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Learning and looking forward towards 2016

With the end of 2015 approaching it is time to look ahead. The first months in 2016 will be interesting, especially to those connected to the poultry industry. Preparation of the International Production and Processing Expo in Atlanta is in its final stages. With more exhibitors than ever and a high value scientific programme there is a lot to learn and to look forward to. A major talking point will be the HPAI outbreak which occurred in the US Midwest. During IPPE, USPOULTRY will sponsor a special programme called "Highly Pathogenic Avian Influenza – Lessons Learned", which will provide a valuable opportunity to learn about the recent outbreak of avian influenza in the United States from people who were actively involved in controlling the disease. The programme will provide a timely reminder to the industry as it is approaching the spring migration period of wild birds. Only one month after the IPPE the poultry industry community will gather in Abu Dhabi, from 15-17 February. Animal protein producers in Middle Eastern and African countries will gain a new trade fair geared specifically to their needs there: VIV MEA. The fair is the new addition to the VIV portfolio, the specialist Feed to Food show serving the poultry, aquaculture and dairy industries in the Middle East/Africa region. VIV MEA will be co-located with the Global Forum for Innovations in Agriculture (GFIA), which has become the flagship event for agricultural innovation across the world. Really looking forward to the IPPE, VIV MEA and all other events that 2016 has to offer!

Fabian Brockötter, editor *World Poultry*



COLOPHON

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Different mindset needed for antibiotic use in animal husbandry

A new antimicrobial resistance mechanism has been found in bacteria from Chinese pigs, pork, poultry meat and humans. This is a serious public health threat because it results in resistance to what is considered to be a last resort antibiotic in human medicine. Prof Dik Mevius of the Dutch Central Veterinary Institute explains the consequences.

By Fabian Brockötter

What exactly is the situation in China?

“Colistin is a class of antibiotics that has been used in animals for treatment and control of diarrhoea for decades. It has become important in human medicine due to the fast evolution of resistance over the past decade. The rapid spread of ESBL- and carbapenemase-producing organisms – has made colistin a last resort antibiotic for humans infected with multi-drug resistant bacteria. The finding in China is therefore primarily a human problem. Since the 50s, colistin is used on a large scale in livestock, especially to treat and control diarrhoea caused by *Escherichia coli* and *Salmonella* infections in young cattle and pigs. In the poultry sector colistin is used in the treatment of colibacillosis in laying hens as there is no withdrawal period set for eggs. Colistin is a so called polymyxin.

The use of polymyxins has dramatically decreased during the past years. Recently Chinese and British scientists reported that they have found a strain of *Escherichia coli* which is resistant to colistin. In China – and there are indications this also applies to other parts of South East Asia – a transmittable form of resistance has been discovered in pigs, pork and poultry meat, and also in a small number of Chinese people. A direct link has been established between the use of the antibiotic in animal husbandry and the resistance found in slaughtered animals, in food and in humans. This resistance, caused by a new mutation dubbed the MCR-1 gene, is also capable of spreading. The samples of the study were taken from pork and poultry meat from supermarkets and wet markets. Additionally samples were taken from hospitalised people. About 20% of the animals and 15% of the meat carried resistant bacteria. The resistance is quite worrying as bacteria can exchange the resistance amongst each other and also in between species. Although there is no proof of a causal connection, it is considered likely the animal industry is the source of the problem. In China antibiotics are applied on a large scale, animal husbandry is booming.”

What is the extent of the threat?

“This undesirable development exerts more pressure on health care. Particularly in combination with the ESBL problems which exist on a global scale. We must be alert, not because colistin resistance is an enormous problem in animal husbandry. But we don’t want the livestock industry to become a reservoir of resistant bacteria, with a potential risk for public health. Resistant bacteria can spread on an epidemic scale in a short period of time. The worst case scenario would be that there is no treatment left for humans with infections. This can lead us

Dik Mevius

Prof Dr Dik Mevius is senior researcher at Central Veterinary Institute, Lelystad, the Netherlands. At the CVI Mevius is responsible for the Dutch national reference laboratory on antimicrobial resistance in animals. He also holds a chair at Utrecht University and has participated and still has a role in many policy advisory boards and committees on national and European level, such as the Expert Panel Veterinary Medicines Authority and the Veterinary Antibiotics Usage and Resistance Surveillance work group.

Biography



back to the pre-antibiotics era. The future does not look bright then, with possible tens or hundreds of thousands of deaths caused by outbreaks and antibiotic resistance.”

How fast do you expect this problem to spread?

“That is rather unpredictable. The world is small and globalisation involves a constant exchange of humans and materials. Products, and this certainly applies to the poultry sector, originate from all corners of the world. Problems like this do not remain restricted to a specific area, but have to potential of soon becoming a global issue. Humans can be a source, as can materials, and even wild birds. We now know what to look for. This provides us with tools to recognise the resistance when it occurs. When the production chain spreads the bacteria the situation might get out of hand.”

How should this situation be handled on a global scale?

“This subject has received massive world attention. There have been previous calls for curtailing the use of polymyxins in agriculture. We must all reiterate these appeals and take them to the highest levels of government. A crucial aspect is the colistin use in a country. We must think the situation through. Will we advise to forbid the use of colistin in livestock? Or only when there is proof there is no alternative for it? Governments, sector organisations and veterinarian organisations must address this issue. A local approach is most effective approach. The subject is currently on all agendas. The implications of the current developments are also being discussed on a European and global level – this is a very slow process as global and European organisations are less powerful. It is however in everyone’s benefit to place this topic high on every agenda. In 2012, the World Health Organization Advisory Group on Integrated Surveillance of Antimicrobial Resistance described colistin as an antibiotic of critical importance. This also counts for animals, poultry for instance. Implementing measures which involve enormous reductions will be extremely challenging. Still, this is a challenge countries are facing. The use of colistin must be reduced. The influence of the West on Asia is only limited. However, it is important politics and scientists join forces and take action. For Asia this implies being aware of the negative effects of their booming industrial developments and realizing the choices they make effect people. This is complicated when it concerns antibiotics. Use of colistin in the pig and poultry sector has a significant impact on the industry.”

What will have to change in the poultry sector?

“To secure public health on a global scale a transition will have to be made towards a completely different husbandry system, which will not induce this type of resistance. In the poultry industry, but also in other livestock industries, a different mindset is needed. We must focus on animal health instead of production at a low cost price. We must concentrate on preventing health issues instead of systematically clamping down infections. At world level this is currently only a drop in the ocean. What we need is to obtain a hearing on a larger scale.”



PHOTOS: WORLD POULTRY

Use of colistin in the pig and poultry sector has a significant impact on the industry.



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“We kind of felt like we lost the fight”

Brad Moline couldn't be happier. After a tough time in which bird flu contaminated his turkeys, it is finally time to look ahead again. “It is great to have birds back. We are two thirds full now. And the birds are doing well.” The biggest outbreak of an animal disease in the US history also presented some valuable lessons for the Iowa farmer. “If we don't learn from the process, then that would be failure.”

PHOTOS: MOLINE FAMILY

By Edwin Timmer

The 19th of May was a tuesday morning. A typical morning for the Moline family in Manson, Iowa. “We were doing tours,” says the American poultry producer. “A couple of guys and myself were going through the brooder houses. After that I was working with the pressure washer. We stopped for a morning break at about ten o' clock. That is also a meeting to hear how the turkeys are doing and to see what we'll do further. Then we discovered that one of the gentlemen had gotten hold of my father. Because I was on the pressure washer and didn't hear my phone.”

Father John Moline had gone to the finisher building. The turkeys had been all right the night before. Brad adds, “It was a building with 7,000 turkeys and it had 90 dead ones in there. You could see the whole flock was getting sick quickly. They were panting. It was about 65 degrees F in there, and the birds looked like it was a 100 degrees. Panting, trying to cough and they were dying very, very rapidly. Unfortunately we knew right away what it was: bird flu. We had been doing about everything we possibly could to keep it out. It kind of felt like we lost the fight.”

Independent for generations

The Moline family came to Iowa in the 1800's. Brad started farming pretty much since the time he could walk. “We've been on this location since 1924. I'm a third generation on this farm. I started raising my own turkeys when I was in grade school. I went to Iowa State University, got a degree in animal science and dairy science. Then returned home to the farm full time in 2002 and I've been in charge of turkey production ever since, along with my father John and my brother Grant.”

The family grows about 1,800 acres of corn and soybeans. “We can provide enough soybeans and corn for our turkeys. But we actually buy a complete feed and sometimes sell the corn to a feed mill. That just depends on the year and the marketing decisions we make. We're very close to ethanol plants up here as well, so there are different opportunities. But we do buy a complete feed at a feed mill a few miles away.”

The turkeys are from the genetic company Hybrid. The Molines are independent producers, so they buy the turkeys the day they're hatched. “We get flocks in of 28,000 day old turkey poults. Every nine weeks we try to get them in here. They're grown and then marketed through West Liberty Foods. We're part of the cooperation that owns the company. From there they go to Subway Sandwich.”

The Moline family lost 56,000 turkeys in total.

When the virus hit many birds became critically ill, the rest were euthanised.



From left to right; Brad, Grand and John Moline. "It is great to have birds back. We are two thirds full now. And we definitely learned from this process."

Rolling along good

A normal day on the farm? "Every morning just about everybody – my father, my brother and myself and our four full time workers – has some kind of turkey tour to do. I take care of the brooder houses, where the baby turkeys grow. My brother goes through the finisher houses. It's a family run operation, and the turkeys really do come first. Then it depends on where we are in the year. Like today, we are in the harvest season right now. We have combines running and semi trucks hauling grain. When I hire new help I always tell them: "No two days are entirely the same."

"Before the bird flu, we were rolling along good. We were cranking out about 155,000 turkeys a year or more. Turkeys were coming in and out of the farm every nine weeks. Sure, we had a few struggles here and there. You always have bird health challenges that you need to stay on top off. But our records have always been good. We get good growth rates." Then at the beginning of 2015 news about the bird flu broke. First in northern Minnesota. The Iowa Turkey Federation tried to keep everyone posted. "Immediately, we stopped hunters and fishers coming in, and keeping their vehicles far away from the buildings. We thought, we do not want anyone close who might have been near ducks and geese. Anyone who did have to enter the farm, we made them change their boots and wash their vehicles."

Disaster strikes

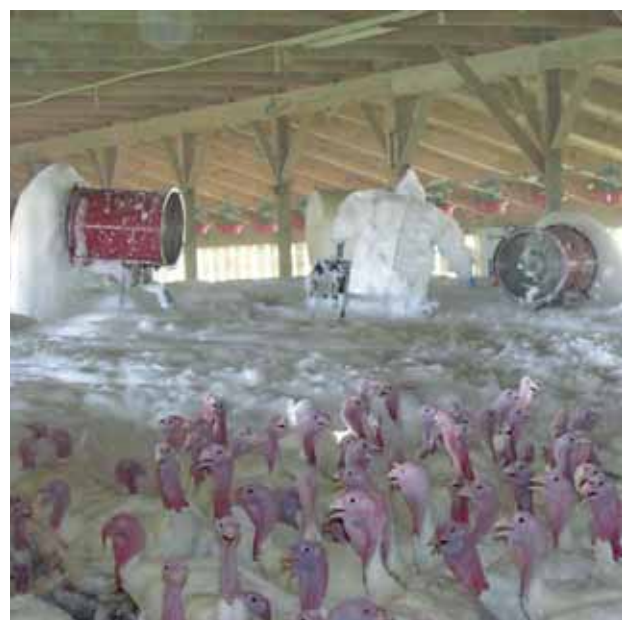
But it kept getting closer. Brad remembers: "You could just feel it creeping in. We always change boots going into every finisher barn and our brooder barns are shower in/shower out. So we felt we were fairly protected. But we added one more step.

