecting the optimal method for dividing broilers to maximise their value.

### Maximising profits

OptiValue is a powerful tool that offers a range of benefits to slaughterhouses, including the ability to maximise the value between live birds and end products. OptiValue can quickly calculate the optimal method for dividing broilers based on a range

of factors, such as weight, quality, and market demand. This allows slaughterhouse planners to make informed decisions that maximise the value of their broilers.

### Saving time

OptiValue can help slaughterhouse planners save time by automating the process of calculating the optimal method for dividing broilers to generate the maximum value.

This can be a time-consuming and complex task, but with OptiValue, it can be done quickly and accurately.

[poultryplan.com](http://poultryplan.com)

## Animal ag educator honoured



Novus representatives recently presented the 2024 Novus Outstanding Teaching Award to Michael D. Cressman, Ph.D., of The Ohio State University during the Poultry Science Association (PSA) Annual Meeting in Kentucky.

Dr. Cressman is a Professional Practice Associate Professor in the Department of Animal Sciences at Ohio State University (OSU), where his appointment has him spend 75% of his time teaching

## Orego-Stim gains EU organic approval



Orego-Stim Gains EU Organic Approval Orego-Stim Plus has been approved for use in organic livestock production by the Research Institute of Organic Agriculture, FiBL Germany, and Demeter International.

Satisfying the rigorous certification process to ensure compliance with EU regulations, the complementary feedstuff is now available for organic producers to help support optimal production. Organic Farmers & Growers and FiBL in Switzerland and Austria already approve other products in the Orego-Stim range for use in all livestock species.

"Organic production across Europe continues to grow at 5-8% per year and is fast approaching half a million organic producers.

Demand for natural products like Orego-Stim to help support optimal production within organic systems continues to

rise, so we are delighted to confirm this new certification for our flagship product, which celebrates its 25th anniversary this year." Corporate Development Director Sarah Osborne told International Pig Topics

"The Orego-Stim range is renowned for its high quality and unrivalled consistency and has been demonstrated around the world to support animal health and production by promoting optimum gut health in food-producing animals.

"With so many challenges on production and so few feed

additives approved for use in organic systems, Orego-Stim Plus is a product that can add value to organic farming operations," adds Sarah. Orego-Stim is an oregano essential oil-based product that works in the

gastrointestinal tract to support animal health, leading to more productive and hence more profitable livestock production.

[anpario.com](http://anpario.com)



and 25% on OSU Extension responsibilities. He is also responsible for undergraduate student advice, co-curricular team coaching (poultry judging), undergraduate and graduate student research advising in applied poultry and meat science, and poultry youth program development in collaboration with FFA, 4-H, and Ohio State Extension faculty and staff members.

Heavily embedded in student development, Cressman has held his current position since 2015 and has gained valuable insight he puts into practice in the classroom.

PSA is a professional organisation consisting of educators, scientists, extension specialists, industry researchers, administrators, producers, and college students who are committed to advancing the poultry industry.

Founded in 1908, PSA's member scientists have contributed through their research to the

development of safer and more nutritious food products.

Novus provides solutions for the animal agriculture industry around the world.

The company's portfolio includes trace minerals, nutritional enzymes, feed digestibility and meat quality solutions, and methionine supplementation products, along with a network of experts globally who guide management best practices.

[novusint.com](http://novusint.com)





# International News



APF Holdings invests EUR 4 million in Big Dutchman equipment. A remarkable story of success began in Soviet Latvia more than sixty years ago: in 1961, Alūksnes Poultry Farm was founded. Today, the company operates under the name APF Holdings (APF) and is one of the largest egg producers in the Baltic region – and on target for more growth. To this end, the Latvian holding recently signed a contract worth EUR 4 million with Big Dutchman. The German poultry equipment supplier will provide innovative technology for two new aviary houses for barn egg production in Alūksne, located near the border of Estonia. "We have chosen, in our opinion, the world's best and most modern egg production equipment supplier," Jurijs Adamovičs, founder and chairman of the board of APF told International Poultry Production, explaining the decision in favour of Big Dutchman.

