International Poultry Production

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Practical information for progressive poultry professionals

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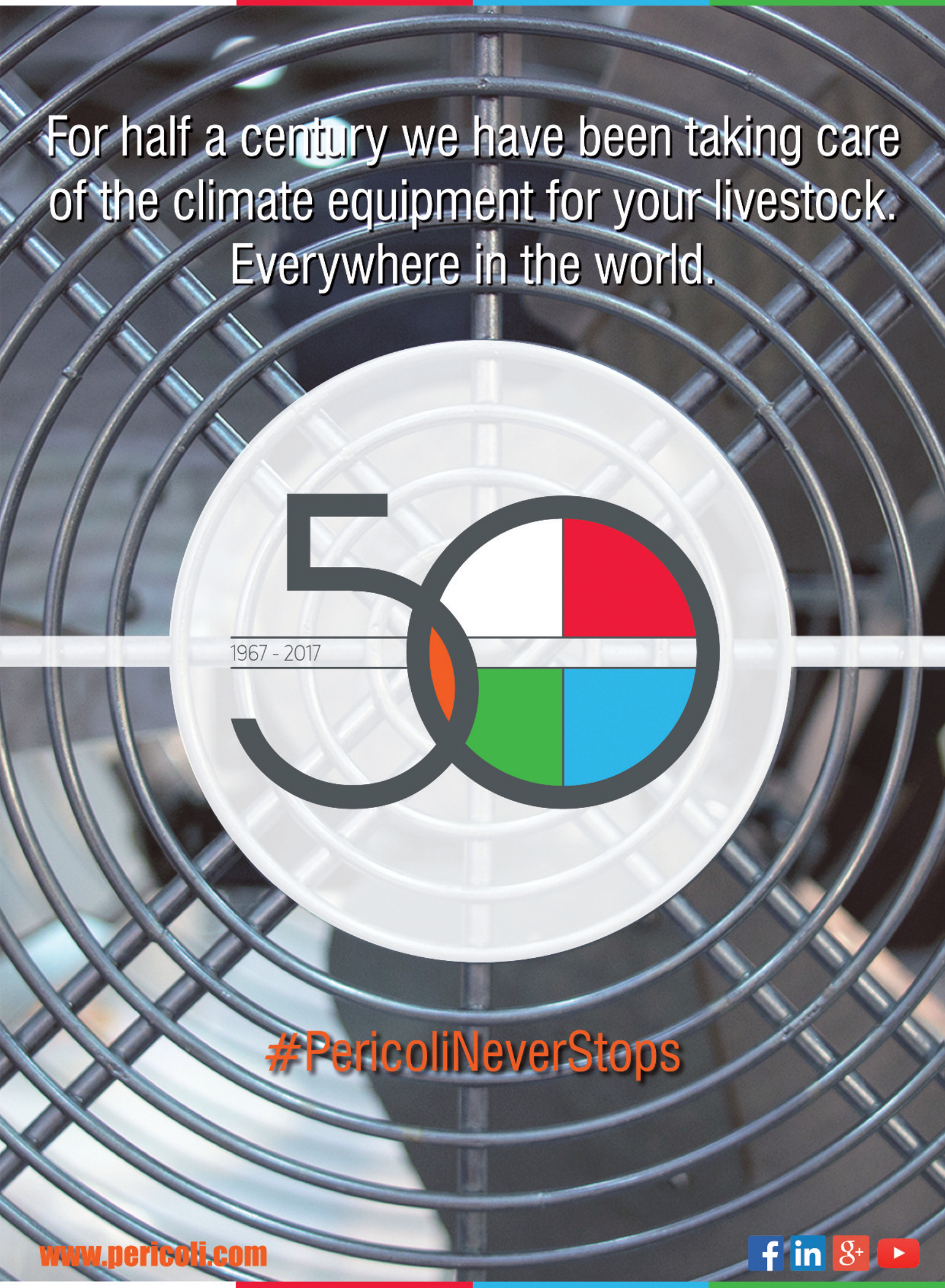
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editor's perch

Biosecurity is an important subject for poultry producers and one that has many aspects to it.

As an example, let us consider bird and farm numbers. If we take, for example, 500,000 broilers these could be accommodated in one farm with 10 x 50,000 bird houses or on 100 small farms each carrying 5,000 broilers.

The former is typical of the modern intensive integration, while the latter typifies the small farmer economy seen in many parts of Asia and in Africa. In some countries the two often run in parallel.

The intensive scenario has purpose built houses with well maintained sites and perimeter fencing.

These farms have protocols and standard operating procedures (SOPs) for virtually every activity you can think of, as well as good biosecurity.

The small farm scenario is virtually the complete opposite of this.

Diseases are therefore much more likely to enter the small farms than they are the intensive poultry units.

However, although they are less likely to get into the intensive farm, if a fast spreading disease that can affect the whole flock in a day, for example HPAI, does get in, then that poultry house is going to discharge a much greater viral load into the environment and be a significantly greater risk to neighbouring flocks over a greater area than the smaller flock.

So, let us consider HPAI, which can be spread by wild birds, the impact it could have on these two scenarios and relate this to poultry bird numbers per square kilometre.

A wild bird is going to be 100 times more likely to find a small farm than a large intensive one and, when it does, it will have a greater chance of infecting the poultry therein due to poorer building structures and the lack of proper biosecurity.

If this hypothesis is correct, should we not be seeing more cases of such diseases in smaller flocks?

If we are not, is it a case of other factors at play or a case of under reporting of such incidences?

Is this a case of foul play or are isolated cases of HPAI being genuinely misdiagnosed?

Competent diagnosis and proper surveillance are essential. ■

Cover Picture:

Highlighting the environment!
(Photo courtesy of Hato)

worldfocus

An executive summary of key international issues

Rwanda

A country to be proud of!

The first thing that strikes you about this small central African country is how neat, tidy and clean the place is. In the capital, Kigali, there is no litter to be found in public places – unlike some other capital cities where the roads have potholes, old cars and lorries constantly belch out fumes and, if the wind gets up, you can be plagued by flying plastic/polythene bags. This is a country where plastic bags are banned by law and every citizen is obliged by the government to spend at least half a day each month tidying up and cleaning public places. The same can be said about rural Rwanda where the roads are clean and every house and small farm is a visual credit to its owner!

Poultry Africa

A successful exhibition!

Rwanda recently hosted its first international poultry exhibition, Poultry Africa, and the vast majority of its exhibitors rated it a success. For those of us who have attended the birth of other international exhibitions the general feeling is that it was 'possibly the best first exhibition yet'. The exhibition hall had excellent air conditioning, which is not always the case in warmer climes, and was well laid out with catering points. As for the carpeting! Now the exhibition has been born, VNU – the organisers – need to nurture the exhibition through its challenging first three editions. Then, hopefully, a worthwhile exhibition that caters for the region's livestock producers will have been created.

Conference

Poultry Africa's leadership confirmed!

The Leadership Conference at Poultry Africa, for which this magazine was a co-organiser and the WVPA supported, was also highly acclaimed. The two morning sessions, presented by seven international members of the WVPA, looked at antimicrobial resistance, zoonotic pathogens, avian influenza and poultry welfare. They were well received by a distinguished audience of veterinarians, producers and advisers from across the region, including delegates from Senegal, Ghana, Morocco, Ethiopia, Kenya, Tanzania, Zambia and, of course, Rwanda. From their feedback it became obvious that there is a real need for such events to be regularly held in the region.

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Enzymes: feeding for optimised poultry performance

Ensuring feed is efficiently digested for optimal nutrient uptake and assimilation in poultry requires appropriate enzyme activity. In young birds, endogenous enzyme production from organs such as the pancreas is typically insufficient for complete digestion of feed materials.

by Dr Jules Taylor-Pickard, Alltech.
www.alltech.com

Even in older birds, the presence of certain antinutritional or indigestible compounds can compromise feed digestion and conversion efficiency. These compounds include phytate, arabinoxylans and beta-glucans, amongst others, and they have been widely studied since the 1980s.

Since the early 1990s, exogenous feed enzymes have been used to negate these antinutritional factors and promote digestion. However, not all feed enzymes are produced in the same way, and they have different specificities and activities on feedstuffs.

Commonly, feed enzymes are produced by batch fermentation processes, followed by filtration, drying and addition to a carrier. Source organisms are often genetically modified to ensure over-expression of the desired activities required for in-feed applications. However, other specialised feed enzymes are produced by solid state fermentation (SSF), in which the source organism Aspergillus niger is grown on the main feed ingredient used in the target diet.

This production method utilises the organism's ability to respond to the substrates available from the feedstuff, producing the appropriate enzymes required to optimise digestion. These enzymes include pentosanase, cellulase, protease, amylase, pectinase and beta-glucanase.

Raw materials used in this type of enzyme production include corn cobs, wheat bran, soybean meal and palm kernel meal. The resulting mix of feedstuff and enzymes is then dried and can be used directly in animal feeds without any losses in activities.

Digestibility trials

Digestibility trials in poultry showed that Allzyme SSF addition increased 11% more P from phytate in wheat-based diets and 8% in corn-based diets, compared to a liquid fermentation phytase enzyme. In addition, amino nitrogen was increased by 1.7% and 6.2% and sugars were reduced by 2.9% and 6.2%, respectively, in wheat, or corn, based feed.

This demonstrated the benefits of using Allzyme SSF to liberate more nutrients from poultry diets, thus supporting a reduced nutrient matrix value during formulation.

Hence, many feeding trials have given an energy and mineral reduction applied to the formulation of feed, to allow for increases due to Allzyme SSF activity, thus reducing diet costs for producers without compromising performance.

From commercial trials in various types of poultry, broiler weight gain and FCR were equalled or improved with addition of Allzyme SSF in down-specified diets, and egg weight increased by an average of 3% with equal feed-to-egg FCR.

Calculated cost savings due to increased feed efficiency, and return on investment from layers over 53 weeks of production, were €0.04 per egg.

Early research in broilers showed that, when diets were reduced from 0.35% P down to 0.25% P and supplemented with Allzyme SSF at levels of 300 phytase units/kg feed, weight gain and FCR were not significantly different.