We put foot baths outside of every finisher barn, so in the area where they were changing boots there could not be any contamination either. So, on the people end of things, we really felt we were as protected as we could get."

Still, the disease came in. "There is no real smoking gun," says the Manson farmer. "But my best guess are the sparrows. The virus load was so high in the area, that it could have been transferred by anything from sparrows to starlings. Our finisher barns are naturally ventilated. We have what we call a ridge vent. This is basically a 16 inch opening over the entire length of the building. We tried bird netting it years ago, but all it did was plug up with dust and feathers from the heath and humidity up there because we put it on the inside of the barn."

Actually, the sparrows never really were a high priority. The Moline farm used to grow free range turkey for decades. They finally quit in 2002 because the birds just couldn't be handled outside anymore. Because of the intense breeding and because it took too much labour. Moline adds, "The point is, our turkeys mingled with sparrows and other birds all those years. But I do think the sparrows brought in the virus. Carrying it on their feathers, feet or whatever."

Looking back, Moline says: "Hats off to the Iowa Turkey Federation. They did a great job in informing us about everything that was going on - arranging meetings with the USDA, even with US secretary of agriculture Tom Vilsack. At first the USDA was not prepared for an outbreak of this size. They didn't have the manpower nor the organisation. But to their credit, secretary Vilsack, chief veteran officer John Clifford and doctor Jack Shere stepped it up and made the necessary changes to stop the virus." In the end the turkeys on all the three sites of the Moline farm had to be euthanised. "The first contamination was at our home site. We have two barns with 7,000 birds - at both barns the birds were euthanised. At a different site we have three barns and they became positive. Two of the three



Euthanising the birds really breaks a producers heart, especially when they are seemingly healthy at that moment in time.

barns were sick, but the birds at the third barn had to be killed as well. A week later at our third site the birds became sick. That was the tough part - seeing healthy birds being killed. In about two weeks, we lost 56,000 turkeys.”

“It really breaks your heart. Especially as an independent producer. You get the birds the day they’re hatched. You have a bond with them. You work your butt off to grow a healthy bird. Not only for food safety reasons, but for your own pride. You want the biggest, strongest and healthiest bird you can produce. Washing the water, making sure the litter’s dry, treating any sick bird. That stuff you do every single day. And boy, when something like this happens, it comes through like a tidal wave. It really takes the wind out of your sails.”

Aftermath

The family decided to clean up everything themselves. “Composting the birds, cleaning every single barn, from top to bottom. Washed it down again. We disinfected with a heat process to a hundred degrees. And then killing any left-over virus with a fog. Then we had the barns environmentally tested by the USDA. All of our barns came back negative. Then they sat through a 20 day fallow period, when you don’t go in or out of the barn. On July 21st our first two sites were cleared for repopulation and we started to repopulate on July the 31st” At that particular time there was no shortage of eggs. “We were the first in the state. So the first squad was not a question of getting the birds. Now that everybody is restocking, the egg shortage is very significant. Our second flock has been delayed two weeks. I think industry-wide, everybody has delays of two to three weeks now to get new poults in. It

might take a year to get the poult supply streamlined again.”

Birds are back

Brad’s family gave the green light to make the restocking a media event. First because we were the first ones in the state of Iowa to restock. Second because I believe that US citizens need to know that food safety is the number 1 priority for farmers. We want to produce this big healthy turkey. The media did a good job explaining there never was any risk to human health.

It was also good to explain why egg prices are high and turkey prices as well.”

Several months later, familiar sounds of poults and turkeys come out of barns again. “It is great to have birds back. We are two thirds full now. And we definitely learned from this process. All the measures we took as temporarily are now permanent. All vehicles have got to park away from the farm. There are foot baths before you go into any of the barns. The biggest thing for us, is a system to keep all sparrows out. We introduced a net over the top of the barns. That took some engineering, but we’re on the right path. If we don’t learn from the process then that would be failure.”

“Another lesson industry-wide is that we need to have a de-population goal of 24 hours or less. If we do that, then in future outbreaks you may not stop every single case, but we will not have the massive outbreak like we had this time. The USDA has adopted this idea, which I suggested in Washington in July. The best thing to have would be a vaccine. That was the first question we asked, when bird flu showed up. “Has it been developed and when will it be available?” Without any doubt we will be in favour of protecting our birds with this new method.”

The family decided to clean up everything themselves.

“Composting the birds, cleaning every single barn, from top to bottom. Washed it down again. We disinfected with a heat process to a hundred degrees. And then killing any left-over virus with a fog.”





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Assessing global trends in bacterial enteritis

PHOTO: WORLD POULTRY

Diarrhoea and wet litter continue to be the signs most often associated with emerging cases of BE.

Elanco Animal Health recently released findings from its fourth Bacterial Enteritis Global Impact Assessment (BEGIA), providing interesting insights into ongoing trends of a disease that continues to have important impact on our industry.

By Fabian Brockötter

Elanco has conducted this survey every five years since 2000, surveying poultry professionals from the major poultry-producing regions around the world. The 15 years of survey data shows that prevalence and economic loss continue, while early intervention becomes a more favoured strategy as the years progress. The 2015 survey included over 330 respondents comprising veterinarians, producers/production managers, nutritionists,

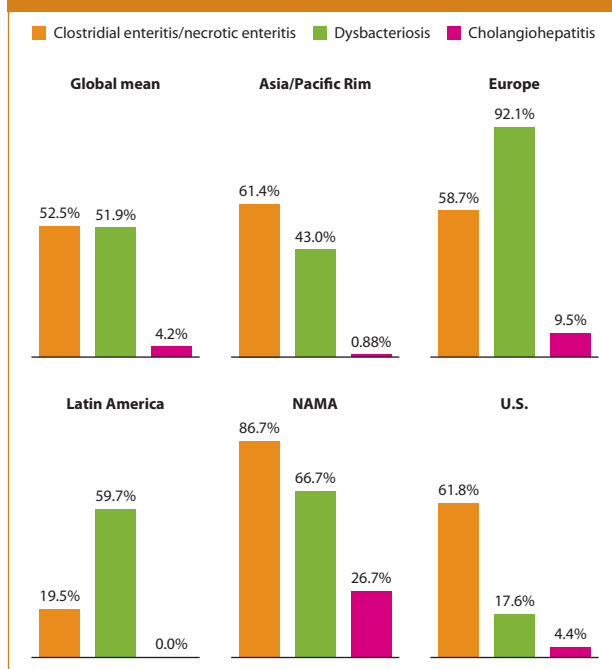
on-farm managers and other industry professionals from 38 countries. Participants were asked a series of 25 questions, including several questions repeated from past surveys, to assess prevalence, treatment, impact and attitudes about bacterial enteritis (BE).

This year's results confirm those from past surveys: BE continues to be very prevalent and affect productivity and profitability. However, the 2015 survey also found some interesting new trends in treatment initiation, perhaps as a way to mitigate these effects.

Prevalence

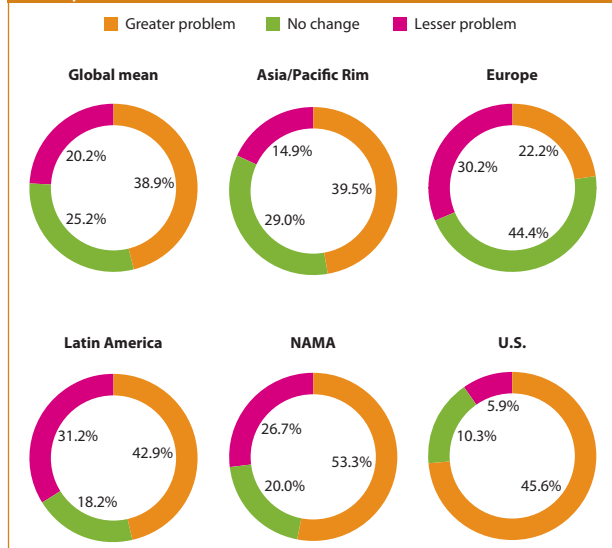
Nearly 75% of respondents reported diagnosing BE in their flocks at some time, and 78% said they were currently experiencing one of the three forms of BE at the time of the survey (Figure 1). Clostridial/necrotic enteritis and dysbacteriosis were reported overall at very similar rates (52.5% and 51.9% respectively), with cholangiohepatitis reported at low rates, except in North Africa/Middle East countries (NAMA), where it accounted for more than a quarter of cases

Figure 1 - Forms of bacterial enteritis.



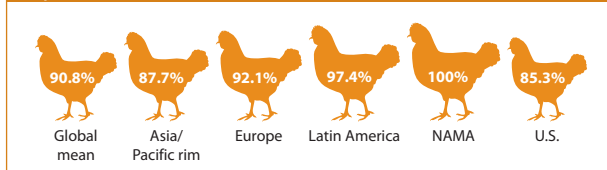
Clostridial/necrotic enteritis was seen most often (52.5%), but Dysbacteriosis was nearly as common, at 51.9%.

Figure 2 - Assessing the challenge of bacterial enteritis (compared to 2010).



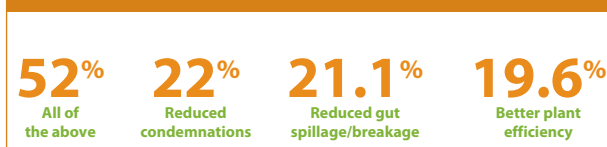
BE continues to be a big concern, with a majority of respondents (64.1%) believing the issue of BE is the same or worse than it was in 2010.

Figure 3 - Prevalence and severity of BE when coccidiosis is present.



The vast majority of respondents agree that BE prevalence and severity increase when coccidiosis is present. NAMA participants agreed 100% with this statement.

Figure 4 - Results at the processing plant.



Over half of the respondents agree that preventing coccidiosis results in several benefits at processing, including fewer condemnations, better plant efficiency and reduced gut breakage.

respondents had seen. Almost two-thirds (64%) of respondents feel the BE problem will remain the same or get worse over the next five years (Figure 2).

Signs and diagnosis

Diarrhoea and wet litter continue to be the signs most often associated with emerging cases of BE (as found in 2005 and 2010), and necropsy and clinical observation are still the preferred methods for diagnosing BE. High percentages of respondents associate coccidiosis with increased prevalence and severity of BE (Figure 3). Most respondents agree that preventing coccidiosis reduces issues at processing (Figure 4).

BE still impacting profitability

As in past years' surveys, respondents in 2015 indicated BE can significantly impact their profitability. Those surveyed identified disease, feed optimisation and missed target weight as the most important factors influencing operational profitability, and these are of course problems also directly related to BE. Over 90% of the respondents reported at least some performance loss caused by BE, with worsening feed conversion and weight gain being the most frequently cited issues (Figure 5). Over half of respondents estimated per-bird costs of BE at more than US \$0.05, or \$50,000 for every 1 million birds affected. North Africa/Middle East countries in particular associated BE with higher costs (Figure 6).

