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DIGITAL.

October 2016

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How to Put Your Poultry on an Organic Diet

How Science is Supercharging Poultry Feed

Aaron Cowieson
Interview: Improving Feed to Build a Better Bird



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Welcome.Editors Note

ThePoultrySite
Digital

October 2016



Welcome to the October issue of *The Poultry Site Digital*. In this issue you can find out more about feeding and nutrition – one of the most important aspects of raising poultry to get right if you're looking for a healthy, productive flock.

Alice Mitchell

Editor
The Poultry Site



Our first feature looks at the importance of gut health to poultry productivity and profitability. There are a number of different feed additives that poultry producers can use to improve gut health, but how can you ensure you are buying a good-quality product? Glenneis Kriel discussed this issue with two feed experts.

Also featured in this issue are two interviews with experts in animal nutrition. Award-winning scientist Professor Aaron Cowieson shares his insights on the use of enzymes in poultry feed to aid digestion. Later in the magazine you can hear from Professor Robert Blair, author of *A Practical Guide to the Feeding of Organic Farm Animals*, who told us about the particular challenges and benefits of feeding organic poultry.

Finally, we have an article from Chris McCullough on the latest poultry feed research featured at the 67th European Federation of Animal Science conference, including a look at improving digestion of alternatives to soy protein in feed.

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Contact

For Editorial Enquiries:

Alice Mitchell

ThePoultrySite.com Editor
newsdesk@5mpublishing.com
Tel: +44 (0) 114 24 64 799

For Sales & Advertising Enquiries:

Digory Holmes

Digital Sales Executive
digory.holmes@5mpublishing.com
Tel: +44 (0) 114 24 64 799

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The secret to a healthy flock? Go with your gut...

Growing international concern over antimicrobial resistance is forcing poultry producers across the world to look at new ways of maintaining production levels and keeping birds healthy. Glennis Kriel heard from two feed and nutrition experts about the importance of good gut health.

Antimicrobial growth promoters have been used for more than 60 years to boost animal growth and feed efficiency in many countries. It is thought that most of these benefits come from suppression of the population of microbes in the gut, as these tiny creatures can compete for nutrients with their hosts as well as causing disease. Rising fears about drug-resistant diseases are, however, resulting in widespread bans on using the antimicrobial drugs for growth promotion. But prohibiting these products comes at a price.

At the AFMA Forum held at Sun City in South Africa earlier this year, Kostas Mountzouris, Associate Professor of Animal Nutrition and Biotechnology at the Agricultural University of Athens, estimated that the removal of antimicrobial growth promoters on a farm can result in a two to eight per cent decline in a bird's daily weight gain and a one to five per cent decline in the feed conversion, depending on production conditions on the farm. Since they were banned in Europe in 2006, there has also been an increased incidence of microbial imbalances (dysbiosis) and diseases such as necrotic enteritis.



Dr Charles Gilfillan says gut health is vital for converting high-cost nutrients into eggs and meat.

Dr Charles Gilfillan, health and feed safety technical manager at Kemin in South Africa, says that one of the reasons antimicrobials produce such great production results is that it helps to keep the growth of pathogenic bacteria in the birds' guts in check. Strategies to alleviate the impact of the removal of antimicrobial growth promoters, should therefore centre on ways to promote good gut health in animals.

Good gut health has been called the "Holy Grail" when it comes to the maintenance of poultry growth, health and welfare. An imbalance in gut microbiota will have a negative impact on nutrient digestion and absorption, which in turn will affect bird health and performance.

"Modern broilers and layers are placed under immense pressure to produce as much meat and eggs as possible, in the shortest possible time and with as little feed as possible," explains Dr Gilfillan.

"Broilers are expected to grow from 40g at a day old to 1.8kg or 2kg at slaughter in only

four to five weeks. Layer hens are expected to produce around 300 eggs in a 60-week layer cycle. Such levels of production are only possible if a bird is able to optimally digest, absorb and use the nutrients it is fed. Gut health is vital for converting high-cost nutrients into eggs and meat."

Good farming practices

Poor gut health on the other hand will result in birds not using their feed properly, with symptoms including poor feed conversion, diminished growth and egg production as well as diarrhoea, which in turn may lead to wet litter and a decrease in the general health of birds leading to increased morbidity and mortality.

"Poor gut health ultimately results in higher production costs by causing birds to eat more food without producing more meat or eggs," says Dr Gilfillan.

The balance of the microbiota in the gut can be affected by external factors, such as:

- Infections of the intestine of viral, bacterial or parasitic origin.
- Quality of the feed, which includes the digestibility of the feed and the presence of moulds and mycotoxins.
- Water quality, which includes the pH value of the water, its hardness and its microbiological load.
- The temperature and humidity of the environment.

Fortunately, most of these conditions can be prevented through sound farming practices.

Many infections, for example, can be avoided by following sound biosecurity measures and having a vaccination protocol tailored to the specific requirements of the farm. The quality of feed and water should be tested and monitored and sound sanitation practices should be used to prevent feed or water from becoming contaminated. Environmental stress can be reduced through climate control and by using lower stocking densities.

Pre and probiotics

Producers might also look into using feed additives, such as probiotics and prebiotics, to enhance gut health. Probiotics, explains Dr Gilfillan, are live microbial organisms that are fed to a bird to enrich the populations of microbes found in its intestine: "Enhancing the natural microflora of the gut, will naturally keep the growth of pathogenic bacteria in check. This in turn will maintain the health of

"Many infections can be avoided by following sound biosecurity measures and having a vaccination protocol tailored to the specific requirements of the farm."

the intestine which will ensure that the bird is able to optimally use nutrients in its feed. This will ensure the bird performs close to its genetic potential."