[bigdutchman.com](http://bigdutchman.com)

## International Mini Ads



### New feed additives website



Volac has launched a new website for its Feed Additives division, which highlights the company's expert technical support services and range of evidence-based products designed to improve the efficiency and sustainability of livestock production systems around the globe.

"With core competencies in microbiology, biochemistry, enzymology and immunology, we provide valuable scientific solutions for mycotoxin risk management and some exciting new phytochemical and nutraceutical products.

These global market offerings support good animal health, resilience and productivity in both



## Unlocking the next generation of genetics



Cobb-Vantress, LLC ("Cobb") is excited to unveil the 2024 grant recipients for the Cobb Research Initiative (CRI). These new grant recipients join the original nine recipients from the 2023 CRI funding.

The Cobb Research Initiative (CRI) aims to advance poultry genetics by fostering collaborations across diverse scientific research fields.

These partnerships will help Cobb control and prevent poultry diseases, improve animal health and welfare outcomes, reduce production costs, and enhance product quality while advancing sustainability needs.

"We received many high-quality research proposals from scientists around the world," said Dr. William Herring, Vice President of Research and Development at Cobb. "Nearly half of the submissions were from international institutions, underscoring that the research community globally wants to partner with Cobb.

We also saw that the research community is very aware of Cobb's commitment to leveraging cutting-edge technology, as more than one-quarter of the submissions

centred around artificial intelligence (AI) and precision farming."

With a focus on progressing food security, safety, sustainability and efficiency, the CRI's goal is to benefit the global poultry supply chain and ultimately, consumers. Partnerships with researchers from a variety of fields, even beyond poultry, are vital to gain fresh insights and be able to discover and develop new tools that can be used across the industry, including genetic development.

Joyce J. Lee, President of Cobb, stated, "As a pioneering genetics company, Cobb stands at the vanguard of the convergence of science, technology, and animal health.

Our ongoing funding serves as a testament to Cobb's unwavering commitment to genetic advancement, underscored by our acute awareness that the global appetite for healthy, sustainable and affordable protein is on the rise.

To propel genetic progress and tackle pressing challenges in the chicken industry worldwide, we must harness cutting-edge research, innovative technology, and data-driven insights."

[cobbgenetics.com](http://cobbgenetics.com)

the ruminant and monogastric sectors, ultimately bringing improved profitability and sustainability to the international feed industry," Rebecca O'Sullivan, Volac product manager for Feed Additives told International Poultry Production.

[volac.com](http://volac.com)

### Poultry industry innovation in safety & health award



The Joint Poultry Industry Safety & Health Council is currently accepting applications for the Frank Cruice Innovation in Safety & Health Award.

The award is named in honour of Frank Cruice, formally of Perdue Farms, who was an active member

of the Joint Poultry Safety & Health Council for more than 20 years. In addition, Cruice led the industry safety award committee serving as Council Chair from 2019-21.

The program is open to National Chicken Council (NCC), National Turkey Federation (NTF), and U.S. Poultry & Egg Association (USPOULTRY) members and is intended for poultry and egg industry members that have made a significant advancement in operational excellence in a safety and/or health innovation.

Award applications are open for several industry categories, including Poultry Processing (NAICS 311615), Poultry & Egg Production (NAICS 1123), Animal Feed Manufacturing (NAICS 311119), Animal Support Services (NAICS 115210), and Rendering (NAICS 311613).

[uspoultry.org](http://uspoultry.org)

## Approval for mycotoxin degrading ingredient



dsm-firmenich  
Animal Nutrition and  
Health – a global

science-based company focused on nutrition, health and sustainable living – announced the Canadian Food Inspection Agency (CFIA) approval of a novel enzyme, fumonisin esterase, to help swine and poultry producers manage mycotoxins in feed.

dsm-firmenich will offer a new product that includes the fumonisin esterase called Mycofix FUMzyme for use in swine and poultry diets in Canada. More information will be available in the coming weeks.

"Fumonisin esterase is for the degradation of fumonisins present in swine and poultry feed. This approval expands dsm-firmenich's commitment to innovation in mycotoxin risk management."