High-phytate diets containing 10% rice bran, which are low in available P, were supplemented with Allzyme SSF or phosphorus for young broilers (3-15 days old). There were no significant differences in performance, and bone strength was increased for the birds fed Allzyme SSF-supplemented diets.

Commercial scale trials with laying hens have been conducted in Latin America. The trials were run using Lohmann Brown laying hens

A mix of feedstuffs and enzymes is dried and can be used directly in poultry feed without any loss in activity.

receiving either a control diet (2,885kcal/kg metabolisable energy) or a reduced energy diet (-120kcal/kg) supplemented with 150g/t Allzyme SSF, which had also been down-specified by 0.2% protein, 0.029% lysine, 0.011% methionine and 0.1% each calcium and available phosphorus.

The resulting data showed that egg production and quality was maintained in the down-specified diet containing Allzyme SSF, although the energy reduction proved slightly ambitious and was calculated to be 75kcal/kg, which was used as the basis for subsequent trials.

Hence, energy efficiency recommendations for use in diet matrix values and formulations were established.

Broiler trials in India and Australia

A six-week broiler trial, using 72,000 birds, was run in India, using corn-soy based diets supplemented either with a commercial phytase, with Allzyme SSF at 200g/t, or with a much cheaper diet containing local pearl millet plus 200g/t Allzyme SSF. Prestarter diets were down-specified by 65kcal/kg energy, 0.08% available P and 0.1% calcium (Ca); starter by 75kcal/kg energy and the same Ca and P as prestarter; and finisher had the same energy reduction as the starter, with 0.1% each Ca and P.

Birds fed both Allzyme SSF-supplemented diets showed better performance compared to the group fed with the commercial phytase. Cost savings were US$4.90 of the corn-soy diets and reached US$11.50 in the birds fed supplemented diets containing cheaper pearl millet.

Other trials in broilers fed down-specified corn-soy based diets to six weeks of age showed significantly increased tibial bone ash.

A further trial run in Australia (DPI, Queensland Poultry Research and Development Centre) used broiler diets formulated with wheat and soybean meal to meet commercial standards, or reduced by 150kcal/kg metabolisable energy and supplemented with Allzyme SSF.

Broilers fed the unaltered control diet had a 42-day live weight of 2.73kg, and the same (2.74kg) was recorded in birds receiving the down-specified diet plus Allzyme SSF. Conversion efficiency showed the same pattern, with the control-fed group having an FCR of 1.72, whereas it was 1.70 in the birds fed the down-specified diet plus Allzyme SSF.

These treatments were then repeated to include lower available P as well as lower metabolisable energy. The broilers fed the down-specified diet in energy and P had a reduced weight gain of 2.15 compared to 2.35kg for the unaltered diet at 42 days, but this was improved in birds supplemented with Allzyme SSF on top of the

Continued on page 9

Continued from page 7
down-specified diet to the same level as the positive control. FCR was 1.76, 1.78 and 1.73 for the control, down-specified but unsupplemented, and down-specified plus Allzyme SSF groups, respectively.

Enzyme trials in poultry

Various replicated, research-based poultry trials have examined the benefits of using SSF-produced enzymes. These have been published at conferences and in peer-reviewed journals.

Kay et al. (2011) conducted a poultry growth trial using Allzyme SSF in a wheat soy-based diet. They housed 364 Ross 308 male and female broilers, randomly split between 24 replicated floor pens and separated by sex.

The effects of supplementation with 200g/t Allzyme SSF were compared against a control diet containing commercial phytase and xylanase enzymes. The basal diet for both treatments was reformulated to include a reduction of 0.2 MJ/kg (50 kcal/kg) metabolisable energy, 1% less calcium and 0.083 lower digestible phosphorus.

This was done to ascertain if Allzyme SSF supplementation alone could replace both phytase and xylanase in down-specified broiler diets and replace the removed energy and nutrients by increased digestion, preserving expected performance in the birds.

The basal feeds were formulated to contribute: 12.75MJ/kg (3060kcal/kg) metabolisable energy, 23.3% protein and 1.325% digestible lysine (DL) in the crumbed starter; 13.1MJ/kg (3144kcal/kg) ME, 20.2% protein and 1.1% DL in the pelleted grower, and 13.45 MJ/kg (3228kcal/kg) ME, 18.3% protein and 0.98% DL in finisher/withdrawal diets. Birds were reared to 40 days of age, and feed intake and body weight were recorded on days 0, 12, 24 and 40.

Foot and hock lesions were measured on a 1-3 (none to severe) scale on days 24 and 40. There were no significant differences in body weight, weight gain, feed intake or FCR between birds fed both treatments (Table 1).

Parameter	Standard diet + Allzyme SSF (200g/t)	Reduced energy diet + Allzyme SSF (200g/t)
Cumulative feed intake (g)	4927[a]	4838[b]
Body weight 42 days (g)	2845	2813
Feed conversion ratio	1.73	1.71
Mortality including culls (%)	5.8	4.3
EPEF	369	375

[a,b] Means not sharing a letter differ significantly (P<0.05)

Table 2. Effect of Allzyme SSF solid state fermentation enzyme on broiler performance and mortality up to 42 days of age.

European production efficiency factor (EPEF) was calculated from the measured data and was higher for the Allzyme SSF diet.

From other published data, Allzyme SSF was used in a large-scale (1,280 birds), 42-day growth, performance and health study, using Ross 308 male broilers.

The birds were housed in floor pens and fed a commercial corn-soy diet using starter, grower and finisher phased formulations, with Allzyme SSF inclusion at 20g/t feed either at full dietary nutrient levels or in a down-specified formulation where 75kcal/kg energy was removed from the diet.

This was done to investigate whether supplementation with Allzyme SSF could replace the energy removed from the diet, maintaining growth and liveability in the birds. The researchers monitored feed intake, weight gain and mortality weekly and calculated feed conversion ratio and EPEF from the final dataset (Table 2).

The broilers fed the reduced-specification corn-soy diet plus Allzyme SSF had significantly lower feed intakes; however, their final average body weights and FCR were statistically the same.

Increased energy production

Both research trials demonstrated that using 200g/t Allzyme SSF in broiler diets to replace single or multiple commercial enzymes met or exceeded the control performance in terms of weight gain, feed intake, FCR and EPEF.

This is attributed to increased energy production from starch and other elements in the feed and reducing antinutritional factors by enzyme activity as well as to higher mineral availability, notably from Ca and P liberation from phytate in plant materials.

This was demonstrated not only in larger scale commercial broiler and layer diets, but also under more exacting research conditions, with pen replication, which could be assessed via statistics. Such benefits were evident in both corn and wheat-soy based diets, indicating the flexibility of Allzyme SSF as an enzyme for use in diets formulated with different basal ingredients.

In addition, Allzyme SSF is effective for maintaining or promoting performance in poultry fed cheaper, local feed materials.

The down-specification of diets in energy, Ca and P and the use of cheaper, or local, feedstuffs results in cheaper costs of production when Allzyme SSF is included in the formulation. This is due to the increase in digestibility and feed efficiency in the bird, increasing nutrient availability and uptake supporting or exceeding the expected growth or laying performance.

Conclusion

Using a single product, such as Allzyme SSF, to achieve all these benefits is a more simple, efficient and cheaper way of supplementing poultry diets, compared to having to source and add multiple commercial enzyme products.

In addition, nutrition trials where diets containing Allzyme SSF were heat-processed/pelleted at temperatures up to 90°C demonstrated no losses in efficacy in terms of bird performance, making Allzyme SSF an enzyme of choice for use in poultry feed which may be subject to higher thermal processing. ■

References are available from the author on request

Table 1. Effects of Allzyme SSF solid state fermentation enzyme on broiler performance up to 40 days of age.

Parameter (40 days)	Control	Allzyme SSF (200 g/t)
Body weight (kg)	2.521	2.551
Weight gain (kg)	2.438	2.513
Feed intake (kg)	4.044	4.052
FCR	1.636	1.615
EPEF	371	377

No significant differences between dietary treatments, as analysed by Analysis of Variance (ANOVA)

Combination of seaweed and clay: a new tool to improve feed efficiency

Seaweeds are being increasingly explored for their nutritional, structural and biological properties. For 20 years, Olmix has developed marine biotechnology for animal, vegetal and human care. Olmix is specialised in the identification, characterisation and extraction of specific seaweed extracts from green, red and brown algae.

by the technical team, Olmix, France. www.olmix.com

Among them, a type of extract with biological properties was identified and is being used in combination with micronised montmorillonite for its capacity to improve feed efficiency.

Seaweeds, or macroalgae, are eukaryotic and pluricellular organisms, divided into three different groups: green, red and brown. They contain a variable part of carbohydrates (mainly polysaccharides), proteins, minerals, lipids and vitamins. Olmix focuses mainly on the extraction of seaweed polysaccharides.

Nutritional studies

Nutritional studies on marine algae indicate that green, brown and red seaweeds possess good nutritional characteristics and could be used as an alternative source of dietary fibre, protein, vitamins and minerals.

In addition, detailed screening of macroalgae functions revealed that they contain a high level of diverse metallic ions (iron, zinc, copper, titanium, etc) which act as cofactors of enzymes and favour their efficacy.

Cofactors are defined as thermostable compounds that form the active portion of an enzyme system. In other words, cofactors are helper molecules required for enzymes to be active. They can be inorganic such as metallic ions. Thereby, copper is known to activate lipase and phospholipase A and zinc is a required cofactor of carboxypetidase, to mention only a few examples.

In summary, seaweeds bring in many diverse metallic ions, sometimes absent in the feed, which are required cofactors for the activation of several enzymes.

Clays are layered mineral materials, composed of a succession of aluminium and silica based sheets, which order varies according to the type of clay.

In montmorillonite, several metallic ions replace some aluminium and silica ions in the structure. Known as the substitution phenomenon, this event provides montmorillonite part of its physico-chemical reactivity. As for seaweed, the presence of metallic ions may also contribute to the activation of some enzymes, through their action of cofactors.