Examples of probiotics include *Bacillus subtilis* PB6 and *Lactobacillus* as well as certain yeasts and moulds, such as *Saccharomyces boulardii* or *Aspergillus oryzae*.

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Professor Mountzouris explained at the AFMA Forum that there were a few mechanisms through which probiotics help to enhance gut health. One way is by colonising the intestine of the bird, which in effect prevents pathogen adhesion to the intestine's mucus membrane. Probiotics can also work by preventing pathogen growth through the production of volatile fatty acids dynamics or competing with the pathogens for nutrients. By repressing pathogens, they also helped to improve the birds' immunity.

Prebiotics, the other strategy Dr Gilfillan suggests farmers might consider, are fibres that are not digested by the bird, but can be used as an energy source by bacteria in its gut.

"Prebiotics are added to enhance the growth of beneficial bacteria including probiotics in favour of pathogenic bacteria," explains Dr Gilfillan, "thus enhancing the ability of the natural intestinal microflora to keep the growth of pathogenic bacteria in check." He adds that 'synbiotics' – a new buzz word in antimicro-

bial feed additives – simply refers to a combination of both pre- and probiotics.

Choosing a product

There are an abundance of products containing live bacteria and yeast that can be fed as probiotics to poultry as well as numerous products containing indigestible fibres like mannan- and fructo-oligosaccharides that are used as prebiotics in poultry feed. But how can you ensure you are buying a good-quality product?

Dr Gilfillan's advice to farmers is to ask probiotic and prebiotic manufacturers or vendors for proof that the products work: "The company needs to be able to back up the claims made about products with scientific data. The farmer shouldn't buy a product if there is not data."

"The data should be in the form of peer-reviewed articles that have been published in internationally recognised scientific journals," he continues, "or the company should be able to present the farmers with data from well-designed trials that clearly show the benefit of using the product. If the farmer has problems with interpreting the data, then they need to get assistance from a vet or animal nutritionist specialising in poultry production."

Quantifying the value of the savings that biotics can bring to a farm is very difficult. "No two farms will receive the same benefit from using biotics," says Dr Gilfillan, "as the management will differ from farm to farm, as will the feed used. But if used correctly the use of pre and probiotics should improve feed conversion ratio and improve the health of the birds, which will result in a monetary saving for the farmer." ■



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Aaron Cowieson Interview: Improving Feed to Build a Better Bird

Professor Aaron Cowieson, principal scientist for DSM Nutritional Products, has recently received the Poultry Nutrition Research Award for his sustained contribution to poultry nutrition. Since 2003, he has published more than 200 scientific articles of which over 100 were full peer-reviewed manuscripts that appeared in international journals. Glenneis Kriel talks to Prof Cowieson about the relevance of his work for poultry and pork production.

Professor Cowieson, the American Feed Industry Association and the Poultry Science Association have recently presented you with the Poultry Nutrition Research Award for your continued contribution to poultry nutrition. Tell us a little more about your work and your job?

Most of my articles deal with aspects of non-ruminant nutrition, with a strong emphasis on exogenous enzymes and the effect of

these on nutrition and health. I am currently employed by DSM Nutritional Products as Principal Scientist in Animal Nutrition and Health R&D. I am also retained by the University of Sydney, Australia as an Adjunct Professor of Poultry Nutrition.

With feed conversion ratios running closer to one on one in poultry production, do you think there is still room to improve poultry nutrition?

If you consider feed conversion ratio on a dry-matter basis – how many grams of dry matter are consumed for each gram of dry matter gained – then we are still looking at somewhere in the region of between three and four kilograms of feed for every one kilogram of meat produced. So there still is considerable room for continued improvement.

Even when you assess performance on a more conventional level, there are still huge challenges to maintain sustainability economically, environmentally and socially. For example, the widespread rapid removal of prophylactic antibiotics brings all kinds of new challenges for nutritionists, husbandry and health professionals. From a nutrition perspective we are also still developing knowledge on amino acid requirements, energy, digestibility of key minerals, such as calcium and phosphorus, strategic vitamin use and many other areas. There is a lot still to be learned!

On your profile page on the University of Sydney's website, you have described your most significant contribution to poultry nutrition as having "shed light on the complex interaction between dietary phytate and the digestive system of poultry". Please tell us more about phytate and its function as an anti-nutrient?

"The problem with phytate is that it carries a very strong negative charge and so interacts with positively charged nutrients in the intestine, such as calcium, lysine, zinc and iron. This interaction reduces digestibility of these nutrients and causes other nutritional problems."

Phytate is the storage form of phosphorus in seeds and is typically present at concentrations of around one per cent, though this varies a lot. As poultry diets are comprised mainly of cereals, oilseed meals and grain legumes, we find phytate in the diet at concentrations from perhaps 0.5 to 2.0 per cent.

The problem with phytate is that it carries a very strong negative charge and so interacts with positively charged nutrients in the intestine, such as calcium, lysine, zinc and iron. This interaction reduces digestibility of these nutrients and causes other nutritional problems.

Much of your research centres on the use of microbially-expressed enzymes in poultry nutrition. What exactly are microbially-expressed enzymes?