Treatment initiation trends earlier

As in past surveys, respondents were asked to look at photos of intestinal lesions and assess at what stage of illness they believe economic damage was likely to occur. About half of respondents said they believe economic losses begin at the earliest stage, an increase of nearly 5% compared to 2010 (Figure 7). More telling perhaps is that 45% of participants would also initiate treatment



In necropsy lesions can be found in the intestinal tract, respondents associate coccidiosis with increased prevalence and severity of BE.

PHOTO: WORLD POULTRY

at this earliest stage (Figure 7).

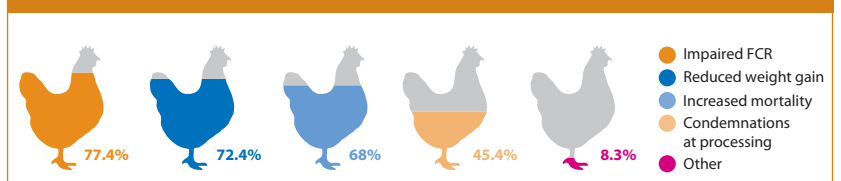
This 5% gap between perceived economic loss and initiating treatment is less than half that seen in 2010 (12%). This indicates that industry professionals are more closely associating sub-clinical disease with economic loss, and are more willing to start treatment sooner to offset potential harm to their profitability. Survey participants also seem to be trending toward earlier flock treatment, with most indicating they would initiate treatment when 5-20% of the flock is infected (Figure 8). In 2010, respondents favoured treatment when 20-30% of the flock was infected.

Treatment options remain the same

More than 75% of the survey participants indicated that their end-customers (retailers, slaughterhouses, exporters, etc.) preferred a preventive approach to managing disease. When it comes to preventing BE, respondents find water treatment and growth-promoting feed additives the most effective options, a trend that hasn't changed since 2010 (Figure 9).

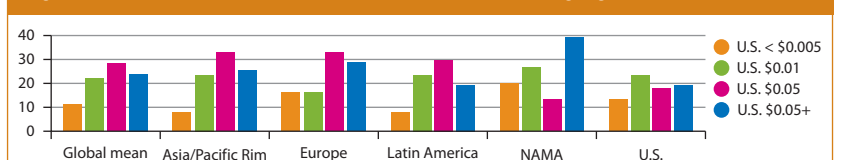
15 years after it was initiated, the BEGIA survey continues to provide valuable data on industry trends, disease prevalence and effects of bacterial enteritis.

Figure 5 - Negative economic impact of BE.



The effects of BE align directly with the economic concerns. 91% of respondents report some performance loss caused by BE. Impaired FCR and reduced weight gain continue to be leading issues.

Figure 6 - Estimated bacterial enteritis cost/bird through growout.



Over half of respondents (52.5%) estimated the cost of BE per bird at US \$0.05 or higher. This equates to \$50,000 for every million birds.

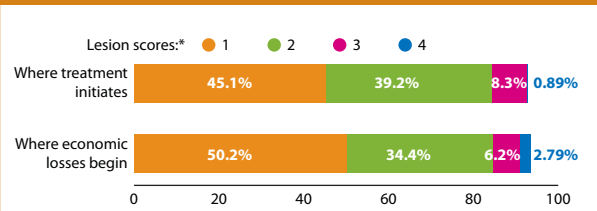


PHOTO: BERT JANSEN

Those surveyed identified disease, feed optimisation and missed target weight as the most important factors influencing operational profitability, and these are of course problems also directly related to BE.

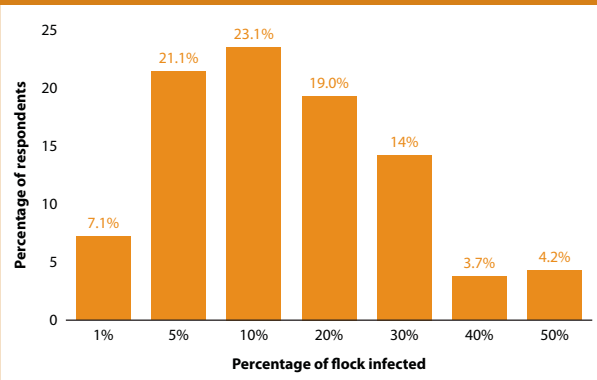
While the disease is still both prevalent and costly, poultry professionals around the world seem to be recognising the benefits of earlier treatment. The fact that respondents' preferences for the same diagnostic and treatment methods remain unchanged year after year hints at possible opportunities for better productivity and profitability if easier diagnostics and more prevention options became available. BE clearly continues to be a widespread, complex issue. If more improvements are made in prevention, diagnosis and treatment, producers will have a better chance to achieve and maintain Intestinal Integrity in their flocks and perhaps we will see even more positive changes in BE trends come 2020.

Figure 7 - Relationship between performance loss and treatment initiation.



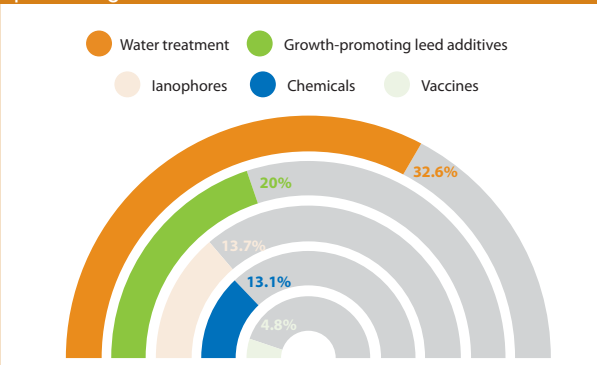
The gap between when respondents say economic loss begins and when they begin treatment is narrowing. In 2010, the gap between economic loss versus starting treatment in Stage 1 was 12%, now it is only 5%.

Figure 8 - Threshold of birds affected before treating the entire flock.



Opinions on when to treat the entire flock varied widely in the 2015 survey, but indicated a strategy of treatment before the flock is widely infected. The largest percentages clustered around 5-20%.

Figure 9 - Respondents' evaluation of efficacy for preventing BE.



Almost one-third of respondents rated water treatment as the most effective option for preventing BE, with vaccines ranked the lowest in efficacy. This mirrors the preference rankings from 2010.

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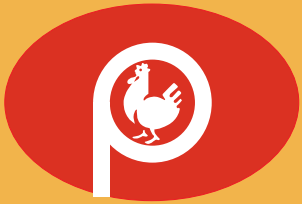
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IPPE 2016 aiming higher

Atlanta, Georgia is again preparing to welcome the global poultry industry to the IPPE in January. What can be expected from the event this time, especially in a country whose poultry industry is rebounding from a devastating disease outbreak?

By Rosie Burgin

Surpassing 1,200 exhibitors with more than 42,000 m² of exhibit space, the 2016 International Production & Processing Expo (IPPE) bodes once again to be a pivotal part of the poultry calendar. Comprised of the three integrated trade shows – International Poultry Expo, International Feed Expo and International Meat Expo – the world’s largest annual feed, meat and poultry industry trade show will be held 26-28 January at the Georgia World Congress Center in Atlanta. “We anticipate more than 28,000 attendees at the 2016 IPPE to learn about the latest products and services offered for the feed, meat and poultry industries,” said IPPE show organisers in the lead up to the event. The

Expo will highlight the latest technology, equipment and services used in the production and processing of feed, meat and poultry products. IPPE will also feature dynamic education programs addressing current industry issues, combining the expertise from AFIA, NAMI and USPOULTRY.

HPAI aftermath

The major talking point of the last year in the US has been the HPAI outbreak which spread across the Midwest. During IPPE USPOULTRY will sponsor a special program named “Highly Pathogenic Avian Influenza – Lessons Learned”, which will provide a valuable opportunity to learn about the recent outbreak of avian influenza in the United States from people who were actively involved in controlling the disease. Speakers will include experts from the US Department of Agriculture, as well as veterinarians from layer and turkey companies that were involved in the outbreak. “The 2015 HPAI outbreak was devastating to the US egg farming community,” said Chad Gregory, UEP president and CEO. “All sectors of the poultry and egg industry must be diligent in preventing the spread of future outbreaks, and this program will share important lessons learned.”

“This program will provide a timely reminder for our entire industry as we approach the spring migration period. Effective biosecurity measures are extremely important, now more than ever,” said John Starkey, USPOULTRY president. Topics will include details on the factors that contributed to the spread of

Over 1,200 exhibitors and 28,000 attendees plan to grace the halls of the Georgia World Congress Center in January 2016.

the virus and the efforts to develop vaccines for potential use in any future eradication efforts. Representatives of the commercial egg and turkey industries will provide valuable insight into the efforts required to control and eradicate the disease and give the audience an understanding of the challenges this disease provided to the commercial companies involved.

Rendering symposium

Once again, the expo will pay attention to the US rendering industry which collects and safely processes well over 50 billion pounds of animal by-products each year, converting these materials into fats and proteins used in animal feed, pet food and fuels. The rendering industry provides services for the safe collection of these materials and uses heat to dehydrate and separate the fat and solid materials. Rendering is a green, sustainable and vital part of the agricultural chain. The two-day International Rendering Symposium, sponsored by the National Renderers Association, will focus on the opportunities and challenges in the industry today. The symposium will begin with a virtual tour of a rendering plant followed by discussions of the usefulness and importance of rendered products in animal feed, pet food and aquaculture. The implications for rendering of the Food Safety Modernization Act, called the 'Most significant change in FDA regulation of feed since 1958', will be discussed along with how rendering influences sustainability, quality, and safety of animal and pet food.

Input costs, global competition and increasing regulatory requirements present ever-changing challenges for the poultry and egg industry. Seeking to address these challenges, the Market Intelligence Forum is returning to the IPPE in 2016. The program will identify the key issues facing the industry and provide understanding into how domestic and international poultry industries are positioned to move forward in 2016. "The Market Intelligence Forum continues to be a popular program on the Expo schedule, and we are pleased to include it again in the 2016 education line-up. It is important to stay

informed on current conditions and projections for the future affecting the poultry and egg industry. This program helps keep industry leaders up-to-date on the many factors that influence financial performance," said Sherman Miller, Cal-Maine Foods, Jackson, Miss., and USPOULTRY chairman. The program will feature a leading economist, a policy advocate and an industry performance analyst.

Addressing sustainability

The eighth annual Animal Agriculture Sustainability Summit will also be held during the event. This timely program will compare the sustainability of today's industry to the past and provide viewpoints from industry and agriculture experts on sustainability and why it matters to the animal agriculture industry. The Summit will also highlight the poultry industry sustainability workgroup's efforts to develop a sustainability assessment program to identify measurable indicators that can gauge industry's efforts to maintain and improve its sustainability.

This year's Animal Agriculture Sustainability Summit will include a presentation by Dr Marty Matlock and Dr Greg Thoma, University of Arkansas, on a 'Retrospective Analysis of US Poultry Production – A 50 Year Comparison of the Meat Bird Industry'. Dr Joy Mench, University of California, Davis, will discuss 'The Sustainability of the Layer Industry – Laying Hen Housing Research – The Coalition for Sustainable Egg Supply'. Dr Claudia Dunkley, University of Georgia, will review a 'Carbon Footprint Tool for Poultry and Egg Producers', and a panel discussion by the Poultry & Egg Sustainability Workgroup will provide an update on the Poultry and Egg Industry Sustainability Assessment Program. The Summit will conclude with a ceremony to recognise and present honours to winners of USPOULTRY's 2016 Family Farm Environmental Excellence Award.