Clays and enzymes activity

Older studies suggest that the increased activity of enzymes in contact with clay not only comes from the presence of cofactors but from their stabilisation. The dominant hypothesis described in the literature is that clays slow down the transit of feed in the intestine, so the time for digestion is increased, hence a better digestibility of feeds and nutrients uptake.

Such an effect has been described for growing pigs, as supplementation with clay increased their speed of growth between 25 and 106kg and improved their carcase quality (higher lean meat).

Weight gain and feed efficiency of broilers has also been improved when the feed was supplemented with montmorillonite. In both studies, the stressed mode of action was a decrease in transit speed.

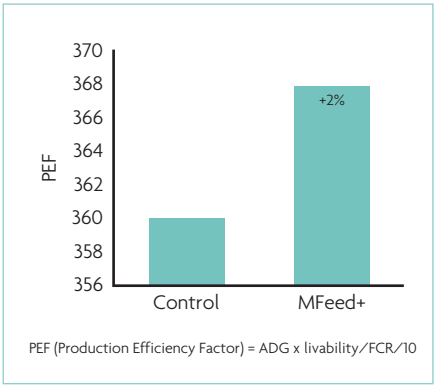

Fig. 1. Production Efficiency Factor (PEF) of commercial broilers in a field trial in Poland.

Nevertheless, it seems that the action of clays to enhance feed digestion in the intestine involves other mechanisms. Reichardt (2008) and Habold et al (2009) both report the ability of clays to favour the contact between enzymes and nutrients, and therefore to improve the rate of digestion of the feed. Indeed, digestive enzymes need to be in contact with their substrate for hydrolysis to occur.

Good supporting matrix

The physico-chemical interactions of the enzymes with clay particles seem to enhance the contact between the digestive enzymes and the feed, making clays a good supporting matrix for enzymes and acting as a meeting point for them to be in contact with their substrate. Indeed, Cabezas et al (1991) demonstrated that clay-enzymes complexes are formed at enteric pH values.

These active stable complexes are resistant to proteolysis and increase the amount of active digestive enzymes in the intestine, thus improving nutrient digestibility.

Micronisation is a specific process that allows a fine dispersion of the montmorillonite in the intestine, in order to increase the number of sites of reaction of

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enzymatic digestion compared to a standard montmorillonite.

Olmix technology first uses a micronised montmorillonite produced thanks to a specific drying and ball milling process. This specific micronised montmorillonite is then complexed with green and red seaweed extracts for their high content in rare metallic ions. The final combination of seaweeds and micronised montmorillonite leads to a unique tool to boost enzyme activity through the action of biocatalysis.

MFeed+ is the only product benefiting from this innovative technology and has proven its efficacy in several trials.

Improved ileal digestibility

The first study implemented to validate the efficacy of this new technology on monogastrics was conducted by INRA Saint-Gilles (French National Institute for Agronomic Research). MFeed+ was successful in improving the ileal digestibility performance of growing pigs.

When compared to the standard diet, MFeed+ diet presented significantly increased apparent ileal digestive utilisation coefficient (%) of gross energy (GE), dry matter (DM) and organic matter (OM), respectively being (+3.4%, P≤0.05), (+3.4%, P≤0.01), (+3.1%, P≤0.01).

MFeed+ diet also showed significantly increased standardised ileal digestive utilisation coefficient (%) for non-essential amino acids (+3.8%, p≤0.01), lysine (+3.6%, p≤0.01) and threonine (+5.3%, P≤0.01).

In a poultry study conducted by an independent research centre in France in a conventional farm, MFeed+ successfully improved the performance of broilers fed a corn-wheat based diet using by-products. Growth performance was increased by 7% in comparison with non-supplemented diets for the whole period (+12% in finishing phase), and was equivalent to the growth rate observed in broilers fed a standard corn-wheat based diet.

Investigators thus highlighted the interest of using MFeed+ in diets using by-products, as a way to decrease the feed cost. With by-products like corn DDGS being more and more present on the market, though not used widely because of their nutritional profile, such an outlet is a great perspective to manage feed cost, while ensuring optimum performance of the feed.

Improved broiler performance

In another experimental study conducted in a Midwest feed company research centre in the USA, MFeed+ also proved its capacity to improve performance in broilers. The study was run on corn-soy based feed and also contained cereal by-products: 9% of wheat middling, 3% of corn gluten meal and 2% of corn DDGS in the starter feed and 9% of corn DDGS in the grow-to-finish feed.

Both feeds contained several digestibility enhancers, including a protected butyric acid and different enzymes (phytase, xylanase, protease and amylase).

In this study, the growth rate of the MFeed+ group was higher in all phases in favour of the test group (+1.4% on average) and feed efficiency was improved by 1.6% on average.

The improvements in performance resulted in a positive return on investment (ROI) of 2:1.

In a recent field trial conducted in Poland in a commercial broiler farm with more than 254,000 birds fed standard corn-wheat based diets, MFeed+ improved feed efficiency (+1.0%), increased final body weight (+30g), and by better utilisation of nutrients from the feed and lower amount available for pathogenic micro-organisms decrease mortality (1.73% vs. 2.66%).

This improved performance resulted in an ROI of 1.5:1.

MFeed+ appears as a great perspective to manage feed efficacy ensuring optimum performance of the feed. ■

References are available from the authors on request

Preventing footpad dermatitis in broilers: the importance of ventilation

Contact dermatitis is diagnosed in the form of lesions occurring on the breast, hock skin and the footpads of broilers. Nowadays, footpad dermatitis, also called footpad lesions, is one of the most important quality items of broilers monitored to meet stricter animal welfare standards.

by L. Verhoijsen, Vostermans Ventilation, The Netherlands, www.vostermans.com

Footpad lesions affect the plantar region of the broiler's feet, noticed by erosions or ulcers on the ventral footpads. The severity of footpad lesions can vary between slight discolourations on a limited area to significant, severe swollen footpads as shown in the photograph.

Whenever severe lesions occur, broilers may undergo pain, questioning the welfare and the health of the animal. Additionally, a high incidence of footpad dermatitis is often associated with lower growth rates and increasing downgrades, directly affecting the farmer's income. Broilers which experience pain due to several lesions move, eat and drink less.

Although footpad dermatitis can have several causes, litter quality appears to be the most influential factor. But how do broiler producers maintain a good litter quality to avoid unnecessary losses and enhance animal welfare at farm level?

In a recent review, the multi-dimensional causal factors of wet litter have been investigated. This review included a survey of 15 people to rank the relative importance of environmental and housing factors contributing to wet litter.

Among the respondents were nutritionists, veterinarians and other experienced poultry professionals.

According to these respondents, management of drinkers and shed ventilation are seen as the most important factors influencing litter quality as illustrated in Fig. 1.

The litter quality is influenced by the design and management of the shed ventilation because ventilation controls the temperature and humidity of the air inside the house.

Footpad dermatitis in a broiler (Wageningen University & Research).

Monitoring both in-shed temperature and humidity is essential for making effective changes in ventilation measurement.

Proper control of the inside relative humidity will decrease the water absorption by the litter and reduces dripping of water droplets from condensation.

The research also found that inadequate ventilation can lead to poor air movement patterns such as too low incoming air-speeds allowing cold air to fall to the ground. This leads to more condensation at specific spots inducing wet litter.

Instead, ventilation should provide a uniform air flow to create uniform conditions throughout the broilers' house.

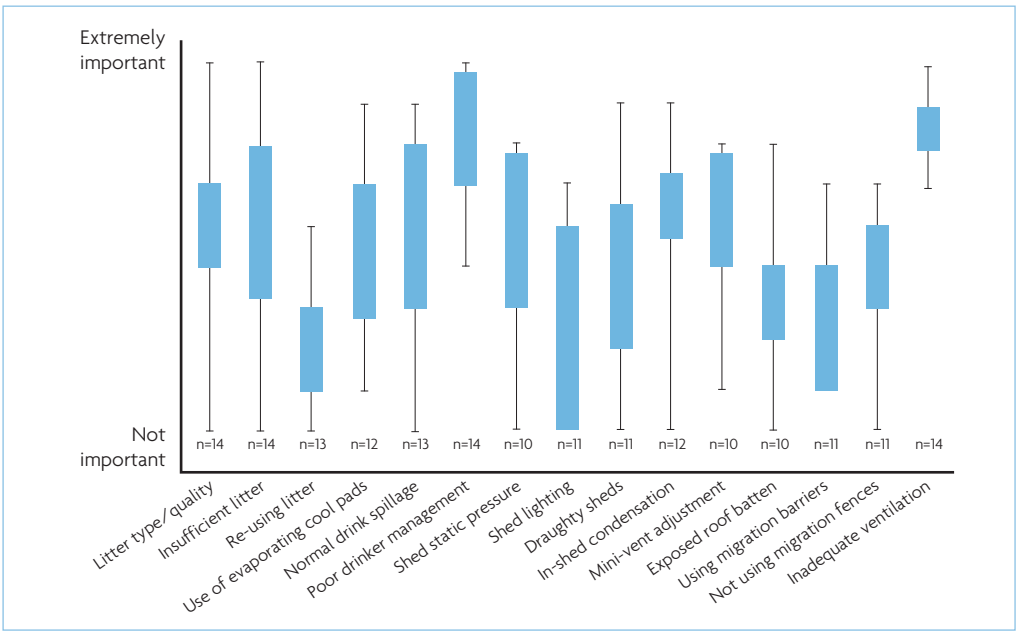
Local differences in temperature could, for instance, cause birds to crowd together impairing uniform litter drying and excreta deposition.

Hence, especially during minimum ventilation when the air change rate is low, the use of internal circulation fans is recommended.

Finally, litter quality is also very dependent on the evaporation rate. A compacted crust, or in other words, caked litter has a lower evaporation rate slowing down litter drying. Airspeed has a positive effect on the evaporation rate which is beneficial for broiler farmers using tunnel ventilated houses.

From the above, it can be concluded that the impact of ventilation on animal health and financial returns should not be underestimated: appropriate ventilation is crucial in preventing footpad lesions in broilers. ■

Fig. 1. Relative importance of environmental and housing factors contributing to the problem of wet litter.