Enzymes are a fascinating area. At a fundamental level enzymes, at least the ones we add to poultry diets, are simply designed to make big compounds smaller, be those proteins, carbohydrates or lipids. The bird is only capable of digesting around 90 to 95

"Phytases are used to improve the digestibility of phosphorus from plant material and this reduces the need for the supplementation of poultry diets with inorganic phosphate."



per cent of the starch in a diet, perhaps 30 to 50 per cent of the calcium and phosphorus, around 80 to 85 per cent of the protein and around 90 to 95 per cent of the lipid. The judicious use of exogenous enzymes helps to improve the digestibility of these compounds.

The enzymes are simply added to the feed, often as granules, but sometimes as liquid, and they assist birds or pigs to extract more nutrients from the diet. It really is a huge success story and has made a massive contribution to the sustainability of our industry. Prime examples include xylanases and glucanases, amylase, phytase, protease and mannanase, but there are others.

So your research is applicable to poultry and pork nutrition?

In many ways yes, and clearly there are common themes, but there are also important differences, such as fore-gut physiology, net energy, microbiota, pathologies and so on that need to be carefully considered. I would say that we can extrapolate from one to the other to provide some context for new areas of exploration.

But validation, eventually, has to be done not only in the target species but also at the appropriate age and under the appropriate husbandry conditions.

According to your profile page, the global feed enzyme industry is worth about AUD 800 million per year (around USD 610 million or GBP 470 million) and it saves the monogastric feed industry in the region of AUD 2 to 3 billion. How does it manage to do so?

Phytases are used to improve the digestibility of phosphorus from plant material and this reduces the need for the supplementation of poultry diets with inorganic phosphate. This not only produces a big financial saving, but it also reduces phosphorus excretion and so has a very significant environmental benefit. Protease on the other hand enhances the digestibility of dietary protein, reducing diet cost.

These enzymes often have beneficial effects that extend beyond diet-cost reduction, by for example enhancing gut integrity or improving litter quality.

How do you link enzymes with anti-nutrients?

Enzymes, in some respects, are anti-nutrients in that they can enhance the digestibility of key dietary nutrients such as fat, amino acids, energy, phosphorus and starch. But they can also reduce the negative impact of anti-nutrients such as phytate or soluble fibre.

What projects are you currently busy with?

I continue to work on new enzyme candidates across a wide range of areas and in that regard work very closely with scientists in our excellent alliance partner Novozymes. I also spend a lot of time working to better understand our existing enzymes so that we

"It is extremely important that scientists continue to work on rapid tests to evaluate ingredient quality in order to strategically deploy feed additives such as enzymes."

can deliver greater value to our customers. To that end I travel extensively to visit customers in all our global regions, so I can understand their challenges and what opportunities we have to work together to best effect.

You have also done a lot of research on the digestibility and differences in feeding values of specific crops. What influences the nutritional qualities of a crop?

Variance in the digestibility of key nutrients is a major challenge of animal production. Sources of variance in, for example, energy digestibility in corn or wheat, include regional effects, seasonal or annual effects, harvesting, fertiliser use, post-harvest processing and many other factors. It is extremely important that scientists continue to work on rapid tests to evaluate ingredient quality in order to strategically deploy feed additives such as enzymes.

Where does your interest in poultry nutrition come from?

I suspect that most poultry nutritionists end up in this career somewhat accidentally, and I've certainly never met any other poultry nutritionists or poultry scientists who had aspirations in that direction from early childhood!

For me, I 'migrated' into poultry science slowly over some years throughout my undergraduate and postgraduate education.

It was not until the second year of my PhD (around 1999 to 2000) that I developed a genuine passion for this subject and a curiosity that has only grown stronger over time.

I can thank several individuals for passing on their passion to me, for example Dr Tom Acamovic (who sadly passed away at a young age) who was my PhD advisor and many others that I have had the pleasure to work with over the years.

Would you recommend this field of study to others?

I absolutely would. I thoroughly enjoy my job. It is a fascinating mix of research, application, technical support and marketing and I have the privilege to work with many exceptional people all around the world.

The animal nutrition industry is relatively small (you see many familiar faces at annual conferences) but it is friendly and, importantly, growing rapidly, so there is a very bright future ahead! ■

For more information visit prof Aaron Cowieson's profile page at <http://sydney.edu.au/research/opportunities/supervisors/1033>

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How Science is Supercharging Poultry Feed

With the world's population estimated to reach 9 billion by 2050, how will global agriculture keep up with demand? Science may have the answer, writes Chris McCullough.

Hundreds of international delegates gathered in Belfast this summer for the 67th European Federation of Animal Science conference. Over five days, from 29 August to 2 September, experts delivered a total of 1,000 papers on various topics concerning the feeding and production of animals, including poultry.

Among the speakers was EU Agriculture Commissioner Phil Hogan, who told the delegates that the agricultural sector “must become smarter, leaner and cleaner” in the future.

He highlighted that agricultural research had become a low priority. The Commissioner said: “Concerns over commodity prices, food security and climate change have emphasised how vital it is to invest in agricultural research and innovation.



EU Agriculture Commissioner Phil Hogan said agriculture must become "smarter, leaner and cleaner"

"To meet these challenges head-on, we will require more knowledge, and better knowledge."

One stand-out example of such knowledge being put to good use was provided by the European research project ECO-FCE, which hosted a one-day symposium on the biology of feed use efficiency in the pig and broiler chicken industries.

Since its launch in 2013 the ECO-FCE project has been investigating ways to make feed use in the pig and broiler chicken industries more efficient. The group's goal is to more fully understand the biological basis of feed efficiency – and to improve it using both nutritional and genetic techniques.