Side events

Other events taking place during the three day expo include a Poultry Handling and Transportation "Train the Trainer" Workshop for poultry transporters and catch crews. The American Feed Industry Association (AFIA) will host its free Feed Production Education Program, providing amongst other things updates on biosecurity in feed mills and energy management in feed mills. USPOULTRY will also hold its second annual Spanish Technical Seminar for Maximizing the Efficiency of the Poultry Industry. Conducted entirely in Spanish, the program will discuss improvements in the areas of breeding, incubation, grow-out, egg production, processing and health. Additionally the annual International Poultry Scientific Forum will present information on industry topics such as environmental management, nutrition, physiology, pathology, processing and products, and avian diseases. After completing a record-breaking year in 2015, the IPPE was recognised by Trade Show News Network (TSNN) as ranking 48th on the 2014 TSNN Top 250 Trade Show List in terms of net square footage. This ranking has also made IPPE eligible to be one of TSNN's Top 50 fastest growing shows. The organisers are hoping to capitalise on this success in 2016 by providing something for everyone from all walks of poultry life during the three day event.

IPPE visitor facts

Opening hours:

Tuesday, 26 January:

10 am – 5 pm

Wednesday, 27 January:

9 am – 5 pm

Thursday, 28 January:

9 am – 3 pm



Location: Georgia World Congress Center, Atlanta, Georgia, US

Registration: All details concerning registration for IPPE can be found on the website www.ippexpo.org. Pre-register for the discounted price of \$50 (USD) is available online up to 31 December 2015. From January 1, 2016, the registration fee will increase to \$100. A complete listing of the available programmes can also be found on the IPPE website.

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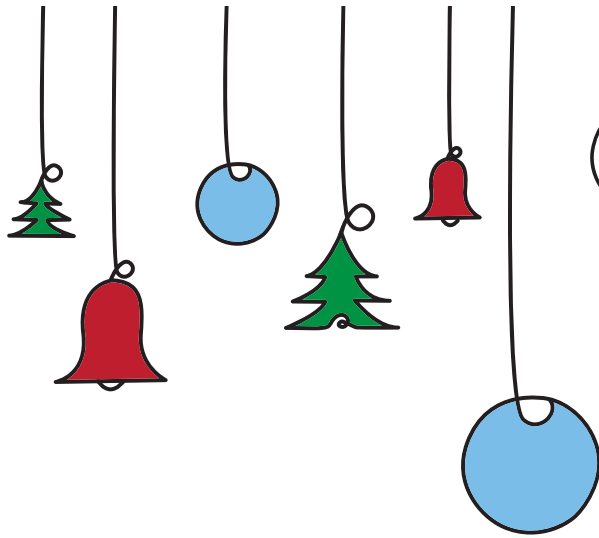
We create chemistry



Novel barn concept

In a quest for more animal welfare, less impact on the environment and last but not least profit for the broiler farmer - a Dutch consortium of companies and research institutes launched a novel barn concept, the 'Windstreek' barn. Commissioned and operated by independent poultry farmer Robert Nijkamp, the house does away with everything the industry is used to having. No mechanical ventilation and no conventional heating system makes this house exceptional as does its design. The barn houses 26,000 chicks at 12,5 animals per square metre produced for the alternative free range market.





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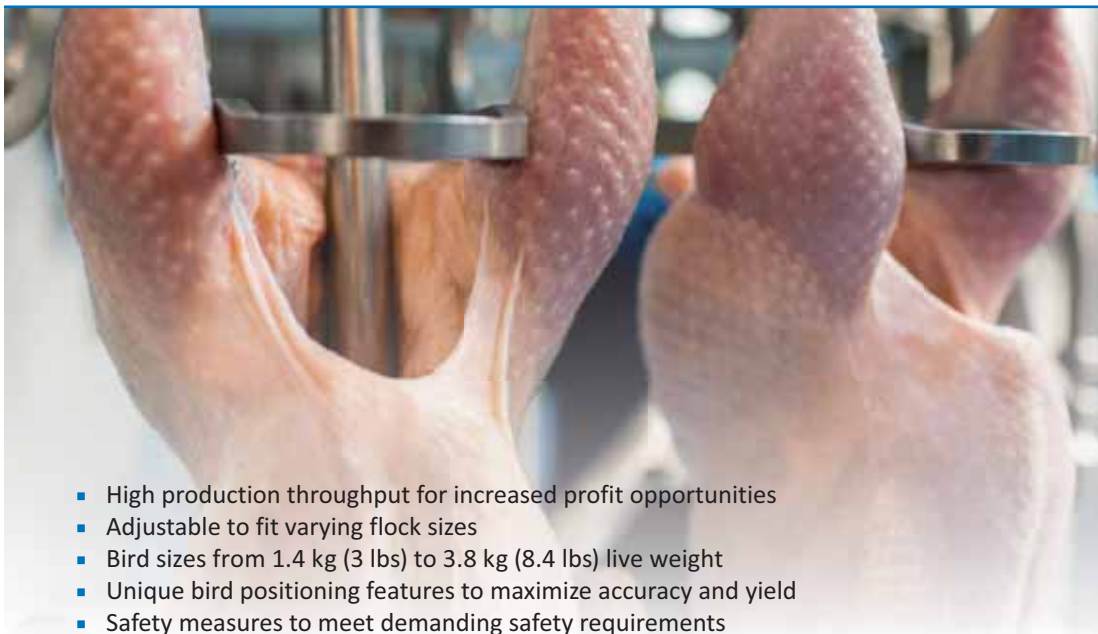


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Chelated trace minerals improve performance in layer and broiler breeder hens



Improved performance and stronger egg shells are some of the traits enhanced by chelated trace minerals.

PHOTO: WORLD POULTRY

Genetic selection has dramatically increased the performance of broiler and layer breeders, which also increased the overall demand for supplemental nutrients in diets. Subsequently, nutritionists have the responsibility to ensure the health and productivity of the flock in addition to the quality of the egg and resulting chick. Trace minerals such as zinc, copper and manganese are essential to ensure adequate performance of the animal. They function both as enzyme cofactors and as constituents of metalloenzymes.

By Dr Ajay Bhojar, Novus International

It is trace minerals which are key to egg and progeny development. Zinc in particular is a constituent or activator of hundreds of enzymes and is essential for many aspects of growth, including DNA synthesis. Zinc also has an integral role in the synthesis of two important functional proteins: collagen and keratin. These proteins have a significant impact on embryonic and post-natal development. Collagen is the major structural protein of internal tissues, including cartilage and bone. Keratin is the structural protein of feathers, skin, beak and claws. Zinc also influences

chick development because of its effect on appetite. A deficiency or excess of zinc is associated with anorexia.

Copper is essential for reproduction and embryonic development and plays an important role in the proper crosslinking of collagen and elastin. Manganese is also essential for growth and fertility. It is crucial for embryonic and post-natal bone development of the growing chick.

When considering eggshell formation and integrity, zinc, copper and manganese are all important components for a strong shell. A zinc deficiency can lead to reduced shell weight and strength, as it is involved in supplying carbonate ions during shell formation. As shell membrane fibres are distributed, a

lack of copper can result in egg-shape deformation and abnormal mechanical properties. Additionally, manganese activates an enzyme involved in the creation of glycosaminoglycans, which are components of proteoglycans. The proteoglycans are present in the eggshell matrix and are involved in the control of its structure and texture.

Zinc, copper and manganese play a role, either individually or in combination, in supporting growth, production and maintenance of the structural integrity of tissues. Therefore, supplementing hens with highly bioavailable chelated sources of trace minerals will support not only the quality of eggs from breeder hens, but also hatching rate and progeny quality. Increased bioavailability of chelated trace minerals can translate into improved performance, tissue development and integrity; as seen with improved eggshell breaking strength, hatchability, embryo development and chick quality. Enhanced immune response to vaccination and growth performance reflected by improved growth and feed conversion can also result from increased trace mineral bioavailability. The increased bioavailability is attributable to reduced antagonistic reactions with other dietary constituents in the gastrointestinal tract. Use of a chelated trace mineral source, such as a metal methionine hydroxy analogue chelate (MMHAC), allows nutritionists to reduce the trace mineral content of the feed, while still meeting the animal's nutritional requirements and improving key production parameters.

Improved breeder longevity

Longevity accounts for the number of days of life of a breeder hen. It is the time period between the date of housing and death, or removal from the house. Optimal longevity includes low culling and mortality rates and consistent egg production throughout the entire lay cycle, as well as maintained production during the late lay period. In order to remain highly productive throughout the entire lay cycle, birds' immune systems and tissue integrity must remain in peak condition. Healthy birds remain in production longer, and optimal nutrition is a pre-requisite for optimal breeder performance.

Research conducted with broiler breeders from 18 weeks to 59 weeks of age shows including MMHAC in the diet decreased mortality by 13.53%, compared to breeder hens fed inorganic trace minerals (ITM) (Figure 1). Most important to breeder longevity, trace minerals can have a direct impact through improved immune response. More specifically, most adequate immune systems are due to strong gut health and tissue integrity. When fed MMHAC, data shows broiler breeders have an enhanced coccidiosis immune response after being challenged with all three Eimeria species on Day 24 (Figure 4). As a factor of tissue integrity and gut health, intestinal strength also provides a measure to ensure adequate supplementation of trace minerals is being provided. Trial results show birds supplemented with MMHAC have improved strength of the Jejunum portion of the gut (Figure 5).

Given today's intensive production system and consequential pressure for birds to continually meet performance parameters under various stressors, optimal trace mineral nutrition is more important than ever. In order for birds to maintain peak performance and produce the desired quality of eggs for longer periods of time, producers should look at all potential

Table 1 – Impact of Feeding ITMs versus MMHAC Zn, Cu and Mn on Egg Trace Mineral Content (Source Effect).

Trace mineral	ITM ¹	MMHAC ²	Difference, %	P-value
Zinc, mg/kg	40	42	+5%	0.036
Copper, mg/kg	2.6	3.2	+23%	0.06
Manganese, mg/kg	0.85	0.91	+7%	NS ³

¹ITM Inclusion level (mg/kg): 30:10:30 Zn/Cu/Mn
²MMHAC inclusion level (mg/kg): 20:10:20 Zn/Cu/Mn
³NS: Not Significant

Table 2 – Growth Performance of 42-day-old Chicks from Breeders Fed Different Sources of Minerals.

	ITM	MMHAC	Improvement, %	P-value
Body weight, kg	2.099	2.247	7%	0.051
Feed intake, kg	3.575	3.723	4%	0.446
Feed conversion ratio	1.704	1.671	2%	0.014

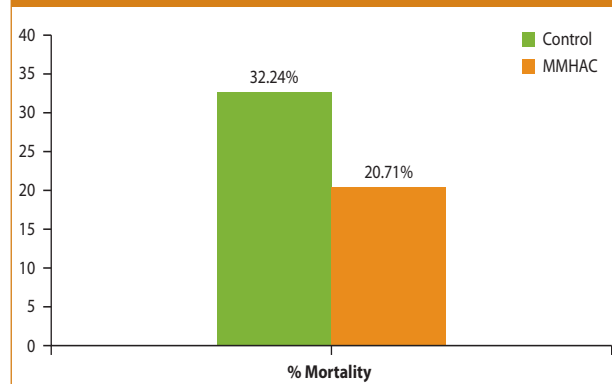
avenues to solve breeder longevity issues. Utilising high-quality chelated trace minerals, such as MMHAC, increases flock longevity by supporting a strong immune system and tissue integrity, resulting in optimum production of quality eggs, with improved hatchability and chick quality. MMHAC provides a thorough trace mineral supplementation approach to address this prevalent industry pain.