Paige Gott, PhD, dsm-firmenich Strategic Product Manager told International Poultry Production.

"This will be the first product ever to be approved for degrading fumonisins in feed in the Canadian market," continued Gott.

"Mycotoxins can have various negative effects on swine and poultry production. Fumonisins are the second most prevalent group of mycotoxins worldwide.

Fumonisins are commonly found in livestock diets in North America and can interact with other mycotoxins and have synergistic effects that impair the health and productivity of livestock and poultry.

They are of increasing importance with more frequent extreme weather events in the region."

[dsm.com](http://dsm.com)

## USDA Proposes New Policy



The U.S. Department of Agriculture's (USDA) Food Safety and Inspection Service (FSIS) today issued a comprehensive proposed rule and determination to more effectively reduce Salmonella contamination and illnesses associated with raw poultry products.

This is the culmination of FSIS' three-year effort to reevaluate their strategy for controlling Salmonella rates in poultry and protecting American consumers from foodborne illnesses linked to the consumption of poultry products.

Food is the leading source of Salmonella infections, and poultry is among the leading sources of foodborne Salmonella illnesses. F

FSIS estimates that there are 125,000 chicken-associated and almost 43,000 turkey-associated foodborne Salmonella illnesses per year. Despite FSIS data indicating that Salmonella contamination in poultry products has been decreasing, there has not been an observed reduction in Salmonella illnesses.

The proposal would establish final product standards to prevent raw chicken carcasses, chicken

parts, ground chicken, and ground turkey products that contain any type of Salmonella at or above 10 colony-forming units (CFU) per gram/ml and any detectable level of at least one of the Salmonella serotypes of public health significance from entering commerce.

The proposed Salmonella serotypes of public health significance identified for raw chicken carcasses, chicken parts, and comminuted chicken are Enteritidis, Typhimurium and for raw comminuted turkey are Hadar, Typhimurium, and Muenchen.

The proposal would also require poultry establishments to develop a microbial monitoring program to prevent pathogen contamination throughout the slaughter system.

[usda.gov](http://usda.gov)

## Smart farm management system



After the successful launch of iHotraco Farm Data – for automatic farm data collection and safe data sharing – Hotraco now introduces iHotraco Farm Manager.

With this smart farm management system, you can view all your barns in real-time and



## Celebrating excellence in breeder management



Aviagen customers in the UK have once again showcased their dedication and expertise in flock management, optimising the genetic potential of Ross 308 breeders.

The annual UK Flock Awards, held in Hertfordshire, recognised the top performers.

Attendees representing the complete UK breeder sector enjoyed networking and sharing innovative ideas while celebrating their remarkable accomplishments at the annual event. Guests at Ross UK Flock Awards top honours and achievements

The evening featured the presentation of 30 breeder awards, including the prestigious Top Flock Award earned by P.D. Hook. Notably, P.D. Hook won this award for the second consecutive year.

Stuart Thomson, Head of Aviagen UK Sales and Technical,

highlighted the exceptional performance of the flocks:

"Our awarded flocks highlighted outstanding results, showing the rest of the industry what is possible. These flocks achieved on average 166.4 chicks per hen housed (chicks/hh), which is 13.8 chicks ahead of the UK average; it also puts these 10 flocks an impressive 4.2 chicks ahead of the UK Top Quartile."

- Average UK performance: 152.6 chicks, surpassing the performance objective of 145.4 chicks.

- 190 out of 231 evaluated flocks for the awards exceeded 150 chicks.

- 57 flocks reached over 160 chicks.

- The top flock achieved a remarkable 174.2 chicks – the only flock of more than 170 chicks/hh.

- Commitment to welfare and sustainability

[Aviagen.com](http://Aviagen.com)

simultaneously on a single dashboard, with easy benchmarking to industry standards (i.e. genetic curves) or between barns and farms themselves.

iHotraco Farm Manager enables you to control your production more efficiently and benefit from better results, every single day.

Key benefits:

- 24/7 real-time farm performance insights

- Advanced data analysis and visualisation in one clear and concise dashboard

- Monitor and React

- Early warning system

- Control multiple barns and farms at once, anywhere and anytime.