References are available from the author on request via ventilation@vostermans.com

Betaine: an underestimated functional nutrient

Betaine is a zwitterion metabolite (a neutral molecule with both positive and negative electrical charges) also known as trimethylglycine. The benefits of betaine in animal nutrition are now well recognised, especially in poultry and swine agro-industries.

by Clémence Messant, Feed Additive Product Manager, and Julie Castier, Galenic Researcher, MiXscience. www.mixscience.eu

Due to its specific chemical structure, betaine has two main physiological functions: it provides methyl groups, required for the synthesis of various metabolically active compounds such as carnitine – an important molecule for muscle energy metabolism – or creatine, and is acting as an osmolyte. The dipolar zwitterion form gives its osmoprotective properties.

Osmoregulation is the ability of a cell to maintain its structure and functions by regulating the movements of water in and out of the cell. Betaine has the ability to especially accumulate in cells exposed to osmotic and ionic stress, such as intestinal epithelium, in order to improve intracellular water retention.

This water is then available for metabolic processes in the cell. By this process, betaine inhibits the accumulation of inorganic ions, and this protects enzymes and membranes from osmotic inactivation.

The osmoprotective properties of betaine are likely to improve nutrient digestibility by supporting intestinal cells, but also the growth and the survival of intestinal microbes. This explains the beneficial effect of betaine to help poultry counteract the negative effects of heat stress and to support the performance of poultry in case of coccidiosis. In fact, betaine not only improves intestinal structure but it also acts directly on coccidia by a partial inhibition of the invasion and the development of coccidia.

Time (hours)	0	8	24	32	48
Betaine hydrochloride					
Anhydrous betaine					
beTane					

VISCOUS FORMS

Table 1. Comparative behaviour of betaine hydrochloride, anhydrous betaine and beTane at 45°C and 50% humidity over time.

Is one source of betaine better?

In the past, betaine has been mainly used under its natural form, anhydrous betaine, usually extracted from vegetable sources like sugar beet and their by-products.

However, the limitation of the natural resource has led to the development of the use of chemical and synthetic forms, including betaine hydrochloride, which is available all year round in a quasi-unlimited quantity and is cost-effective.

As far as we know, there are very few independent studies comparing the two sources of betaine.

In a trial at the MiXscience Research Center (MRC) in 2014, we compared the effect of a supplementation of 500ppm of betaine coming from the synthetic anhydrous betaine and betaine hydrochloride in a diet containing 150ppm of choline, under hot temperature conditions between 20 and 35 days. We noticed no difference between the two groups and did not conclude the superiority of one form of betaine over another.

Table 2. Six treatments used to assess the zootechnical properties of betaine.

Group	Control	B250	B500	B1000	CB250	CB500
Betaine form	-	Free betaine			Coated betaine	
Net equivalent betaine supplementation in the diet from 0-34 days (g/T)	None	250	500	1000	250	500

The hygroscopic problem

Although the beneficial effects of both sources of betaine have been largely demonstrated for animal growth, feed utilisation, carcase quality, resistance to heat stress or coccidian infection, the major limitation for the use of these compounds remains their manipulation at the industrial level because of their high capacity to attract water.

Indeed, the highly hygroscopic nature of both sources of betaine sometimes limits their application in feed mills. Actually, in presence of wet atmosphere, betaine easily turns to a viscous or lumpy substance and becomes very difficult to process, especially in silos.

This could significantly impact the stability of the premixes or the feed. In order to improve the ease of use of this product, it is possible to protect the betaine with a hydrophobic material, as it

Continued on page 17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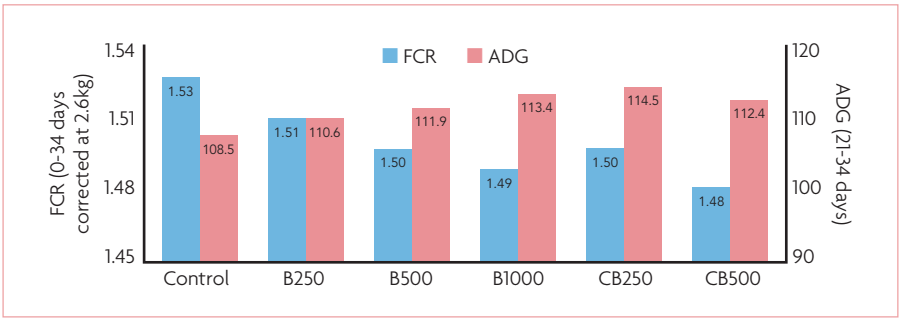


Fig. 1. In vivo validation of the interest of a protected form of betaine compared with free betaine based on performance results of chicks (FCR: Feed Conversion Ratio, ADG: Average Daily Gain).

Continued from page 15
has been developed by MiXscience (France, AVRIL Group) with its beTane product. To illustrate the interest of this technology, in vitro experiments have been performed.

Table 1 shows the comparative behaviour of three forms of betaine: betaine hydrochloride, anhydrous betaine and beTane, a new encapsulated betaine hydrochloride. When challenged at 45°C (this temperature is supposed to mimic extreme storage-temperature conditions, but it is also modelling an accelerated aging situation), beTane keeps its physical integrity over time, whereas anhydrous betaine or non-encapsulated betaine hydrochloride turns to a viscous gel and even a resin, potentially hard to eliminate at factory scale.

Zootechnical properties

To ensure that encapsulation does not affect zootechnical properties of betaine, the encapsulated form of betaine was compared with a non-protected form at different doses in poultry. The results were presented at the European Symposium on Poultry Nutrition by Klein et al. (2016).

160 male Ross PM3 chicks were allocated to 40 cages, with four birds per cage and 6-7 replicates per group. The trial duration was 34 days. Six treatments were applied (Table 2). Birds were challenged with high temperatures from day 21 to 34 of the experiment according to the following daily sequence:

- 24°C from 6pm to 8am.
- 28°C from 8am to 11am.
- 30°C from 11am to 3pm.
- 28°C from 3pm to 6 pm.

High temperature induced variability, but performances were improved for all betaine groups compared to the control group, especially during the heat stress phase (Fig. 1) validating the osmoprotective potential of betaine. No statistical differences were observed between treatments but, overall, the highest performance results were observed with the encapsulated betaine applied at 500g/t. Results were even better than free betaine applied at 1,000g/t indicating that no negative impact of the encapsulating technology was observed.

Conclusion

In vitro and in vivo trials confirm the fact that an encapsulated form of betaine is a real alternative to solve industrial constraints of using this product without affecting its zootechnical efficacy.

Preliminary results also indicate that an encapsulating technology is probably an efficient way to reduce net betaine incorporation in a diet formulation. ■

Next generation of high performance fans developed

Big Dutchman has developed the next generation of fans. Their AirMaster Blue 170C has four outstanding characteristics:

- Very high air performance.
- Minimum energy consumption.
- Optimised aerodynamic design.
- Resistance against corrosion.

bigdutchman.de

This unique combination guarantees that customers have a significant advantage in terms of profitability in climate control.

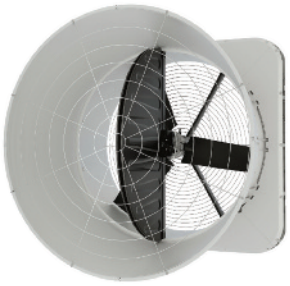
As AirMaster Blue is very resistant against pressure, it is the perfect choice for long houses with tunnel ventilation.

AirMaster Blue is currently the most energy-efficient solution available on the market for ventilating livestock buildings in combination with the Dynamic MultiStep exhaust air principle.

The motorised shutter closes the fan airtight, allowing the connection of an important emergency opening system.

Additional advantages include:

- Extremely low noise level.
- Direct drive and a very stable connection between hub and blades for easy maintenance.
- High quality materials: the fan is made of high-quality plastic and stainless steel.
- Protection rating IP 65: high pressure cleaners can be used without any concern.
- Unassembled upon delivery for a low shipping volume and thus lower transport costs.
- Extensive testing at the Bioenvironmental and Structural Systems (BESS) Laboratory of the University of Illinois, USA, confirms the efficiency and quality of the new AirMaster Blue 170C fan.



New high pressure radiant gas poultry brooder

Space-Ray is introducing a new series of high pressure radiant gas poultry brooders called the Tru40. The Tru40 gets its name because, unlike the leading competitive high pressure model, each Space-Ray Tru40 provides a powerful 40,000 Btu/hr. of heat. In fact, the Tru40 has 17.6% more heat input than the leading competitive model.

spaceray.co.uk

The Tru40 features a patent pending pressure reduction design that is able to obtain a low pressure burn (10" W.C.) with a high-pressure (5psi) input. This allows for reduced gas piping costs for new houses and like their low-pressure model, no air filter is needed. Having no air filter to clean means less hassle for the grower and saves time and aggravation.

The Tru40 uses the same powerful and fuel efficient radiant heat and has the same great features and proven reliability as Space-Ray's popular SRB40 Brooder, including being water and corrosion resistant which allows it to withstand the harsh environments found in today's modern poultry houses.

It is a direct one-for-one replacement for other high-pressure brooders so the grower can replace a single unit or all of their units.

The Tru40 is CSA Design Certified for safety and is available in both Natural and LP Gas models.

Get the best out of your birds with the perfect in-house climate

DACS' roof mounted ventilation system ensures a perfect in-house climate all year round.

The constant flow of temperate air down and around the birds provides maximum animal well-being and allows you to optimise production and thereby run a profitable business.

dacs.dk

The Corona air inlet unit is the cornerstone in the ventilation system. It constantly circulates temperate air throughout the house and thereby the house stays dry and well ventilated throughout the year.

The fan in the Corona air inlet actively mixes incoming air with warm room air before this temperate air is distributed in the house. This constant flow of preheated air creates a perfect climate for your animals that allows them to utilise their full genetic potential.

When the need for cooling arises during warm periods, and with large birds in the house, the CoronaD forces cool air downwards through a centre opening.

The cooling effect of this vertical air distribution provides the most efficient air-cooling available in the poultry industry.

In conjunction with the HE740 exhaust unit the system keeps an optimum air exchange in the house that removes waste products from the birds.