Egg production, eggshell strength and hatchability

Research conducted with layer breeder producers in commercial conditions showed dramatic improvements in key production parameters for hens fed MMHAC. In one study, a 4.1% increase in total egg production per housed hen and a 4.9% increase in hatchable eggs per housed hen resulted with the inclusion of MMHAC in the diet rather than ITM sources of zinc, copper and manganese (Figure 1). Additionally, a consistent improvement in eggshell strength was seen in those layer breeder hens fed MMHAC over the 80-week period of the trial (Figure 2).

These results support replacing standard ITMs with MMHAC at lower supplementation levels to promote improved performance and stronger eggshells over the lay period, especially

Figure 1 - Comparison of mortality percentages in broiler breeders fed MMHAC vs ITMs.



after 60 weeks of age when production begins to decrease. In a separate study, done with 15,200 heavy breeders, the inclusion of trace minerals as either MMHAC or a sulphate/oxide combination was compared. For birds fed MMHAC, the percentage of embryos alive at 18 days was improved and hatching rate increased by 2% at 36 weeks of age.

Embryo development

It's important to realise that embryos develop outside the hen's body. Therefore, mineral content in the egg yolk is crucial for optimum embryo development and progeny growth. In a research trial (Sun et al., 2012a), the inorganic source of zinc, copper and manganese was replaced with the corresponding MMHAC at a reduced level, and the mineral content of the egg yolks was measured (Figure 4). This trial demonstrates commercial producers can improve embryo development by improving the trace mineral supply to the embryo, while reducing the diet's overall mineral content. Given the physiological impact of trace minerals, this can favour the resulting chick's immunity development and livability. This relationship can be further assessed by measuring the extent of bone mineralisation in the day-old chick.

Chick viability

To support improved progeny growth performance by including MMHAC in the diet, a trial was conducted to analyse the growth performance of 42-day-old chicks from hens fed different sources of trace minerals. Hatched healthy male chicks were randomly selected and fed a common commercial ration with inorganic mineral sources. Upon analysis, feeding MMHAC to broiler breeders increased the body weight, feed intake and feed conversion of progeny at 42 days of age (Figure 6).

A major element in profitability of both layer and broiler breeder poultry operations is hen longevity. As birds are usually pushed to produce more eggs for extended periods of time, the additional stress can lead to decreased performance, and even increased mortality. In order to support optimal performance, nutritional factors should be considered to provide a stable basis from which birds can perform.

Reaching full potential

Trace minerals such as zinc, copper and manganese play an essential role in the maintenance of the health and productivity of the breeder bird. Supplementing breeder diets with MINTREX chelated trace minerals (MMHAC) maximises egg production and hatchability up to 80 weeks of age when compared to other organic and inorganic mineral sources. Additionally, the inclusion of MINTREX in breeder diets supports increased mineral levels in the egg yolk, which then become available to the developing chick. As a result, the formation of key structural components, such as collagen and bone, is enhanced, as is the viability of the day-old chick. This additional nutritional support helps the chick to fully reach its genetic performance potential. The highly bioavailable forms of MINTREX achieve these effects at lower dietary concentrations than inorganic sources, thus reducing environmental impact and increasing profitability of breeder operations.

Figure 2 – Enhanced coccidiosis immune response with MMHAC supplementation.

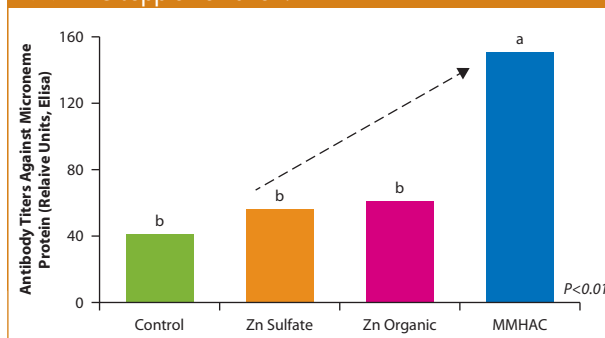


Figure 3 – Enhanced intestinal strength with MMHAC supplementation.

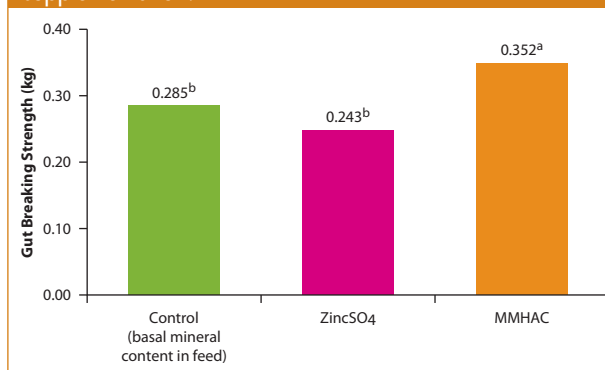


Figure 4 – Effect of ITMs vs MMHAC Zn, Cu and Mn on total egg production and hatchable eggs per hen household.

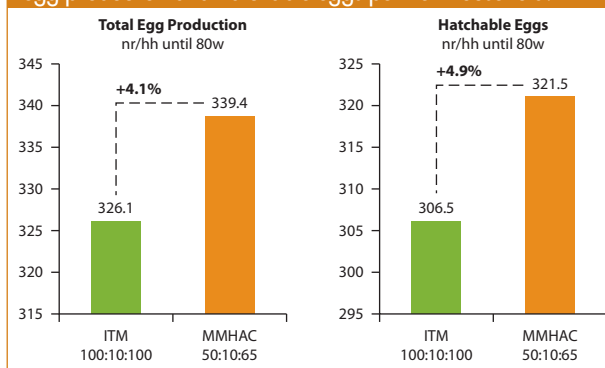
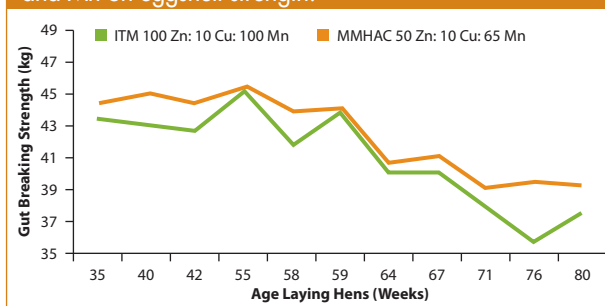


Figure 5 – Effect of inclusion of ITMs vs MMHAC Zn, Cu and Mn on eggshell strength.





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Endotoxins and their negative impact on poultry

Recent research shows that exposure to lipopolysaccharides through dust in the environment impairs the immune response in chickens and can lower resistance against pathogenic insults.

PHOTO: MARK PASVEER

Endotoxins, present everywhere in a broiler's environment, pose a genuine threat that can impair the immune system and performance. A multi-strategy toxin risk management solution can counteract both endotoxins and mycotoxins.

By Simone Schaumberger, Biomim Austria

Endotoxins, are part of the outer membrane of the cell wall of all Gram-negative bacteria (*E. coli*, *Salmonella*, *Shigella*, *Pseudomonas*) that are released from the bacterial cell wall by shedding or through bacterial lysis. These toxins called also lipopolysaccharides (LPS) because of their structure, consisting of a lipid and a polysaccharide (*Figure 1*). While there are many natural sources of endotoxins, for example, air, dust, food, water, and faeces, the major source is the gastrointestinal tract.

Endotoxin contamination – why we should care

Poultry are exposed to lipopolysaccharides throughout their lives. In healthy birds, the intestinal and other epitheliums

such as skin or lungs, represent an effective barrier that prevents the passage of lipopolysaccharides into the blood-stream. Once there, however, endotoxins can elicit strong immune responses, weakening birds' immune systems and impairing performance. Severely pronounced immune response can lead to septic shock.

Recent research shows that exposure to lipopolysaccharides through dust in the environment impairs the immune response in chickens and can lower resistance against pathogenic insults. For these reasons, greater care regarding endotoxin exposure is crucial for proper animal health and performance.

Flock exposure

In recent years, new concerns have emerged about nutritional, environmental, and social factors that may disrupt the barrier function and/or increase exposure to lipopolysaccharides. Such



PHOTO: JAN WILLEM VAN VLIET

Dietary changes play a clear role. For example, moving birds from a corn-based diet to a rye-wheat-barley diet was shown to increase lipopolysaccharide levels in blood serum along with inflammatory markers.

exposure may result in clinical or sub-clinical signs that ultimately affect poultry production. Septic shock is very often related to infection by pathogenic Gram-negative bacteria that produce lipopolysaccharides. However, the presence of lipopolysaccharides in blood can also be due to metabolic or gut barrier problems along with issues related to the intestinal microflora. Given that many of the factors vary from bird to bird, a combination of factors as a whole will result in disparate impacts within a flock.

Dietary changes play a clear role. For example, moving birds from a corn-based diet to a rye-wheat-barley diet was shown to increase lipopolysaccharide levels in blood serum along with inflammatory markers. Other factors can significantly contribute to endotoxin-associated problems. For instance, in summer high temperatures inside poultry units can induce heat stress. In other livestock species, it is well established that a 1-20°C increase in inner body temperature causes the intestinal tight junction proteins to be affected, thereby increasing intestinal permeability and allowing more lipopolysaccharides to enter the blood stream. Whether the same mechanism applies to poultry is currently under investigation. Sub therapeutic use of antibiotics in some countries not only raises concerns about antibiotic resistance but also about the change in gut microflora and the plausible release of lipopolysaccharides in the gut lumen that results from killing Gram-negative bacteria. In addition, mycotoxins such as deoxynivalenol are also very well known to disrupt the intestinal barrier. The multitude of factors relating to lipopolysaccharide exposure helps explain the disparate impact on birds.

Reducing LPS in birds

A trial was conducted with the aim to investigate the influence of a multi-component mycotoxin deactivator (Mycofix® Select, MSE) on performance and health status of broiler chickens fed diets naturally contaminated with mycotoxins in an

environment with high pathogen pressure from *E. coli*. Over 600,000 day-old broiler chickens (Ross or Hubbard) were investigated in this field study. The animals were allocated on three different farms. On each farm two houses were compared at the same time (control vs group fed MSE). In each production cycle the birds were kept until 35 days of age. The feed contained a mixture of mycotoxins consisting of B-trichothecenes such as deoxynivalenol (200 ppb), fumonins (470 ppb) and zearalenone (75 ppb).

Besides performance parameters, intestinal content samples were taken for surveying the endotoxin load. *Figure 2* displays the results for the endotoxin concentration in stomach content of broilers at the end of the trial. The addition of a multi-component mycotoxin deactivator proved to be effective, counteracting low level of mycotoxin challenges in combination with *E. coli* pressure.