Limiting phosphorous intake to help the environment

One of the experts at the ECO-FCE symposium, Dr Maria Francesch from the IRTA research institute in Catalonia, spoke about her investigation into phosphorous feeding strategies to improve lifetime performance in broiler chickens.

Phosphorous is an essential nutrient for all animals, and most of it in broiler diets comes from inorganic phosphates, a relatively scarce and non-renewable natural resource that has to be mined from phosphate-rich rocks. The excess of phosphorous in poultry manure is also a threat for the environment, as it can cause eutrophication – the process

by which nutrients leach into water courses and trigger runaway growth of algae.

So how do you increase the efficiency of phosphorous digestion and reduce its excretion, without having a negative impact on broiler productivity and welfare?

Some studies show that broiler chickens are able to adapt to nutrient deficiencies early in life. In experiments, young birds that had been deprived of nutrients were able to compensate with an increased efficiency of nutrient absorption in their intestines. Dr Francesch and her colleagues decided to find out whether they could take advantage of this effect to improve phosphorous nutrition.

The team set up tests looking at 600 one-day old male broiler chickens housed in 24 pens that were fed a phosphorous-controlled diet during the first week of life.

Although not conclusive, their results suggested a positive effect of limiting phosphorous intake during the first week of life on performance and bone health of broiler chickens.

However, Dr Francesch said more research is required to understand the mechanisms behind this effect, to define the phosphorous-restriction period in terms of optimum length and intake, and to confirm that bird health and performance can be maintained.

Improving digestion of alternatives to soy

Elizabeth Ball, from Northern Ireland's Agri-Food and Biosciences Institute, explained her studies into how alternative-protein feed ingredients for poultry affect birds' performance.

The main source of protein in broiler diets



Elizabeth Ball, from Northern Ireland's Agri-Food and Biosciences Institute

is soybean meal. However, due to environmental and economic pressures, alternative protein sources, such as rapeseed meal and dried distillers' grains have been investigated.

These ingredients have been shown to reduce performance but it was not previously known if supplementing them with enzymes would improve performance.

The aim of Dr Ball's trial was to examine the effect of adding enzymes (phytase and protease) to broiler diets containing rapeseed meal and dried distillers' grains, with lower levels of phosphorus, calcium and available amino acids than standard diets. These enzymes are sometimes added to poultry feeds to improve digestion.

But Dr Ball's results from these trials did not match expectations, as the diets with lower nutrient levels did not have a detrimental effect on the broilers and enzyme addition did

"The inconsistent effect of phytase on the feed conversion rate is difficult to explain, but the non-significant effect throughout the overall experimental period indicates that phytase had no beneficial or detrimental effect on broiler performance."

not seem to improve broiler performance relative to controls.

Dr Ball explained: "Offering diets containing rapeseed meal and dried distillers' grains did not significantly affect performance and therefore these products can be included in diets for broilers and pigs at the levels used in these trials.

"There was no significant beneficial effect of adding enzymes to broiler diets and there was no detrimental effect of reducing dietary phosphorous, calcium or amino acid content in this trial. It can be concluded that all the broiler diets on test supplied adequate levels of key nutrients.

"The inconsistent effect of phytase on the feed conversion rate is difficult to explain, but the non-significant effect throughout the overall experimental period indicates that phytase had no beneficial or detrimental effect on broiler performance."

Why does feed efficiency differ between chicken populations?

In chickens, conflicting results exist regard-

ing the impact of digestion on feed efficiency. Many physiological features have been reported as contributing to residual feed intake (RFI), an overall measure of feed efficiency. Residual feed intake describes the difference between the actual feed ingested by an animal and the amount of feed that would be expected to maintain and increase body weight – meaning that a chicken with a lower RFI could eat less without sacrificing weight gain.

Austrian researcher Barbara Metzler-Zebeli, from the University of Veterinary Medicine, Vienna, noted that the impact of digestive and intestinal function on the variation in chicken residual feed intake has not yet been fully explained.

Dr Metzler-Zebeli and her team investigated the reasons behind diverging residual feed intake in birds raised in similar ways in two

separate environments, namely Austria and Northern Ireland.

The performance of the chickens varied between the two locations, as the more efficient chickens from Austria gained on average 350g more with the same feed intake as birds from Northern Ireland.

The more efficient chickens, with low RFI, were able to absorb protein more easily across their intestinal tracts. Higher feed intake levels have previously been found to reduce the ability of chickens to digest protein.

Dr Metzler-Zebeli concluded that factors like digestive function, permeability of the intestinal walls and response to microbial stimuli in the intestines seem to contribute to the diverging feed efficiency levels in these fast-growing meat-producing chickens. ■

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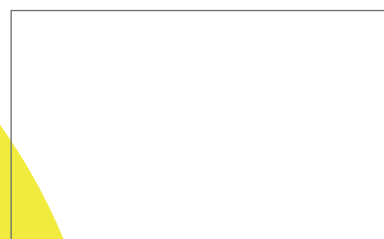
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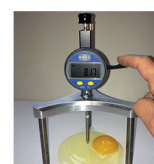
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How to Put Your Poultry on an Organic Diet

Robert Blair, Professor Emeritus in Animal Science at the University of British Columbia, Canada, has written several textbooks on the nutrition and feeding of organic livestock. He has just completed *A Practical Guide to the Feeding of Organic Farm Animals*, which aims to translate the science of feeding organic livestock and summarise it into practical guidance for farmers and producers.