A pioneer in the field of innovative climate control

Founded in 1988, Agrologic specialise in the manufacturing and marketing of top automatic climate controllers, sensors, feed and silo weighing systems and weighing scales.

agrologic.com

Selling in more than 80 countries worldwide, Agrologic is a global leader and pioneer in the field of innovative and advanced climate control systems, which are all very user friendly and affordable.

Their all-in-one Image II is the most flexible and robust controller for raising poultry. Smart and easy-to-use, it is designed to handle all housing needs.

Image II has a large 7" user friendly colour touch display and comes with an expandable relay box using sets of 8 relay output modules for up to a maximum of 64 relays.

The all-inclusive unit provides complete climate control, feed silo weighing, batch weighing, automatic bird weighing and egg counting.

Along with their complete end to end after sales service and support, Agrologic make your work easier and more efficient.

Optionsfor

Durable ventilation offers the greatest protection

Durable ventilation is required when raising poultry and Val-Co has durable fans to keep your operation running smoothly.

val-co.com

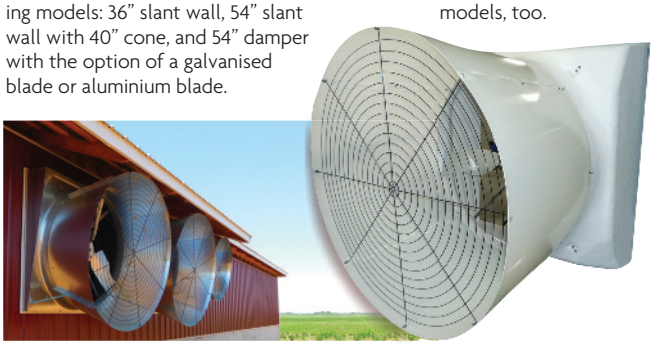
Their new Z-Fan is the next big thing in rust-resistant ventilation. It is coated with a unique alloy compound more durable than galvanised steel. During a salt spray test, the Z-Fan housing and cone showed no signs of rust after 2,500 hours – galvanised fans were completely rusted through.

Z-Fans are available in the following models: 36" slant wall, 54" slant wall with 40" cone, and 54" damper with the option of a galvanised blade or aluminium blade.

All Z-Fan models come with a seven year warranty when used in poultry operations.

If you prefer fibreglass, the HyperMAX 54" Fan is one of the top-rated fans in the industry for its air-moving capacity and energy efficiency. The moulded fibreglass housing and poly cone offer the greatest protection against corrosion.

Combined with the slant wall design, this fan is easy to clean, drains water efficiently, and can withstand even the most forceful weather. If you do not require such a big fan, they come in 36" and 50" models, too.



Highly innovative product for broilers and layers

The Corax from Hato Lighting is the standard for today's agricultural lighting applications as confirmed by many users worldwide. This highly innovative product is applicable to broiler and layer houses.

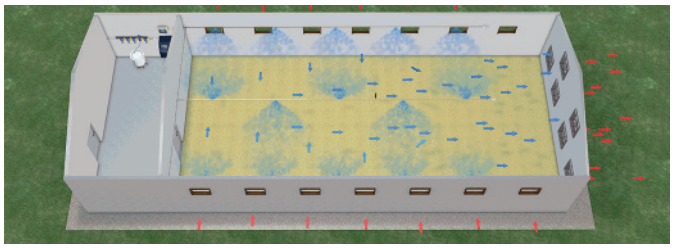
hato.lighting

Over 40 years of experience in agricultural lighting has led to a product that stimulates both animal welfare and user satisfaction.

● **Animal welfare:**
Uniform light distribution helps prevent shade, and thus reduces clustering. The Corax is flicker-free, 0-100% dimmable and able to ensure a perfect light spectrum. This all leads to a reduction in stress for the animals.

● **User satisfaction:**
The Corax is IP 67 rated, which means it can easily resist high pressure cleaning. It is an easy-to-install product with a lifetime of 50,000 hours. Thanks to its highly efficient LEDs, the Corax will save a significant amount of energy compared to traditional lighting.

● **Breeders:**
The Corax XL offers 1750lm, which is 86% higher than the light output of the regular Corax. This makes the XL solution perfect for breeder houses.



Cooling, humidifying and dust binding in the poultry house

Lubing specialise in developing and manufacturing climate systems for poultry. Their Top Climate System has been developed for effective humidifying, cooling and dust binding of the house air. It works according to the principle of direct evaporative cooling.

lubing.com

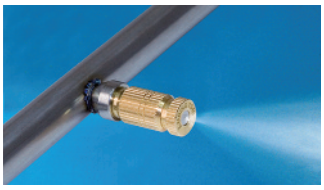
Through high pressure nozzles water is injected into the house air with a pressure of 70 bar as fog. The fog evaporates immediately and causes the cooling of the house air by extracting heat.

The maximum cooling effect is reached by the very small water particle size of 5µm, due to the high pressure and the 0.2mm hole in the nozzle. The system cooperates successfully with any kind of climate computer and can be used with every ventilation system.

The EcoVario HR is an acid resistant stainless steel pump unit which has an automatic speed regulator (frequency 6-60Hz).

The pump can adjust the needed capacity automatically to the required volume of water.

Through this high resistant pump it is possible to administer additives to the flock – therefore the bacteria and germ load can be reduced and this leads to a reduced use of medication.



Ventilation with quality and reliability

The OmniFlux is a unique inlet from TPI Polytechniek that provides maximum control over ventilation capacity and air direction.

tpi-polytechniek.com

Agricultural entrepreneurs want optimal control over the incoming air and control over the air direction, independent to the ventilation capacity demand. The OmniFlux was developed to meet this requirement.

It features four louvres that can be positioned independently to determine the direction of the incoming air.

A profile plate slides in front of the louvres to regulate the capacity of the OmniFlux. It is especially suitable for wide buildings and buildings that contain obstructions like aviaries.

The four settable louvres that direct air can be set independently to guide air to the desired directions. Rounded edges on the outside guarantee less air resistance and therefore provide maximum capacity. A rather unique guiding system creates dimensional stability and an opportunity to remove the profile plate for easy cleaning. Special wear and stretch resistant seals prevent air leakage and provide optimal control over the climate.

The importance of fresh air in poultry production

An increase in demand for quality meat production means growers face challenges in maintaining the well being of the birds, while controlling diseases and ensuring the quality of the meat. An increase in construction of closed poultry houses in parallel to the conversion of open houses into closed houses is the result.

vostermans.com

Constant and uniform climate conditions are becoming more vital, giving ventilation a crucial role in poultry production. The benefits of proper ventilation in closed poultry houses are supply and circulation of fresh air, removal of excess heat and moisture from animals and reduction of the ammonia level.

Multifan fans from Vostermans Ventilation are highly rated worldwide because of their durability, efficiency and reliability. The company's dedication for decades to the agricultural market gives them in-depth expertise in the air movement required for livestock.

An example of their innovative research and development aimed at better air performance in poultry houses is their V-FloFan for vertical ventilation.

With an extensive line of Multifan galvanised box and cone fans and their fibreglass series, Vostermans offers a wide range of fans for poultry houses with sizes from 45cm to 140cm for a variety of ventilation systems. Objective test results by BESS Lab, Illinois, show the highest results for air flow.

Their carefully selected global network of independent distributors strive to deliver dedicated service and expertise.

Mastering air control for optimal bird performance

Broiler health strongly depends on the quality of the air in the house. A healthy climate is created by controlling the air flow inside the poultry house and bringing fresh air at bird level.

vencomaticgroup.com

The Clima+ design allows you to optimally control the climate in your poultry house in all weather conditions with minimal energy use and superior air quality.

The Clima+ heat exchanger uses warm air from inside the house to heat up fresh air from outside and achieves a thermal efficiency of 80%. Pre-heated air is brought directly into the broiler house and projected towards the roof, where circulation fans spread the fresh air throughout the house.

It ensures an even temperature and uniform climate throughout the entire house. Intelligent software governs this technology and allows you to realise substantial savings in heating costs and reduction in environmental emissions (such as ammonia, fine dust and CO_2 emission).

With the Clima+ design you create a perfect and constant climate in the house for optimal bird performance.

The importance of air quality for a good start in the brooding period

To get the best start in the brooding period it is important to think of the air quality. It is a common mistake to think only about keeping the right temperature. This is obviously an important issue but we need to also take care of other factors.

pericoli.com

According to the seasonal climate, it is important to have equipment to heat and cool the air and options to provide proper air distribution.

Circulation fans distribute the heat throughout the barn and keep good air quality and homogeneity: inadequate air distribution resulting in poor air quality can cause increased levels of CO_2, moisture and a spread of diseases.

The Pericoli Group offers its best solution and recommends their ACF 26. Compact and high performing, it provides good air quality without throwing annoying air velocity at bird level. Furthermore, in combination with an RWA water atomiser, it helps maintain good humidity levels and recreates the hatching life conditions that are useful to ensure the best start for chicks.

There are many unique features that contribute to this product's success, which are certainly worthy of a second look, such as the all-new six blades Peraluman (high tech aluminium alloy) propeller assembly, and motor mounts which are aerodynamically designed to stabilise the airflow and to increase the efficiency, in addition to robustly supporting the motor.

A complete line of products for environmental control

Chore-Time offers poultry producers a full line of products for environmental control of poultry houses. Producers can take control of all their environmental control needs and more with Chore-Time's newly updated Chore-Tronics 3 Whole House Controller.

choretime.com

Enhanced features include control of drinker line water columns, zoned sprinklers and multiple variable-speed fans. Chore-Time has also added a Mobile App and an optional Broadcaster Alert System.

For air movement and heating, Chore-Time offers its Cubo Air Destratifying System, which comes with or without heat. The system circulates air downward within a building and distributes it at bird level. This improves litter condition, eliminates stir fans and promotes more even bird distribution because of uniform temperatures throughout the house.

Chore-Time also offers traditional brooders and heaters for reliable, efficient heat distribution with patented features and sturdy construction. Chore-Time's Quadratherm Heater outputs a house-shaped pattern of infrared heat for greater heating consistency and efficiency.

Chore-Time's complete line of fans and shutters includes its 145cm Endura fan with Hyflo Shutter. It combines high airflow and energy efficiency with corrosion-resistant materials for long-lasting, high performance.