Overall performance of broiler chickens was enhanced; the endotoxin load in the gut lowered and the negative effect of *E. coli* was reduced. These results reinforce the importance of counteracting the effects of endotoxins in order to protect birds' health and improve performance.

Figure 1- Gram-negative bacterial endotoxin lipopolysaccharide, LPS).

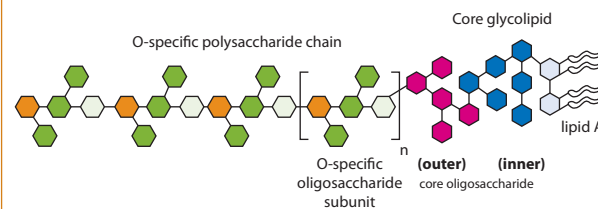
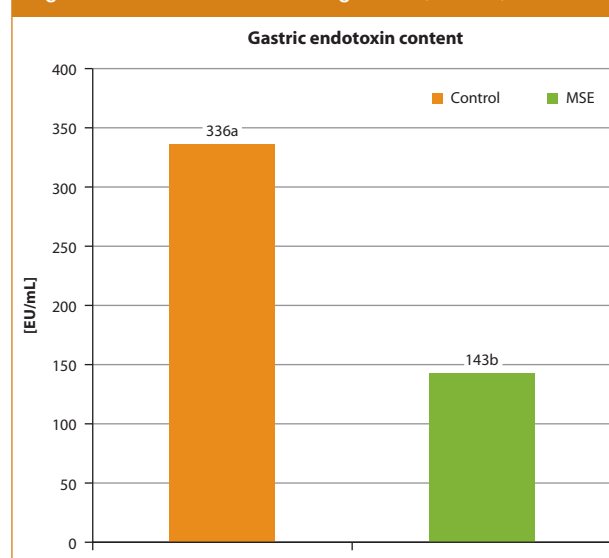


Figure 2- Endotoxin content in gizzard (EU/mL).



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Troubleshooting hen performance by benchmarking

Nowadays, chicken breeds are becoming more and more efficient. With the continuous improvements in genetics, housing and feeding equipment, good and accurate record keeping throughout the bird's life is becoming crucial. With accurate records, managers can more easily identify areas for improvement for future flocks.

By Dr Alvin P. Arucan, Cobb-Vantress Asia

Benchmarking is a tool to help identify the best performance being achieved by a particular company, a competitor or the industry in general. This information can then be used to identify shortcomings in a company's procedure or processes in order to achieve a competitive advantage. Successful businesses that continuously aim for improvement are the ones setting goals and targets using KPI's (key performance indicators) to drive and measure progress towards attaining world class performance. Benchmarking can be internal, competitive or strategic in nature.

Benchmarking in troubleshooting breeder performance

It is preferable to compile information for the entire sold flock data and on a year-to-year basis, compare the top performing flocks within the company, as well as the worst performing flocks. At first, it will be advisable to compare the flock in terms of total eggs/hen housed (TE/HH) and calculate the top 25% performing flocks as well as the worst 25% flocks. We can now compare the programs implemented (growing weights and feeding pattern etc.) of these top performing flocks and use it as a guide for potential future revision of the program.

Achieving the right bodyweight during rearing plays a vital role in successful laying flock performance and analysing this data will help to fine tune the management program from time to time. The accuracy of this data cannot be compromised at any time, as this would make it difficult to assess hen laying performance. Another benefit of benchmarking and consistent data collection is establishing trends on flock performance.

Internal benchmarking

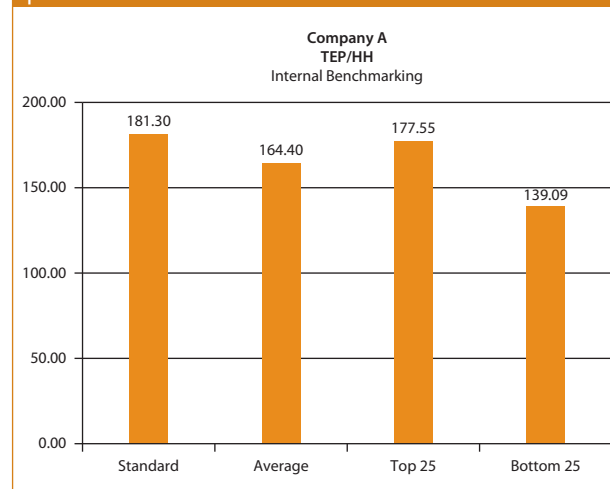
Internal benchmarking is used when a company has already established and proven best practices and needs to share them. Usually, internal benchmarking is made during the

budgeting process before the end of the year, but this can be an ongoing process, or carried out every six months, to identify rearing and production programs which had achieved the best results. To start this internal benchmarking, there is a need to identify the best performing flocks for the year - probably the top 25 flocks - and use this data as a target for benchmarking.

Comparing the flocks

Almost all poultry companies have their own databases of production results on an individual flock basis. These flocks can be ranked through the parameters each company chooses. Some basic information needed for completed flock results includes number of pullets capitalised, number of hens sold, feed/female up to capitalisation age (male feed included), total Egg Production (TEP/HH) and of course total Hatching Eggs (THE/HH), % Hatchability for Life of

Figure 1 - Initial step is to identify the hen performance using Total Egg Production (TEP)/Hen Housed as parameter.





Cobb-Vantress is collecting as much data as possible not only to evaluate the actual commercial performance of the breed, but also to help customers set their goals and be more competitive within their respective country, region or globally.

Flock (LOF) and total Chick/Hen Housed.

Flocks can then be sorted according to the chosen parameters. The most common category to start with is the Total Egg Production/Hen Housed, (TEP/HH) adjusted to a common sell age as this is the most accurate parameter to measure hen performance (Figure 1).

Troubleshooting and data analysis

Now that the overall performance based on TEP/HH has been identified, it is time to go into the details. Since we have identified the top 25%, we need to see how their management practices compare with those of the bottom 25% flocks. Common comparisons include bodyweight during rearing, and feeding pattern. In Figure 3, we can see the bodyweight of the top 25% flocks has a smooth transition from the start until peak production, while the bottom 25% started to get heavy at five weeks of age but became underweight just before light stimulation, which is a big mistake. The actual bodyweight gain (22%) from 16 to 20 weeks of age of the bottom 25 flocks was also not achieved. The top 25 flocks became slightly overweight from 15 weeks, but remained parallel to the standard weight and achieved a 33.5% bodyweight gain from 16 to 20 weeks of age. The pullets need to have at least a 33-36% gain at this age. This is necessary for proper accumulation of pelvic fat as well as proper fleshing development. Low bodyweight gain is the main reason behind why a bottom 25 flock doesn't sustain good production (Figure 2).

The pullet feeding (Figure 4) also showed that the early heavy-weights from five weeks with the bottom 25% flocks

Figure 2 - Actual production comparing the standard, average, top 25 and bottom 25 performing flocks.

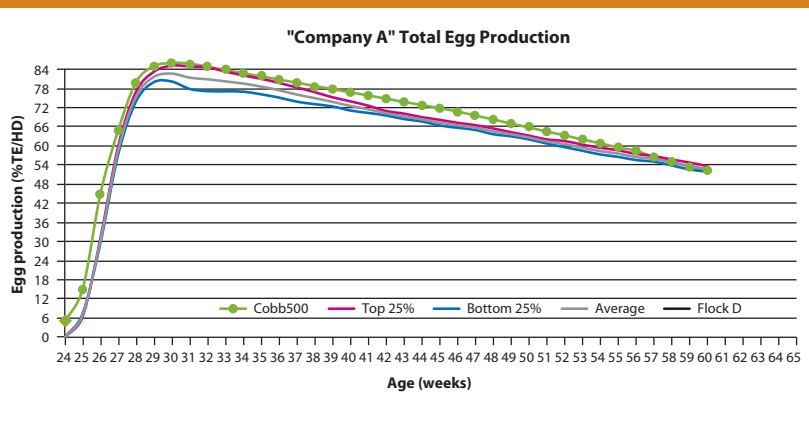


Figure 3 - Pullet weight profile of the top 25% and bottom 25% flocks.

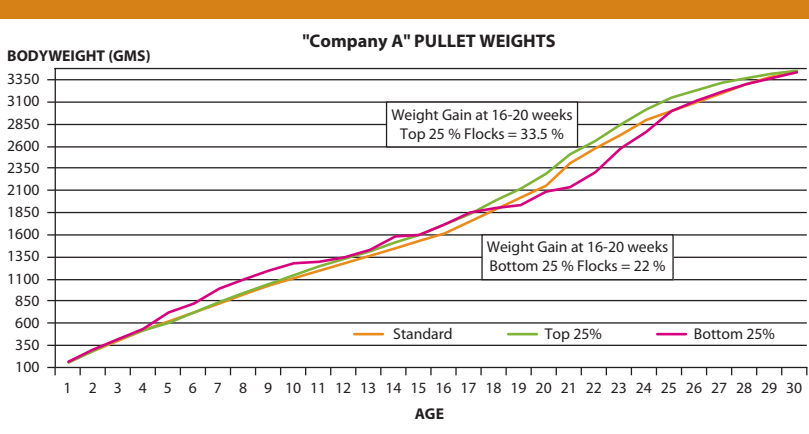


Figure 4 - Cumulative feed amount of the top 25% and bottom 25% flocks.

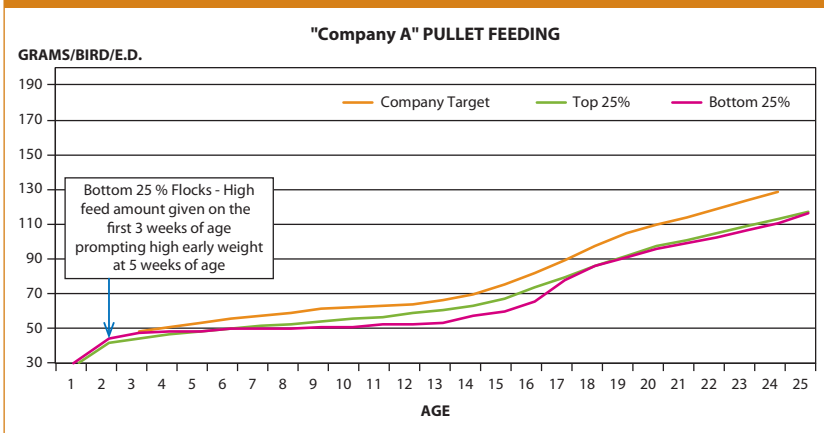
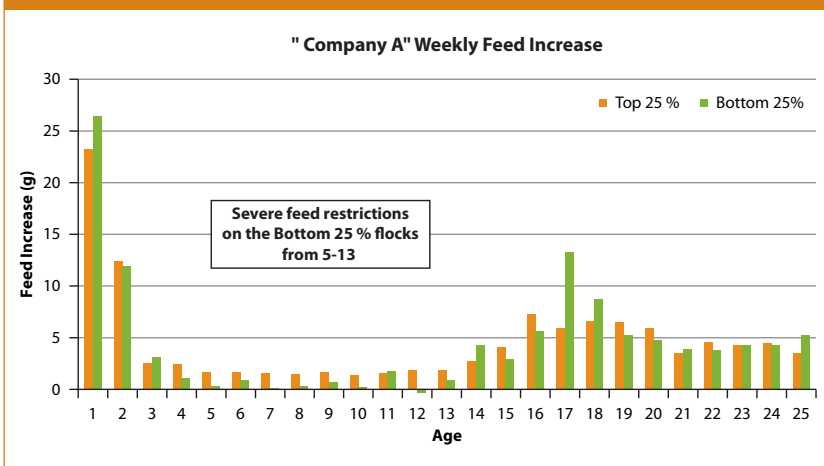


Figure 5 - Feeding curve of the top 25% and bottom 25% flocks.



were caused by too much feed during the first three weeks of age. There was also a severe feed restriction from 5 to 13 weeks as a response to the continuous increase in body-weight at the same age (Figure 5), but this restriction eventually significantly affects the flocks as the birds become underweight from 18 to 24 weeks of age (Figure 3). Underweight pullets at this age will not respond properly to light stimulation.