The Poultry Site's Editor, Alice Mitchell, spoke to Professor Blair about the differences between feeding organic and conventional poultry, and some of the latest developments in poultry feed, such as the use of insects.

How do organic poultry producers ensure their feed fits with the principles of protecting the environment for future generations?

Only those feedstuffs meeting organic standards are permitted in organic diets. No genetically modified types are allowed. Organic farming also attempts to be as sustainable as possible and to have a low impact on the environment.

One of the aims of organic farming is to raise the animals in as natural a way as possible and to integrate the herd or flock into the other farm activities, purchasing only a minimum of feedstuffs not produced on the farm. Feed still has to supply all the necessary nutrients otherwise

"Organic feed is more expensive than conventional feed because of the higher costs of organic feedstuffs, which are in short supply due to the increasing acreages of GM crops worldwide."

productivity is lower and the animals would suffer from malnutrition.

Organic feed is more expensive than conventional feed because of the higher costs of organic feedstuffs, which are in short supply due to the increasing acreages of GM crops worldwide.

Does consumer preference provide an incentive for producers to feed poultry in an environmentally friendly way?

Consumers like to see farm stock out in the fields, enjoying the fresh air and sunshine and expressing their natural behaviour. Organic producers are aware of this and have tailored their regulations to try and meet these expectations.

How are organic feedstuffs regulated, and how can these standards be improved?

Each country has its organic regulations and standards, and organic products must be certified as organic by certification agencies.

Some consumers would like to see an actual testing programme introduced to prove that an organic product (such as eggs or milk) was produced from livestock raised organically, but such a test is at present not feasible.

Many in Europe's poultry industry, even within conventional poultry farming, are concerned about the use of large amounts of imported soybeans, and the impact this has on sustainability. What do you think would be a good alternative or mitigation to improve matters?

Soybeans and soybean meal (fat-extracted soybeans) are generally the best protein supplements for livestock feeding. However, these are expensive imports in countries that are unable to grow soybeans, and also the organic types are in short supply because most of the soy being grown worldwide is GM.

An interesting development with soybeans is the introduction of plants suitable for cultivation in cooler climates – for instance the Maritime region of eastern Canada. This development, together with the installation of co-operative extruder facilities to process the soybeans, allows the crop to be grown and utilised locally. This could help regions that are deficient in protein feedstuffs to become self-sufficient in terms of fulfilling their feed needs.

Other protein-feed crops can also be grown and are being utilised as alternatives to soy, such as canola, field peas, field beans and sunflowers among others.

Allowing pure forms of amino acids in organic feeds, as has been done in several countries, helps to utilise scarce protein supplies more effectively and reduce pollution from excessive nitrogen in manure.

How does the process of feeding poultry differ between organic and conventional farms?

Organic feed can be fed in the same way as conventional feed, except that in organic production we try to maximise the use of whole grain. This generally requires the use of more feeders to allow the whole grain and other feed components to be fed separately.

The bird has a digestive system designed to digest whole seeds, therefore it seems unnecessary to feed it a pre-ground diet. This is what I recommend in organic poultry production.

Feeding whole grain also presents energy savings in feed preparation. The process of grinding requires about 20kWh per tonne of grain, whilst pelleting requires a large input of electrical energy amounting to approxi-

mately 10 per cent of the total feed costs and additional energy is required to generate steam for the steam-pelleting process.

Another advantage of whole grain feeding is that it has been shown to result in health benefits. It reduces leg and skeletal problems through a reduction in early weight gain and by promoting a better-developed gizzard, which appears to act as a barrier organ that prevents pathogenic protozoa (which cause coccidiosis) and bacteria from entering the lower digestive tract.

Are there other differences between the health status of organic and conventional poultry?

Organic production has some positive effects on bird health, and some negative effects. For instance, many producers use her-

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itage breeds and strains that have a much lower incidence of health problems such as ascites (water-belly) and sudden-death syndrome (SDS) than found with commercial meat breeds.

Nearly all synthetic animal drugs used to control parasites, prevent disease, promote growth or act as feed additives in amounts above those needed for adequate growth and health are prohibited in organic poultry production. However, it is recommended to use similar vaccination measures to conventional poultry where allowed under the local organic regulations, against a variety of diseases such as Marek's disease, Newcastle disease and infectious bronchitis.

A main health problem in poultry is gastrointestinal disease. Relevant approaches to this problem in organic production include

the enhancement of immunity, using whole grains in the diet to encourage gizzard development, and including some fibrous ingredients in the diet to encourage fermentation in the large intestine and stimulate the growth of beneficial gut bacteria.

One of the disadvantages of using organic diets containing some partly indigestible carbohydrates (fibre) is that they can lead to increased worm infestations, because they provide more of a nutrient source in the lower gut.

Therefore, poultry producers should use highly digestible diets during outbreaks of worm infestations and, where possible, should use liquid whey as a dietary supplement.

A good grazing management plan should also be used, with rotation of pastures and yards. Most worms are strictly host-specific

and mixed grazing is known to be useful in controlling the parasites.

How does the increasing interest in feeding insects to poultry fit in with the organic ideals?

Insect larval meal is being produced in several countries from substrates such as household food waste.

Some certifying agencies take the view that the meal produced is a permissible ingredient (and a good source of protein) in organic feed, while others take the view that the insect meal is unacceptable as an organic feed ingredient since the substrate used cannot be verified as organic. In addition, some in the organic industry take the view that the product of any industry-scale process is contrary to the principles of organic production.