The Hyflo Shutter is designed to further improve fan output and efficiency by minimising obstructions during fan operation.

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Efficient and sustainable poultry
Dominic Elfick, Aviagen, Australia

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New systemic treatment for poultry red mite infestation in layers

Poultry red mite infestation represents a major threat to layer welfare. A recent epidemiological review reports that 83% of European farms are infested by Dermanyssus gallinae. This prevalence reaches 94% in The Netherlands, Germany and Belgium.

by A. Flochlay-Sigognault and E. Thomas, Merck Animal Health, Madison, NJ, USA. www.msd.com

The presence of mites in a production house induces a high level of stress in birds. Stress is induced by pain and skin irritation associated with repeated mite bites favoured by the very high parasite load typical of poultry red mite infestations, with mite densities ranging from 25,000-500,000 mites per hen.

In addition, mite infestations induce aggressive feather-pecking and cannibalistic behaviour, increased feed and water intake, and decrease general animal health.

Higher noise volumes are typically observed by farmers in mite infested houses. Increased self-grooming, a characteristic symptom of anxiety, is observed in artificially infested hens.

The severity of injuries resulting from such behaviour is currently limited by beak-trimming, but is expected to increase now that beak trimming has been banned across several European member states since 2016.

Poultry red mite infestation decreases general health and productivity parameters. The first clinical sign observed in infested animals is sub-acute anaemia due to repeated mite bites.

A laying hen can lose more than 3% of its blood volume every night. In extreme cases, D. gallinae infestation burdens may be so heavy that hens may die from severe anaemia. Mortality is increased mainly in cases of severe infestations.

The ban of traditional cages has caused the move to complex housing environments, favouring the proliferation of the parasites by offering far more hiding places for mites to escape classical treatments. For all these reasons, poultry red mite infestation is widely recognised as an animal welfare issue by the scientific community.

Effective control needed

Welfare concerns, production losses caused by the poultry red mite, and widespread mite resistance to environmentally applied acaricides continue to drive an urgent need for new and effective control measures. The few treatments currently approved for use in the presence of hens are mostly sprays, which is stressful when applied to animals.

Exzolt is a new systemic mite treatment developed to address that need.

It contains the novel systemic acaricide fluralaner, and is administered orally to the birds through drinking water, which is not stressful to the birds and ensures that all mites are exposed to the product when feeding.

A recent study has demonstrated the very high and consistent in vitro activity of fluralaner against D. gallinae isolates collected under field conditions in Europe. No adverse reactions were observed following treatment with Exzolt of layers dosed at five times the recommended dose for three times the recommended duration of treatment.

Exzolt is approved as a veterinary medicinal product in Europe and a zero-day withdrawal time has been established for eggs by the European Medicine Agency.

Study objectives

A multi-site field study was initiated to investigate the efficacy of Exzolt when used in drinking water for the treatment of natural poultry red mite infestations in infested caged layer farms in Europe.

This controlled and blind study also evaluated the effects of Exzolt on production parameters indicating well-being of the hens, and verified its safety under field conditions.

Materials and methods

Five enriched caged layer farms naturally infested with Dermanyssus gallinae in France and Spain, having two similar houses (flock size, age, breed, feed, drinking water system), were selected for the study. The houses contained 19,000-100,000 hens aged from 22-58 weeks at treatment initiation.

Mite infestation levels were evaluated pre-treatment, during and at weekly or two-weekly intervals post-treatment, using mite traps (18-24 per house), fixed at different places close to the hens. At each evaluation day, traps were placed for 24 hours, removed, frozen and shipped to a central laboratory for mite counting and development stage differentiation.

On each farm, the treatment was allocated to the house with the highest infestation, for animal wel-

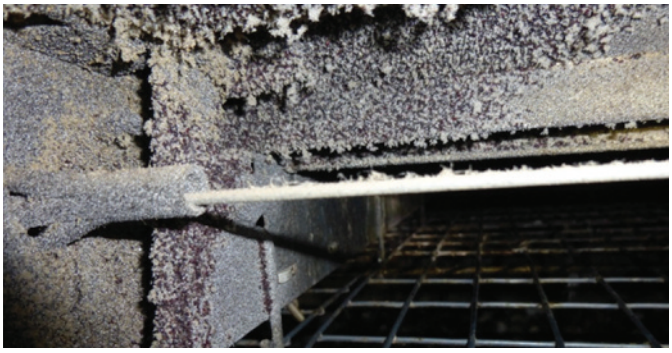
Continued on page 26

Mite infested hen with anaemia and decreased general health (A. Camarda, Univ. Bari).

Table 1. Reduction of mite populations after initiation of treatment with Exzolt. Exzolt was used on days zero and seven.

Farm	Reduction in mite counts (%)		
	Day 3	Day 9	Day 14
1	96.9	99.6	99.9
2	96.0	99.9	99.9
3	99.4	100	100
4	95.3	100	99.8
5	99.4	100	100
	>95.3%	>99.6%	>99.8%

Mite colonies on equipment beneath the hens (enriched cages).



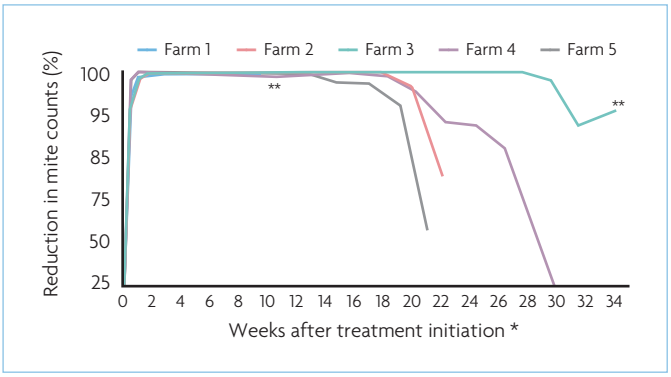


Fig. 1. Reduction of mite populations after initiation of treatment with Exzolt. *treatment administered on day zero and seven. **end of production cycle (farms 1 and 3).

Continued from page 25
fare reasons. The control house was left untreated. Exzolt was administered via drinking water, using a dosing pump, at 0.5mg fluralaner/kg bodyweight, twice seven days apart.

The reduction in mite counts in the treated house versus control was calculated using the Henderson-Tilton formula for the mean mite counts (mobile stages) per trap, at regular post-treatment time points.

Production parameter indicators of well-being, which included laying rate, mortality, and proportion of downgraded eggs (data available in two farms), were recorded weekly before and after treatment.

Results

In all farms, the reduction of the mite population started quickly after treatment initiation; it exceeded 95% based on mite counts in traps placed in the houses three days after treatment initiation. Two days after the second Exzolt administration, the reduction of mite population ranged from 99.6-100% (Table 1).

The reduction in mite counts reached 100% from 6-13 weeks post treatment initiation in the majority of the farms. The efficacy was maintained above 90% until the end of the egg production cycle (three to eight months) in three farms and for four months in two farms (Fig. 1).

In all the farms, the control of mite populations was associated with numerically higher laying rates (0.9-5.7%) (Fig. 2) and with lower mortalities (-0.01 to -0.15%).

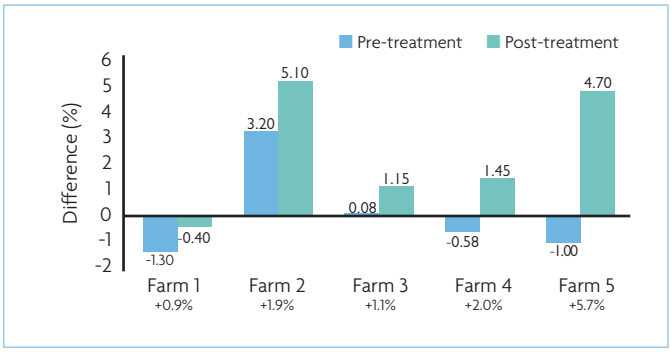
The proportion of downgraded eggs, measured in two farms, was numerically lower by -1.1% and -3.4% in the treated houses. No treatment related adverse effects were observed.

Conclusion

This study demonstrated that systemic treatment with Exzolt resulted in safe and non-stressful control of poultry red mite, and positively impacted layers' welfare performance indicators. The results indicate that this novel treatment has the potential to be the cornerstone of an integrated approach to reducing or eliminating the welfare and productivity costs of this increasingly threatening pest. ■

References are available from the author on request

Fig. 2. The impact of Exzolt treatment on laying rates between treated and controlled housing.



turkeyFOCUS

7. Fungal infections in turkey flocks

by Albert Nakielski, DVM, Specialist of Poultry Diseases, BioPoint, Stawiguda, Poland. www.biopoint.eu

The most common fungal infections in turkey flocks are aspergillosis and candidiasis. In order to develop they need contributory factors, such as inappropriate conditions affecting bird welfare, the use of mouldy bedding material, fodder contaminated with fungal spores, lack of vitamins or accompanying infections causing lowered immunity.

ASPERGILLOSIS

Caused by: Aspergillus fumigatus, A. flavus, A. niger, A. nidulans.

- One of the most dangerous diseases among turkey poults is aspergillosis.
- It usually develops in poults during the first two weeks of life.
- The occurrence of the disease has been linked to poults hatching or rearing in an environment contaminated with fungal spores.
- Young birds during their rearing are most vulnerable to the disease but it may also occur in older birds.
- Fungal spores enter the organism through the respiratory tract. When they reach parabronchi and epithelium of the air capillaries, the spores sprout and reach the circulatory system from there.
- The disease usually has an acute character and causes a sudden, uncontrollable increase in flock mortality.
- Characteristic mycosis symptoms are dyspnoea, frequent gasping, neck stretching and closing eyes.
- Main post-mortem lesions are single or multiple whitish fungal nodules in lung tissues and air sacs.
- Hyperaemia of the upper and lower respiratory tract and focal fungal lesions in the brain are also found.
- Sometimes necrotic lesions in nasal turbinates and fungal nodes on the surface of the cornea are noticeable as well.
- Prevention is currently the preferred approach to control this disease.