One of the major responsibilities of today's breeder manager is to analyse the details of existing and previous breeder performance. This information must be used to determine viable programs for good breeder performance within the company's environment, covering both pullet and laying management. This exercise will show up meaningful differences based on solid data - and not opinion. These graphs are actual examples of the methods to analyse flock performance.

Competitive benchmarking

Competitive benchmarking is used when a company wants to evaluate its position within its industry or country or within a region. This is usually done by the company to

boost morale of the workforce in achieving goals and help become competitive within the industry (Figure 6).

Strategic benchmarking

Strategic benchmarking is highest form of benchmarking, where a company identifies and analyses best practices towards achieving world class performance. The company will then compare its own performance against the world average performance and/or top 25% performing flocks (Figure 7).

Finding opportunities

Cobb-Vantress is collecting as much data as possible not only to evaluate the actual commercial performance of the breed, but also to help customers set their goals and be more competitive within their respective country, region or globally. Cobb guarantees confidentiality for all customers supplying data by keeping the details of identity and location private; the source of the flock results are never divulged. By working with customers on flock results and focusing on the breeder programs and best practices, Cobb helps to discover areas of opportunity within the company's management program, building the strengths of each customer within their own environment.

Figure 6 - Competitive benchmarking where a company compares its own performance against the industry/country or regional performance.

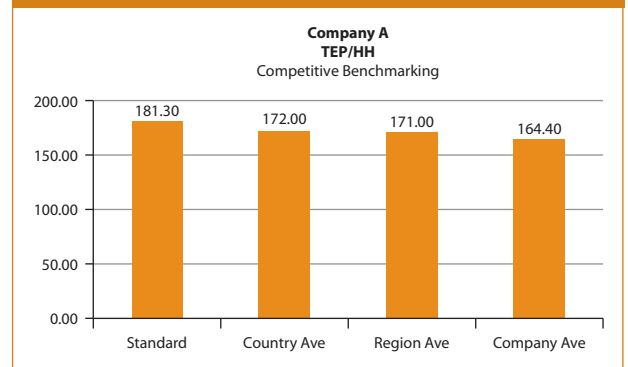
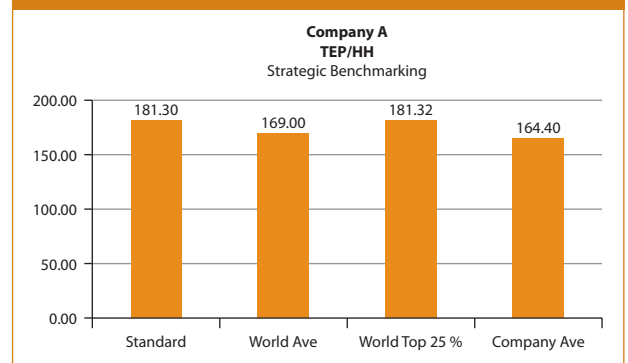


Figure 7 - Strategic benchmarking comparing company against the world average and world's top 25% flocks.



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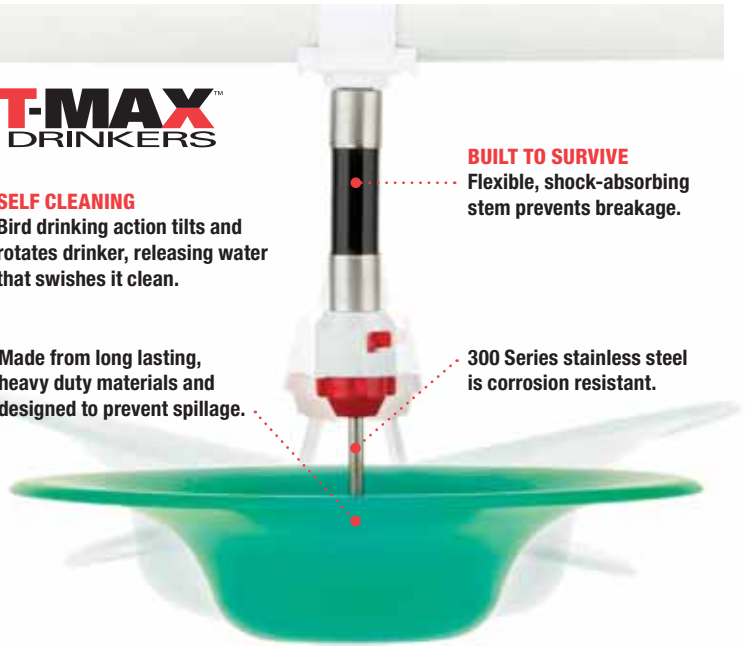
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Importance of gut active feed ingredients

Ensuring an optimal gut environment and micro-flora profile, reduces the risk of diseases in the animals. It enables efficient nutrient uptake and is used for the birds' own growth. Prebiotics, which feed the beneficial bacteria and can bind the harmful varieties, have emerged as the main choice for many poultry producers.

By Dr Jules Taylor-Pickard

Keeping the gut healthy, i.e. free of pathogenic challenges, is important to the productive performance of poultry. Since the 1960s, when the widespread use of prophylactic antibiotics began in poultry feed, producers have recognised the need for controlling potentially disease causing bacteria colonising the gut. However, times have moved on substantially since then. Genetics have improved, giving bigger birds a shorter period to slaughter and feed conversion ratio (FCR) of 1.5 and below in certain countries. Whilst management practises have typically become more focused on welfare and hygiene, intensive and extensive poultry rearing remains vulnerable to disease. Whatever enters the animal can be a source of infection. Feed and water must be clear of infectious agents before they are consumed by the flock. Feed has been a major focus for preventing the transmission of disease-causing agents entering the birds and contaminating the entire flock. As the late 1990s saw the ban on using in-feed antibiotics in poultry diets, the need for acceptable alternatives has seen a large amount of research devoted to this area. Nowadays, poultry feed typically include proven technical ingredients which negate the effects of pathogens entering the animal at the time the feed is consumed and enters the gut environment. Ensuring an optimal gut environment and micro-flora profile, reduces the risk of diseases in the animals. It enables efficient nutrient uptake and is used for the birds' own growth. This is much more desirable compared to a situation where the pathogens use nutrients and there is extra requirement for maintaining the gut wall from damage caused by toxins and colonisation or launching an immune response to the disease, both of which require a high proportion of energy and other factors.

Beneficial bacteria

Prebiotics, which feed the beneficial bacteria and can bind the harmful varieties, have emerged as the main choice for many poultry producers. Such ingredients assist in preventing wet litter and, thus, increased ammonia within poultry houses, which pose a problem for both the animals and the personnel employed

looking after them. Many countries have limits on wet litter and ammonia in the atmosphere, with some in Scandinavia preventing the sale of poultry which have foot and breast lesions caused by poor bedding conditions. This article looks in depth at some of the newer research on zootechnical ingredients which ensure the maintenance of the gut in terms of a beneficial microflora. Prebiotics have dominated the research for ensuring gut health and poultry performance since the late 1990s. These are natural carbohydrate fractions, typically mannan-oligosaccharides, which have the ability to bind pathogens that have fimbriae flagella on their surface, which they use to attach to the gut wall, enabling colonisation (*Figure 1*). When an oligosaccharide prebiotic is present in feed, it selectively binds the fimbriae, preventing bacterial adherence and colonisation of the gut. However, new advances in science have allowed the evaluation of multiple activities of such products on more than just the binding of pathogens.

New science

Recently, data has become available on the novel prebiotic, Actigen®, from Alltech, a specialist mannan-rich fraction isolated from a specific strain of yeast. The new science of nutrigenomics, whereby the influence of dietary components or pronutrients on

Attachment of bacterial fimbriae to oligosaccharides.

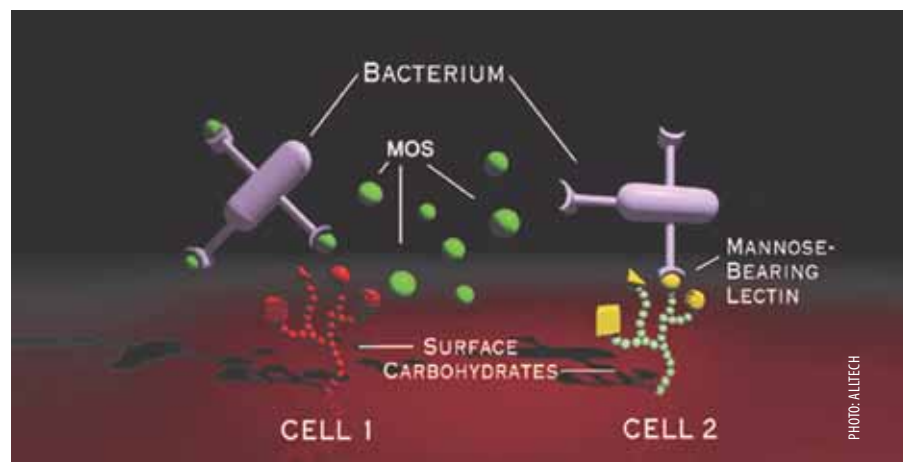
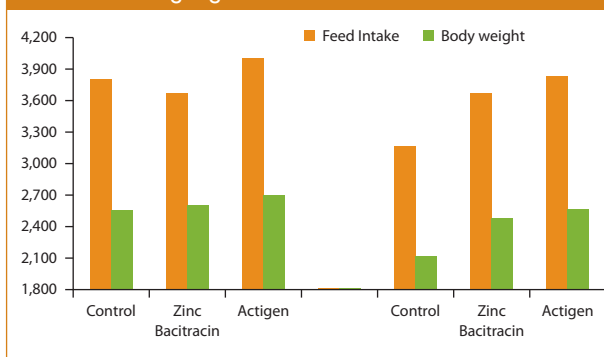


PHOTO: ALLTECH

genetic expression is analysed, has proven convincingly that Actigen has unique properties. Nutrigenomics compares the expression of several thousand genes, thus gaining a much more comprehensive understanding of how a dietary component affects the metabolism and health of the bird. In a challenge model, analysis of Actigen showed that it increased intestinal enzyme production, reduced cell cycling and heat shock protein production, indicating improved digestion, intestinal health and reduced stress. An analysis of the extensive list of published broiler growth trials, which compared Actigen supplemented diets to a negative control, showed 129g higher body weight, 4.5 points improvement in FCR and reduced mortality by 0.76%. In a necrotic enteritis challenge model, Actigen prevented most of the negative effects on body weight and feed intake (Figure 2) when compared to a negative control or a diet supplemented with an antibiotic.