Producers planning to use this type of product in organic poultry feed should, therefore, obtain approval from a local certifying agency before doing so.

It is important to note that only immature forms of insects can be digested by poultry. Chitin is the main component of the hard shell of adult insects and has a chemical structure like that of cellulose fibre. Birds have some ability to digest this component but our studies indicate that the hard insect skeleton is not an important source of nutrients for domestic poultry.

A main issue relating to the topic of larval meal as a feedstuff is economics. The high cost of production usually means that the product is used most effectively in fish feed (as an alternative to soybean meal) and is too expensive for use in poultry diets. ■

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October.Industry News



Electrolyte Balance of Broiler Breeders

GLOBAL - The broiler breeder's requirement for sodium (Na), chlorine (Cl) and potassium (K) should not be considered individually but as a whole.

A balanced supply of cations (positively charged ions Na⁺ and K⁺) and anions (negatively charged ions Cl⁻) is necessary to achieve acid-base equilibrium of the bird.

This is calculated using the formula Na plus K minus Cl, expressed as milliequivalents per kilogram (mEq/kg) of the diet and is called the electrolyte balance.

Correct electrolyte balance is required to regulate water levels and pH throughout the body. An imbalance can lead to tibia dyschondroplasia and respiratory alkalosis which may negatively impact egg shell quality.

Deficiencies in Na and Cl can result in cannibalism and reduced egg production, while birds lacking K coming into lay are susceptible to sudden death syndrome due to osmotic imbalance disturbing normal heart function.

In ad lib fed birds such deficiencies are rare under normal conditions. However, broiler breeders are more at risk due to lower protein formulations and different feeding strategies. For this reason there is some uncertainty around the correct electrolyte balance for broiler breeders, especially during egg production.

In a recent trial conducted by Aviagen® the response of hens to three levels of electrolyte balance (170, 200 and 230 mEq/kg) during the laying phase was investigated.

Differences in electrolyte balance were achieved by manipulating K and Cl. Egg production and egg weights were not affected

by treatment. The 230 mEq/kg treatments resulted in a lower percentage of cracked eggs.

Later in production, and when environmental temperatures were high enough to provoke heat stress, a higher cumulative chick number was also observed in the 230 mEq/kg treatments. In late production, liveability in flocks was positively influenced in treatments with higher K levels (>0.65 per cent) in the diet.

The results of this trial suggest that formulating to a higher electrolyte balance by increasing K may be advantageous for broiler breeders during heat stress. Under normal conditions ensuring an electrolyte balance of between 170 and 200 mEq/kg with a minimum K level of 0.6 per cent in the feed is sufficient to ensure good flock performance.

BASF and Pancosma Enforce Intellectual Property Rights for Metal-Glycinates

GLOBAL - BASF SE and Pancosma SA have taken action to enforce their intellectual property (IP) rights and protect their innovative metal-glycinates by filing lawsuits against potential patent infringers at the district court of Düsseldorf, Germany.

Metal-glycinates are organically bound trace elements, e.g., copper, iron, manganese and zinc.

The glycinates offered by BASF and Pancosma are patent protected due to a unique technology.

Because of their superior bioavailability, they have an optimal impact on both the animal, in terms of improved vitality and performance,

as well as on the environment, with less excreted minerals and trace elements. From a technology perspective, these products are free-flowing granules with excellent mixing properties and dissolve easily in water.

BASF and Pancosma are successfully marketing these glycinates for animal nutrition. Both companies strongly invest in research & development.

They respect intellectual property rights of third parties and welcome innovation from other companies that also contribute to meeting the needs of a growing population worldwide. Securing intellectual property rights is an integral part of their innovation strategy.

Therefore, they have decided to enforce their IP position against third parties, which in the opinion of BASF and Pancosma are in breach of the existing intellectual property rights.

Wireless Egg Node Gains Strong Recognition

EggTester.Com (officially known as "ORKA Food Technology") introduced Wireless Egg Node™ to the market early 2016 at IPPE2016 and it is gaining strong recognition in US and Latin American markets. ORKA's Wireless Egg transmits real time data to monitor egg grading facilities and eggs transferred from the egg cage to grocery store, aiming to reduce egg cracks, breakages and losses.

Here is a video clip recently taken at one ORKA customer's grading station in Arizona, US, which implemented ORKA's Wireless Egg Node™ and is one of the most reputable egg producers in US.

Digital Haugh Tester - this instrument is extremely precise and friendly to use in order to assist you with the correct process of reading of the albumen height;

Egg OR Candler - this instrument is a portable LED battery/mains operated egg candling lamp, allowing the user to candle both white and brown eggs in any environment;

Wireless Egg Node™ - this instrument enables simultaneous, high-speed sensing and real time data aggregation from multiple wireless eggs.

The current ORKA range comprises:

Egg Analyzer - this instrument determines the weight of eggs, albumen height, Haugh units, yolk colour and USDA grade for routine quality control and regulatory compliance;

Egg Force Reader - this instrument measures the force required to crush a shell and is a direct measure of marketability;

Eggshell Thickness Gauge - this instrument uses ultrasound to measure the thickness of shells for quality control and research applications;

The ORKA range of instruments is used extensively in QC laboratories operated by egg producers, packers, universities, regulatory authorities, and primary breeders.

Contact details: Katz Yoshida.