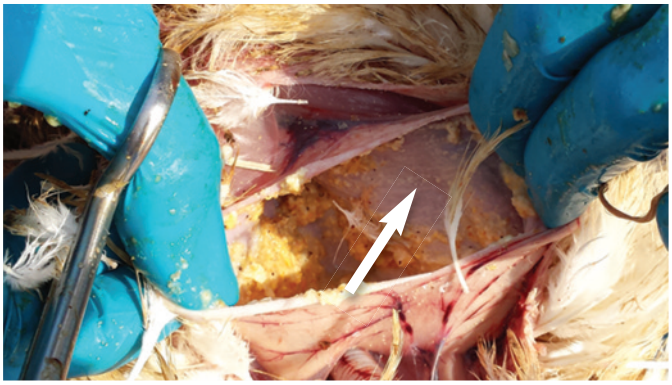
CANDIDIASIS

Caused by: types of yeast – Candida albicans, C. crusei, C. tropicalis – and often referred to as a fungal infection.

- It usually affects poults younger than three weeks, sometimes older, and 11-14 week-old birds.
- The infection is foodborne and occurs as a result of consumption of fodder, water or bedding contaminated with blastospores.
- The most important factor which encourages spreading of the fungal spores in the organism and the development of symptoms is long-lasting antibiotic treatment.
- Spores populate mostly the beak cavity, oesophagus, crop and proventriculus.
- Under appropriate conditions for development the fungus can spread on the surface of these organs and fungal filaments may penetrate into the top layers of epithelium.

The latter undergoes pathological outgrowth and a grey and yellow coating in the form of a pseudo-membrane appears on the surface of epithelium.

- Non-specific symptoms, such as lack of appetite, inhibition of growth, decrease in activity or ruffled feathers are commonly found in the course of the disease.
- Pendulous crop, neck stretching and beak opening as well as nervous ticks are also sometimes found.
- Confluent yellow or white coating tightly covering the mucosa can be seen in post-mortem observation of preferential sites of fungal development (usually in the crop).



Candidiasis – crop surface wrinkled and coated with confluent mass of white pseudomembrane (8-week old toms).

When the coating is removed, ulcers of varying intensity are noticeable.

Management of flocks in respect of fungal infections, as with many other health issues, should be focused on prevention, as treatment of the disease is difficult and often ineffective.

The best available solution to protect birds against infection is strict adherence to sanitation on the farm. However, both during prophylaxis as well as during disease outbreak, additional measures can be taken, such as application of herbal preparations.

In our practice we often apply with positive results: Defungal (a combination of herbal materials and potassium iodide) and Mintamix (a combination of herbal materials and vitamin A).

PROPHYLAXIS

As a prophylaxis the following programme can be applied:

Defungal 200ml/1000l of drinking water/12 hours daily.
Duration of treatment: 3-5 days, starting from first week of birds' life.
Application route: Drinking line.

Prevention against Aspergillosis (additional measures):
Defungal 200ml; Mintamix 200ml/10l of warm water.
Frequency of administration: 2-3 times per week.
Duration of treatment: First two weeks of birds' life
Application route: Spray.

Caseous nodules due to aspergillosis in an air sac (2-week old turkey male).

DURING DISEASE OUTBREAK

Barns should be fumigated with enilconazole according to label directions. Defungal may additionally help reduce the challenge.

Defungal 200 ml/1000l of drinking water/12 hours daily.
Duration of treatment: five days, starting from first signs of occurrence.
Application route: Drinking line.

Aspergillosis outbreak (additional measures): If enilconazole is not applied daily, then between successive applications of enilconazole spray application of Defungal is recommended. ■

International Poultry Production

Poultryhealth BYTES

Your own reference source on poultry health

Number: 198

Avian Influenza XVI

The transmission cycle

Transmission of avian influenza virus is mainly by the faecal-oral route. In ducks, viral replication is centred upon the intestines and results in high concentrations of the virus being shed via the faeces. Thus, contaminated water and sediment is a likely source of infection.

Mallards can be infected via intranasal, intratracheal, intraocular and intracloacal routes, all of which could come into contact with contaminated water. Surface or ground water contaminated with avian influenza virus could be both a long and a short term source of infection for poultry flocks.

There are various host factors that can influence the potential for infection, viral shedding and contact with the environment. Although many wild birds are susceptible to infection with avian influenza virus, the main shedding route, duration of shedding and the amount of infectious virus being shed varies between species.

Wild ducks, for example, can shed the virus for 28 days, but although this is possible it is also exceptional and during experimental infections in wild mallard, the duration of shedding is usually less than 14 days, with most virus being excreted 2-6 days post infection.

This shorter shedding period could be linked to immunity from recurring infections by the avian influenza virus. The field shedding period for the mallard has estimates ranging from 3.1 to 8.3 days.

Environmental factors

The importance of environmental persistency of avian influenza virus in the transmission and maintenance of these viruses is still not fully understood.

Experimental work has shown that avian influenza virus can remain viable in faeces or water for significant periods of time. Decreased water temperature, neutral pH and low salinity are important factors to enhance viral activity.

Fluctuations in temperature, freeze-thaw cycles and ammonia all reduce the period of infectivity.

Broiler mortality during transportation

The objectives of this Thai research **(J. of Appl. An. Sci. 10 25-34)** were to examine the mortality of broilers during transportation from the farm to the poultry processing plant.

Researchers examined the effect of transport factors, such as journey distance, transportation time and lairage time on mortality rates.

The study covered 5,325,913 broilers for the export market.

The mean percentage mortality was 0.19% and the effects of distance on this figure are shown in the table above. There was no significant difference between the mortality figures for journeys of up to four hours – the figures for differing journey times are shown in the table below.

Distance (km)	Mortality (%)
<50	0.15
50-100	0.19
100-150	0.17
>150	0.31

Time (hours)	Mortality (%)
<2	0.16
2-3	0.17
3-4	0.21
4-5	0.24
>5	0.40

The figures for lairage holding times are below.

Time (minutes)	Mortality (%)
<90	0.14
90-180	0.23
>180	0.23

Decreasing transportation distance and time and reducing lairage time should decrease mortality and increase profit.

Colloidal silver nanoparticles

This Ukrainian study **(Biol. Bull. of Bogdun Chmel. Mel. State Peda. Univ. 7 77-83)** tested colloidal silver nanoparticles as a means of achieving a long term reduction in the microbial contamination in the air of broiler houses by intestinal rehabilitation of broiler chickens and the simultaneous disinfection of water pipes and drinking water.

It was shown that the environmental microbial contamination influenced the microbial composition of the intestinal contents of the birds.

Zinc and vitamin C for free range layers

This Bulgarian study **(Bulg. J. of Ag. Sci. 23 289-297)** looked at the effect of dietary supplementation with zinc (35mg/kg feed) and vitamin C (250mg/kg) on behaviour and plasma corticosterone in New Hampshire hens kept under free range conditions during hot, thermoneutral and cold subperiods. In all birds subjected to temperature changes, corticosterone levels in the plasma were significantly higher than they were in the thermoneutral birds.

During those periods hens were more aggressive. The hens receiving zinc or zinc + vitamin C had reduced corticosterone and increased egg numbers, dust bathing and preening during the hot and cold periods. Their aggressive behaviour

was also reduced. The birds receiving both zinc and vitamin C showed more intensive preening and resting and less aggression and movement than the zinc only group suggesting a synergistic action of both supplements towards alleviating stress.

Herbal antioxidants

In this Indian trial **(Env. and Ecol. 35 1201-1204)** the effect of herbal antioxidant supplementation on broiler chick performance up to six weeks of age was evaluated.

It was found that herbal antioxidant supplementation improved growth rate but did not influence feed intake.

Chinese salmonella

This Chinese report **(China Poult. 38 22-27)** related to a study that investigated the prevalence of serotypes, drug resistance and virulence genes isolated from chicken slaughterhouses in Shandong Province.

A total of 233 salmonella isolations were made and these contained 25 different serotypes, of which the most prevalent serotypes were S. enteritidis, S. indiana, S. thompson and S. derby. Antibiotic resistance rates of the 233 isolates are shown in the table above.

Antibiotic	Resistance rate (%)
Gentamicin	100
Doxycycline	75
Ampicillin	73
Spectinomycin	67
Tetracycline	58
Florfenicol	56
Sulphamethoxazole	52

Early detection of lameness

In this Turkish work **(Comps. and Elecs. in Agric. 136 140-146)** a novel technique was developed for the early detection of lameness in broilers. For this purpose, broilers with five different predetermined gaits were continually monitored using a digital camera. Using image analysis algorithm feature variables were defined and then coefficients of correlation between the feature variables were determined.

It was shown that all the features could be used for the early detection of lameness.

Cold effects and broilers

This Chinese study **(China Poult. 38 40-43)** looked at the effect of different cold stimulus times on the behaviour index of Arbor Acres broilers between 22 and 42 days of age. The times of the stimuli were one, three or six hours and they were 3°C less than the control temperature.

The influence of the cold stimulation on broilers was assessed by detecting and measuring the behaviour index that included lying, feeding, standing, drinking, walking and grooming.

It was concluded that the time (duration) of the cold stimuli had an impact on feeding and lying behaviour, but had no impact on grooming, drinking, standing or walking behaviour.

Individual ranging patterns in commercial free range layers

This Australian study **(Animals 7 21)** tracked individual birds in two free range layer flocks by using RFID (Radio Frequency Identification) technology.

Distinct outdoor zones were identified on the basis of their distance from the house, namely, veranda (0-2.4 m), close range (2.4-11.4 m) and far range (>11.4 m).

Most of the hens in both flocks (68.6 and 82.2%) went outdoors on every day of the study and most hens accessed all three zones (73.7 and 84.5%).

Hens spent half of their time outdoors in the veranda area. Great variations occurred between individual birds.

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High performance enzyme

DuPont Industrial Biosciences has launched DuPont Axtra PRO, a single protease enzyme, in Latin America.

Axtra PRO will improve protein digestibility in animal diets and save animal producers up to US$7.8 per treated ton, without compromising performance or animal health.