A further trial was conducted at Gent University, challenging birds with *Campylobacter jejuni*. Supplementing Actigen in feed from the first day increased viable *C. jejuni* cells, which demonstrated that 800ppm Actigen in feed could prevent colonisation of the primary bird in a flock with limited *C. jejuni* exposure and so prevent total flock colonisation. The importance of gut health in poultry cannot be underestimated. Products such as Actigen

Figure 2 – Influence of Actigen versus control or antibiotic in challenge trials with necrotic enteritis (right graph) versus no challenged birds (left graph) on feed intake and weight gain.



have proven efficacy in maintaining gut environment and function and thus enable good digestibility of nutrients and minimising the opportunities for disease-causing organisms and preventing performance losses.

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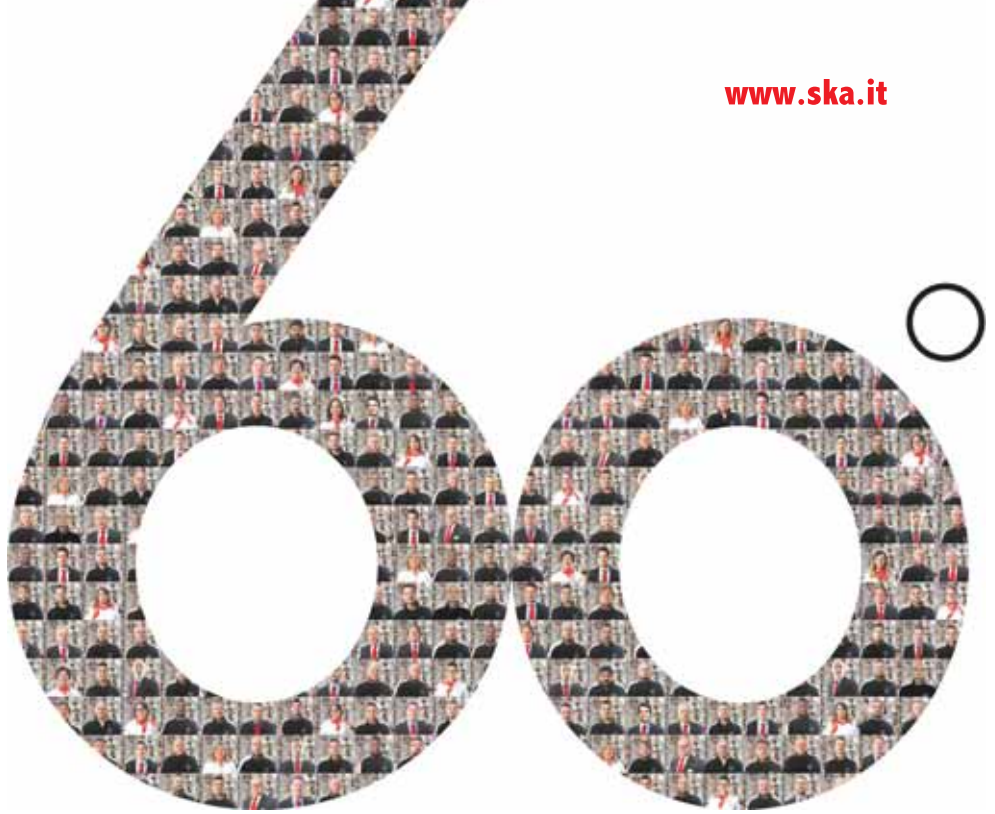
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Cobb Vantress

Dr Randy Borg has been appointed as European director of genetics for Cobb-Vantress. He is responsible for directing the breeding programme at the Cobb pedigree farm at Herveld in the Netherlands, representing research and development in support of Cobb in Europe, the Middle East and Africa and managing the day-to-day external research activities established with European collaborators. In addition, **Charles Swain** has rejoined the Cobb-Vantress technical service team and will be responsible for providing technical support to Cobb customers in South Arkansas, Louisiana and Northeast Texas.



Anitox

Anitox has appointed **Loretta Hunter** to the role of compliance director. This newly created position will oversee the company's quality assurance and quality control functions, manage patents and trademark activity, and drive regulatory affairs globally. Previously, Hunter served Anitox as the manager of regulatory affairs for the Americas.



USAPEEC

Dr Guillermo Zavala, an independent clinical avian medicine consultant specialising in controlling infectious diseases in commercial poultry and egg flocks, has joined the staff of the USA Poultry & Egg Export Council (USAPEEC) as director of veterinary services. Zavala spent 11 years on the faculty at the University of Georgia's College of Veterinary Medicine before forming Avian

Health International LLC in 2014, which serves poultry and egg industry clients worldwide.

Roxell

Tan Yet Chez has joined Roxell's Asian branch in Malaysia as service engineer for Asia/Pacific. He will work closely together with **Kenny Ng**, Sales Manager Asia from the company's office in Malaysia.



Dupont

Danisco Animal Nutrition, part of DuPont Industrial Biosciences, has grown its Central and Eastern Europe team. **Konstantin Zvezdin** has been appointed regional sales manager for Russia and other CIS countries. **Bart Hillen** has been appointed regional technical manager for Central Europe and Russia and finally **Victor Advahov** has been appointed regional technical manager.

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Effects of curing methods on turkey quality traits

In meat preservation salts are incorporated for its antimicrobial and flavour-enhancing effects. Certain salts were noticed to impart a particular flavour and colour to meat, perhaps due to impurities in the salt sourced from seawater or mines. One impurity of note was potassium nitrate, and due to its desirable safety and quality traits its use was encouraged in cured meats. Nitrate from natural sources is converted to nitrite by bacteria with nitrate reductase enzymes, otherwise no cured meat characteristics will develop. The advantages of direct addition of nitrite however were demonstrated and these led to the direct addition of nitrite to meat products. Nowadays the use of nitrite in cured meat products has been criticised for various reasons and therefore, traditionally cured products are to be made without conventional curing. Celery and leafy vegetables such as Swiss chard, spinach, broccoli, and lettuce are rich sources of nitrate and may serve as alternative sources of nitrate for meat curing. Celery has advantages over other vegetables by causing less off-flavours and colours. As the nitrite concentration is critical and inclusion in formulas should be standardised, a pre-converted celery juice powder with fixed nitrite amounts was

tested into formulas similar to those used for conventional curing. The physico-chemical and sensory attributes of conventionally and alternatively cured deli-style turkey breast formulated with equivalent ingoing concentrations of sodium nitrite were examined. Deli-style turkey breast cured with pre-converted celery juice powder or sodium nitrite were manufactured with ingoing sodium nitrite concentrations or equivalent of 0 to 200 ppm. Initial levels of cured and total meat pigment, salt, and water activity were measured; colour, pH, and residual nitrite were measured between days 0-42 of storage. Untrained panellists evaluated sensory traits. Less ingoing nitrite and increased storage resulted in less ($P \leq 0.05$) residual nitrite in products. Sensory results showed that products made with 200 ppm nitrite from celery powder were less acceptable.



PHOTO: WORLD POULTRY

The quality traits of processed turkey differ depending on the curing method used.

Overall, products were similar for several traits, but the inclusion of ingoing nitrite from celery powder should be limited to 100 ppm nitrite (0.46% addition) for acceptable deli-style turkey breast.

A. L. Redfield and G. A. Sullivan, Poultry Science.

Effect of chilling rates on quality of duck fatty liver

Animal products, including 'foie gras' (fatty liver), have to be chilled as soon as possible after slaughter. The chilling method and chilling rate are crucial and can affect the technological and organoleptical qualities of the final product. Temperature plays an important role in the determination of the texture, which is considered to be the most important quality attribute of fatty liver products. Based on its texture, three classes of fatty liver can be distinguished, i.e., soft, firm and hard fatty livers. The texture of a fatty liver is determined by its biochemical composition, more specifically by its water and fat contents. The richer the fatty liver is in water the softer it is, and the richer in fat the harder it is. Texture is strongly correlated to cooking yield, the major quality issue for the industry of fatty liver; soft livers have a higher weight loss during chilling and storage compared to hard fatty livers. Hard fatty livers, however melt more during cooking and therefore are less wanted for industrial processing. Melting can be influenced by many factors such as the genetic type, the weight of the fatty liver

or its total lipids content, the duration of force-feeding or the age of birds. Also technological practices such as delaying the cold storage time have also been shown to alter the cooking yield. A good compromise for the industry are firm fatty livers. The aim of the experiment was to study the effect of 3 different chilling rates (ultra-fast, fast, and slow) on quality features of fatty livers. The livers used were harvested from commercial flocks of male mule ducks of 13 weeks of age, at which age, ducks were force-fed by the distribution of a soak corn mixture (42% grain-58% flour) twice daily during a period of 12 days. Effects of the different chilling rates were mainly significant at 24 h post mortem. As a conclusion we were able to highlight an indirect positive relation between



JAN WILLEM SCROUTEN

Temperature plays an important role in the determination of the texture, which is considered to be the most important quality attribute of fatty liver end products.

proteolysis and melting yield in ducks' fatty liver. The ultra-fast chilling treatment resulted in the lowest percentage of hard fatty livers and cooking loss.

S. Awde, N. Marty-Gasset, G. Sandri, A. Dalle Zotte and H. R'emignon, Poultry Science.

Brazilian poultry industry too big to fail

Is the Brazilian poultry industry too big to fail? Different large groups are buying up Brazilian poultry companies, be it in US dollars or Euros. These are not limited to poultry production but also pork and red meat companies all over the world. If adding this all together and only for this on-going year, it amounts to billions of US dollars. Here is a good question with not a very clear answer - who is financing these take-overs and in which currency?

Brazil definitely needs exports to not only pay for these acquisitions but also for the very much needed modernisation and automation of poultry production facilities. The new techniques and automation needed to cope with mounting production costs are probably paid in US dollars or Euros. The cost of production is rising much too fast due to many reasons. We see substantial increases in the salaries of workers, higher taxes on labour and profits, the mounting cost of the social welfare system. The on-going strikes in the transport system and in the exporting port are becoming a big problem to ship products for export in time. Last but not least, the industry has to contend with frequent breaks in the electricity supply and water shortages. And not to forget the cost of the raw materials are increasing - creating a negative impact on the overall live cost of the broilers.

Some 20 years ago and out of the blue, Brazil arrived on the export market. This was mainly thanks to the first big devaluation of the country's currency, the real. In 1995 you needed 0,961 Brazilian real to buy 1 US dollar, where today you need 3,898 real to buy 1 US dollar, so just this year alone they lost 32.50%. How far can they go with the currency?

They may have been saved by the bell! The country has increased its poultry exports, profiting from avian influenza in the US, and from political issues between Russia and Europe. But again the question arises, "is the Brazilian poultry industry too big to fail?" And if so, who will take-over? Europe? This is not likely. What about China, Russia, Ukraine? Argentina would/could have the capacity and the possibilities of producing at low cost – even at a lower cost than Brazil, but the world importers of poultry have no confidence and trust in the capability of Argentina to ship in time. This is mainly due to the bad reputation of social unrest and frequent strikes preventing transport or shipment.

Frans Fransen is the general manager of IFT Poultry Consultants. Based in Belgium, IFT has offered poultry consulting activities to over a 100 countries across the world since 1983. Services cover each field of the sector from grandparent stock farms to the packed end. Fransen can be contacted at ift@busmail.net.



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