Email: yoshida@eggtester.com

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Industry.Events



**Egg & Poultry Industry
Conference (EPIC)**
Newport, South Wales, UK
6th to 7th November

This year's theme is: "Celebrating an EPIC 50 years" As well as providing up to the minute thought provoking debate from invited international experts, the conference will include a 'Back to the Future' session in which speakers from our own industry will look across all sectors to remind us of what we have achieved and also what is yet to be done.

**5th Mediterranean Poultry
Summit (MPS)**
Italy, Spain, France (Cruise)
20th to 6th October

In contrast to previous Summits, the Fifth Mediterranean Poultry Summit of the WPSA will be held in October 2016 on board a ship cruising through the Mediterranean sea, to ports in Italy, Spain and France. This innovative idea will stimulate interest in all countries of the Mediterranean region and beyond and will attract more scientists and industry people.



EuroTier 2016 / EnergyDecentral 2016 ●
Hanover, Germany
15th to 18th November

EuroTier first took place in 1993. Since 1996, Hanover's exhibition grounds – the largest in the world – has hosted the event every two years in the month of November.

EuroTier is organised by the Frankfurt-based German Agricultural Society (DLG). Throughout DLG's long history (founded in 1885), exhibitions have always played a major role in its work for the agricultural and food sector.

3rd World Veterinary Poultry ●
Association (WVPA) Asian Meeting
Manila, The Philippines
20th to 21st September

The WVPA and its Filipino Branch (The Philippine College of Poultry Practitioners) is pleased to announce that the 3rd WVPA Asian Meeting will be held in Manila on 20 and 21st October this year.

Listings.Business Directory

Health & Welfare



Ceva Animal Health

Tel: +33 (0) 557 554 040
Fax: +33 (0) 557 554 198
info@ceva.com
www.ceva.com

Areas:

Pharmaceuticals
Vaccines
Equipment: Vaccination
and Medical)
Feed: Additives

CEVA Santé Animale is a global veterinary health company focused on the research, development, production and marketing of pharmaceutical products and vaccines for pets, livestock, swine and poultry.



Merck Animal Health

animal-health-communications@merck.com
www.merck-animal-health.com

Areas:

Feed: Safety Products
Feed: Additives
Feed
Cleaning/Disinfectants
Pharmaceuticals

Merck Animal Health offers veterinarians, farmers, pet owners and governments the widest range of veterinary pharmaceuticals, vaccines and health management solutions and services.



Merial

merial.com

Areas:

Pharmaceuticals
Vaccines
Equipment: vaccination
Medical
Feed additives

From developing advanced vector vaccines fine-tuned for chickens' immune systems, to engineering highly specialized machinery for the most efficient vaccine administration, Merial is leveraging a wide spectrum of technologies to address today's biggest poultry-farming challenges.



Zoetis

Tel: +1 919 941 5185
GP.Marketing@zoetis.com
www.zoetis.com

Areas:

Vaccines
Biodevices
Feed Additives
Diagnostics

Zoetis strives to support those who raise and care for farm animals by providing a range of products and services that offer tangible solutions to the many challenges veterinarians and livestock producers face every day.

Breeding & Genetics



Aviagen

Tel: +1 256 890 3800
Fax: +1 256 890 3919
info@aviagen.com

Areas:

Breeding
Genetics

The Aviagen Group is the global market leader in poultry genetics. As the world's premier poultry breeding company, Aviagen develops pedigree lines for the production of commercial broilers and turkeys.

**Cobb**

Tel: +1 479 524 3166
 Fax: +1 479 524 3043
 info@cobb-vantress.com

Areas:

Breeding
 Genetics

Cobb broiler breeding stock has the sustained advantage of the most efficient feed conversion and highest potential for profitability for the company's global customers.

**Grimaud Frères Sélection**

Tel: +33 (0)2 41 70 36 90
 Fax: +33 (0)2 41 70 31 67
 grimaudfreres@grimaudfreres.com
 www.grimaudfreres.com

Areas:

Breeding
 Genetics

Grimaud Frères are a multi-species selection and breeding operator in the service of the waterfowls and festive poultry field.

**Hubbard**

Tel: +33 296 79 63 70
 Fax: +33 296 74 04 71
 contact.emea@hubbardbreeders.com
 www.hubbardbreeders.com

Areas:

Breeding
 Genetics

Hubbard provides solutions that focus on the economic performance, health and wellbeing of breeding stock. Hubbard specializes in state-of-the-art selection programs to improve the performance of their pure lines.

**Hy-Line**

Tel: +1 515 225 6030
 Fax: +1 515 225 6030
 info@hyline.com
 www.hyline.com

Areas:

Breeding
 Genetics

Hy-Line International is a world leader in poultry layer genetics with a rich history of innovation. Hy-Line was the first poultry breeding company to apply the principles of hybridization to commercial layerbreeding.

**Novogen**

Tel: +33 296 58 12 60
 Fax: +33 296 58 12 61
 contact.novogen@novogen-layers
 www.novogen-layers.com

Areas:

Breeding
 Genetics

NOVOGEN offers a new alternative giving the egg producers more choice and possibilities to fit their specific market requirements.

Biosecurity & Hygiene

**Axcentive**

Tel: +33 442 694 090
 info@axcentive.com
 http://www.halamid.com/

Areas:

Biosecurity
 Cleaning

Axcentive, supplies Halamid®, the universal disinfectant, worldwide. Effective against all major problematic microorganisms, Halamid® is widely used in veterinary hygiene: poultry, aquaculture, among other sectors. In Europe, Halamid® is listed in the BPR for product types 2,3,4 and 5.