- User logs through the controller

[hotraco-agri.com](http://hotraco-agri.com)





# International News

## Egg labelling requirements amended



Producers and packers will no longer need to change how eggs are labelled during mandatory bird flu housing measures.

Egg producers and packers will no longer need to change how eggs are labelled during an outbreak of avian influenza under measures recently announced.

Currently, when mandatory housing measures are introduced to protect birds from the spread of disease, eggs from free-range birds can only continue to be labelled as 'free-range' for 16 weeks after the housing order has come into effect – the existing 'derogation' period under the Egg Marketing Standards Regulations. After that period, these eggs must then be labelled as barn eggs.



In both 2021–22 and 2022–3, the 16-week derogation period was exceeded by six and seven weeks, respectively, which led to significant costs for the industry as egg packaging had to be changed to comply with legislation.

The amendments to existing legislation, which will be introduced through a Statutory Instrument later this year, will mean that free-range eggs can continue to be labelled as such throughout mandatory housing measures.

[gov.uk](https://www.gov.uk)

## Alternatives to AGP



In the effort to minimise the risk of antibiotic resistance, actions to reduce and eliminate the use of antibiotic growth promoters (AGP) in the livestock industry are increasing.

However, such movements have induced significant economic loss for producers and increased usage of antibiotics for treatments. The demand for alternatives to AGP is ever strong – for a new



## Positive effects of yeast cell wall extract



Alltech announced a new study highlights the significant positive effects of yeast cell wall extract supplementation on layer performance during mycotoxin challenges, this week.

Published in the journal *Toxins*, "Meta-Analysis of the Effects of Yeast Cell Wall Extract (YCWE) supplementation during Mycotoxin Challenges on the Performance of Laying Hens" demonstrated that the inclusion of yeast cell wall extract, Mycosorb, supplementation during mycotoxin challenges results in an increase in layers' body weight by 12.5g, and a substantial increase in egg production and egg weight by 4.2% and 1.37g, respectively.

The meta-analysis showed that layers fed mycotoxins experienced lower body weight (by 50g), decreased egg production (by 6.3 percentage points), and reduced egg weight (by 1.95g) compared to control-fed birds. Economic analysis suggested that the inclusion of YCWE not only supported performance but could also result in a positive return on investment. Based on results from the meta-analysis, production

and profitability calculations were made, resulting in:

- +2.7 eggs per hen housed (HH) over 9.5 weeks
- +29.7g edible protein output per HH
- 4.65:1 ROI

The meta-analysis assessed a total of 25 trials and the data was extracted from eight trials that met the inclusion criteria. These trials represented a total of 12 treatments and involved 1,774 laying hens.

The meta-analysis confirms that mycotoxin presence had an impact on body weight, egg production and egg weight and the role of YCWE mitigated the effects on egg production and quality, even at high mycotoxin levels.

Therefore, the use of YCWE could contribute to increased edible protein output and increased farm economics during mycotoxin challenges.

Overall, the meta-analysis underscores the importance of addressing mycotoxin challenges in layer production and highlights the potential role of YCWE in minimising these effects and enhancing profitability.

[alltech.com](https://www.alltech.com)

## EVENT DIARY

### 2024

#### VIV Africa

2–3rd October

Kigali, Rwanda

[www.poultryafricaevent.com](https://www.poultryafricaevent.com)

#### IFRG Meeting 2024

3–4th October

Antalya, Turkey

[www.ifrg.be](https://www.ifrg.be)

#### Eurotier

12–15th November

Hanover, Germany

[www.eurotier.com](https://www.eurotier.com)

### 2025

#### IPPE

28–30th Jan 2025

Atlanta, Georgia USA

[www.ippexpo.org](https://www.ippexpo.org)

#### VIV ASIA

12–14th March

Bangkok, Thailand

[www.vivasia.nl](https://www.vivasia.nl)

#### Turkey Science and Production Conference (TSPC)

18–20th March 2025

Cheshire, UK

[tspc-turkeys.com](https://tspc-turkeys.com)

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