CID LINES
 Tel: +32 5721 7877
 Fax: +32 5721 7879
 info@cidlines.com
 www.cidlines.com

Areas:
 Biosecurity
 Cleaning
 Feed: Additives
 Health and Safety
 Pest Control
 Welfare

CID LINES offers VIROCID, the most powerful disinfectant, which is part of a hygiene program for poultry, written by hygiene specialists. VIROCID has a proven record in preventing and fighting disease outbreaks for many years.

Feeding & Nutrition



AB Vista
 Tel: +44 (0) 1672 517650
 Fax: +44 (0) 1672 517660
 info@abvista.com
 www.abvista.com

Areas:
 Feed
 Feed: Additives
 Feed: Nutrition

AB Vista is an integrated international supplier of new generation micro-ingredients for animal feeds providing visionary solutions for your agribusiness.



Biomim
 Tel: +43 2782 803 0
 Fax: +43 2782 803 30
 office@biomin.net

Areas:
 Feed
 Feed: Additives
 Feed: Nutrition

BIOMIN offers sustainable animal nutrition products such as quality feed additives and premixes, which include solutions for mycotoxin risk management, a groundbreaking natural growth promoting concept as well as other specific solutions.



Kerry
 Tel: +31 36 523 3100
 Fax: +31 36 523 3110
 clive.girdler@kerry.com
 www.kerry.com/animalnutrition

Areas:
 Feed
 Feed: Additives
 Feed: Safety

Kerry Ingredients & Flavours is a leader in developing, manufacturing and delivering technology-based ingredients and integrated solutions. Our products are designed specifically to optimize the nutritional value and maximize the energy of feed ingredients in poultry diets.



Novus International
 Tel: +1 314 576 8886
 Fax: +1 314 576 2148
 contact@novusint.com
 www.novusint.com

Areas:
 Feed
 Feed: Additives
 Feed: Nutrition

Novus International is a global leader of animal health and nutrition programs for the poultry, pork, beef, dairy aquaculture and companion animal industries.

Housing & Equipment



Big Dutchman
 Tel: +49 4447 801 0
 Fax: +49 4447 801 237
 big@bigdutchman.de
 www.bigdutchman.com

Areas:
 Equipment: Breeding
 Equipment: Drinking
 Equipment: Egg
 Equipment: Feeding
 Equipment: Weighing

The poultry equipment supplier for layer management, breeder management, poultry growing and poultry climate control.



Jansen Poultry Equipment

Tel: +31 342 427 000
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info@jpe.org
http://www.jpe.org/

Areas:

Breeding
Drinking
Egg
Nesting

Jansen Poultry Equipment was founded in 1986. With our knowledge of technology and poultry, we succeeded in developing the most sought-after laying nest. Today the company offers a wide range of poultry systems.



Termotecnica Pericoli

Tel: +39 0182 589006
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termotecnica@pericoli.com
www.pericoli.com

Areas:

Climate Control
Climate Management
Heating, Cooling and
Ventilation

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Vencomatic

Tel: +31 (0) 497 517380
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info@vencomatic.com
www.vencomatic.com

Areas:

Equipment: Breeding
Equipment: Drinking
Equipment: Egg
handling and grading
Equipment: Nesting

Vencomatic is a global supplier of innovative and welfare friendly housing solutions for the poultry sector. The flexible and turn key solutions of Vencomatic offer large possibilities for a wide range of poultry production concepts.

Incubation & Hatching



Chickmaster

Phone: +1 330-722-5591
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Email: info@chickmaster.com
www.chickmaster.com

Areas:

Equipment: Incubation
Equipment: Hatching
Equipment: Egg
Equipment: Environment

ChickMaster offers hatcheries innovative solutions incorporating the latest state-of-the-art technology for a broad line of incubators, energy management and control systems. Experts provide round the clock support for hatcheries in over 100 countries to optimize hatchability and quality.



Orka Food Technology

Tel: +852 8120 9245
Fax: +852 2802 7112
info@orkatech.com
www.eggtester.com

Areas:

Equipment: Egg
Equipment: Hatching
Equipment: Incubation

EggTester.com (officially known as "Orka Food Technology") is a leading worldwide manufacturer of egg-quality testing equipment to be used extensively in QC laboratories operated by egg producers, packers, universities, regulatory authorities, and primary breeders.



Pas Reform

Tel: +31 314 659 111
Fax: +31 314 652 572
info@pasreform.com
www.pasreform.com

Areas:

Equipment: Incubation
Equipment: Egg
Equipment: Environment
Equipment: Hatching
Waste Handling

Pas Reform is an international company, which has specialized in the development of innovative hatchery technologies for the poultry sector since 1919. Products and Services: Incubators, Hatchery Automation Systems, Hatchery Climate Control Systems and Hatchery Management Training.



Petersime

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Areas:

Equipment: Hatching
Equipment: Incubation

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Contributors. Our Team

Editor

Alice Mitchell

Commissioning Editor

Laura Elliott

Contributors

Alice Mitchell

Glenneis Kriel

Chris McCullough

Design & Layout

Nick Morton

Sales & Marketing

Digory Holmes

Contact

Editorial - newsdesk@5mpublishing.com

Sales & Marketing - digory.holmes@5mpublishing.com



5m Enterprises Ltd., Benchmark House, 8 Smithy Wood Drive, Sheffield, S35 1QN, England.

5m Enterprises Inc., Suite 4120, CBoT, 141 West Jackson Boulevard, Chicago, IL, 60604-2900, USA.

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