"The Axtra PRO single protease enzyme provides customers with flexibility in ingredient selection, while delivering a high quality product for animals," John Julio Jansen, director Latin America, DuPont Industrial Biosciences, told International Poultry Production.

"This high-performance single protease enzyme will increase digestibility of amino acids in major feed ingredients like soybean meal. Producers can now use less soybean meal and still meet the amino acid requirements of their birds, alternatively, they also can use less expensive, less digestible protein sources."

Axtra PRO improves the digestibility of amino acids present in animal diets. Between 15-20% of dietary protein typically escapes digestion by the animal's endogenous proteases and passes through as waste – causing serious challenges for poultry producers. However, research has shown that on average Axtra PRO provides improvements proportional to the undigested fraction, making 22% of the non-digested amino acids digestible.

It provides flexibility in feed formulation by enabling the use of alternative, lower quality protein sources that would otherwise be overlooked.

By adding the single protease enzyme to animal diets, Axtra PRO reduces dependency on protein sources such as soybeans.

dupont.com

The advantages of the new Cobb MV male were outlined to more than 200 delegates at recent seminars for the Chinese market held in Kaifeng, Henan Province, and Haicheng, Liaoning Province. From the field data, superior livability and feed conversion and ultimately a better European Production Efficiency Factor is being seen. Data indicate the MV male will have at least the same or 1% better hatchability than their previous male, but at least 2% superior hatch to competing breeds. This male requires a lower male/female ratio, which can reduce feed costs. The purpose of the four-day seminars was to introduce the new male to the customers in China and discuss some of the differences that Cobb is expecting. With about 40 million parent stock produced each year, China is Asia's largest broiler market. Cobb and its distributor in China, Beijing Poultry Breeding Company, have invested heavily to supply the market with top quality parent stock chicks.

cobb-vantress.com

USING ENZYMES TO FREE MORE PROTEIN

by Luke Barnard and Andres Belalcazar, Danisco Animal Nutrition

In many markets feed accounts for nearly 70% of live production costs for broilers. Maximising the nutritive value of feed is a crucial part of satisfying birds' dietary requirements while maximising growth performance and producer profitability. This is especially true for protein, which plays a vital role in helping birds realise their genetic growth potential. Even when high quality protein meals such as soybean meal are fed, protein is still not 100% digested by the animal. Between 15-20% of dietary protein escapes digestion by the animal's own endogenous proteases, passes through the gastrointestinal (GI) tract and is excreted. This undigested protein poses several problems:

- It represents an economic loss for producers paying for protein and consequently amino acids that are not utilised for growth.
- High levels of protein in the latter regions of the GI tract is associated with proliferation of non-beneficial bacteria which can impact gut health.
- Lower protein digestibility means higher protein excretion resulting in increased nitrogen in litter; bacteria in the litter can transform nitrogen into ammonia increasing pollution.

By applying an exogenous protease in feed, producers can reduce dietary crude protein while still meeting the birds' amino acid requirements and maintaining animal performance. This will reduce the cost of the diet and at the same time alleviate some of the negative effects of undigested protein. Axtra PRO is a broad-spectrum protease active at a wide range of pH with a complementary mode of action to the endogenous proteases. It has the power to deliver more digestible amino acids from various feed ingredients, improving animal performance in a lower protein/amino acid diet (Fig. 1). Axtra PRO has demonstrated effects on different feed ingredients (Fig. 2), enabling utilisation of industrial by-products and alternative protein meals outside of soybean meal, which are often less costly, but are limited in their commercial inclusion by lower protein digestibility. With improved levels of protein digestibility some of these alternative ingredients are more attractive in least cost formulation. The addition of Axtra PRO increases the efficiency of animal production by maximising protein utilisation and reducing waste. Producers can get more digestible amino acids from their feed, greater flexibility in ingredient selection, increased control of emissions, and maximum feed cost savings through nutritional research.

Fig. 1. The addition of Axtra PRO to a negative control diet deficient in digestible amino acids showed a decrease in 42 day FCR in broilers and an increase in ADG to a level comparable to the PC diet. The digestible amino acid levels in the NC diet were on average ~3% lower than in the PC diet and also reduced by ~40kcal/kg (Means with different superscript are significantly different, P<0.05).

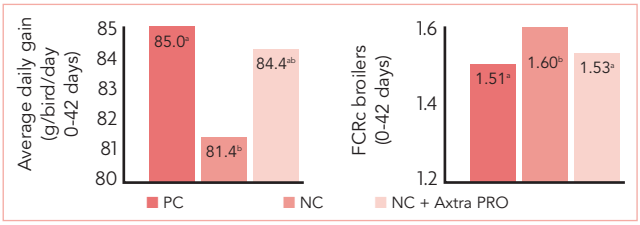
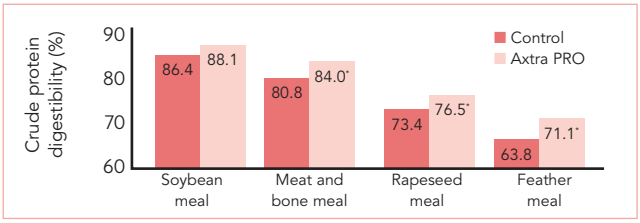


Fig. 2. The addition of Axtra PRO to semi-purified diets of soybean meal, meat and bone meal, rapeseed meal and feather meal in all cases resulted in an increase in protein digestibility (*indicates a significant difference to its relative control group, P < 0.05).



For more information visit http://animalnutrition.dupont.com
or email us at info.animalnutrition@dupont.com

internationalnews

Zambian broiler workshop

Indian River customer, Tiger Chicks, recently hosted an informative workshop for 73 broiler farmers in Lusaka, Zambia.

Tiger Chicks, a business unit of leading South African integrated poultry producer Astral Foods, is a breeder farm and hatchery that produces day-old broiler chicks for the African market.

The workshop addressed broiler management topics such as brooding and maximising seven-day body weights, which are of particular benefit to African farmers.

Additionally, Mohsen Ganjaei, Indian River Commercial and Product Support Manager for the Middle East and Africa (MEA), offered the latest insight on how to optimise the productivity of broiler chicks through effective flock management.

Robust Indian River broiler breeding stock poses key advantages for the emerging African market due to its environmental hardiness and strong livability – coupled with exceptional feed efficiency and high leg meat yield.

Due to the enthusiastic reaction of attendees, Tiger Chicks will present the workshop on similar topics every four months.

aviagen.com

New features for poultry controller

The recently updated Chore-Tronics 3 Controller provides operators with new ways to monitor and manage productivity in their poultry houses. Enhanced features include control of drinker line water columns, zoned sprinklers and multiple variable-speed fans. Chore-Time is the first to combine these benefits in a poultry controller.

With PDS technology built in to the Chore-Tronics 3 System, growers can maintain the same water column height no matter how many birds are drinking. This feature also monitors curving of the minimum and maximum flow-rate alarms, and allows operators to flush the drinking system based on water temperature.

Operators can now set four different fan groupings at infinitely variable speeds with the Chore-Tronics 3 Controller. This feature eliminates spikes in ventilation.

The system controls sprinklers automatically for zoned cooling, which keeps birds cool and helps growers use water efficiently.

Chore-Time has also added a Mobile App and an optional Broadcaster Alert System that gives managers more mobile options for controlling poultry houses.

Chore-Tronics 3 is modular and upgradeable so growers can add new options and capabilities as they are developed.

choretime.com

Champion award for Dutch family farm

The van den Hurk family in the Netherlands is celebrating after winning one of the latest Cobb Champion awards for outstanding broiler performance.

The awards were introduced last year to recognise annual world-class performance at breeder, broiler and hatchery levels in Europe, the Middle East and Africa.

Their Huna Pluimvee farm, south of Hertogenbosch, reared its first flock of 10,000 broilers in 1990 and has expanded to a capacity of 180,000 birds in six houses, growing broilers to around 2.4kg.

The winning flock of Cobb500 broilers was hatched by Probroed and Sloot and grown to 39 days, achieving 2.68kg with an average daily gain of 68.7g and feed conversion of 1.51 – adding up to an EPEF of 441.

cobb-vantress.com

Nebraskan plant opens

Over the last three years, the Marel Poultry Team has been working hard, together with representatives from Costco Wholesale and their newly formed poultry processing company, Lincoln Premium Poultry, on a state-of-the-art greenfield plant in Fremont, Nebraska.

This marks the largest single order to date for both the North America Region and Marel as a whole.

Marel, in partnership with its customers, is transforming the way food is processed by enabling customers to deliver affordable and high quality food in a sustainable way.

Marel Poultry has been chosen to equip Lincoln Premium Poultry with the latest technology from the ATLAS live bird handling system with CAS stunning lines through scalding, defeathering, evisceration, chilling, cut-up and debone to inspection and robotic packing.

The entire system will be monitored by their Innova food processing software to help achieve full traceability and raise efficiency.

Costco has purchased 414 acres in Fremont and the site will hold a chicken hatchery, feed mill and processing plant. The entire supply chain will be concentrated in a 100 mile radius.

The goal is to produce two million chickens a week, the processing plant will handle about a third of the raw and rotisserie chicken sold at Costco stores nationwide. Marel Poultry will deliver the system by the end of 2018 with a start-up around April 2019.

marel.com

Science News App launched

DSM has introduced their ANH Science News App, an innovative tool, which has been created to provide a comprehensive, expert-led resource on the latest research in the Animal Nutrition and Health (ANH) industry.

The DSM Science News App, designed for industry professionals and anyone with an interest in the field, offers an on-demand library of animal nutrition and health abstracts across a variety of species and topics, including poultry.

A filter option in the app allows the abstracts to be selected by species and key words, letting users tailor the experience to their topics of interest. The app is updated regularly, and users can choose to receive an alert when a new collection of abstracts is added – for 24/7, on-demand scientific insight.

It is available to download from the Apple and Google Play stores.

dsm.com

A natural consolidation

Olmix Group, a global leader in natural algae-sourced solutions, has been strengthened by the acquisition of PRP Technologies, a European specialist in biostimulants for agroecology. Both French groups recently formally announced this consolidation.

Olmix is known worldwide for its solutions based on algae, clays and trace elements to improve performance, welfare and health in animals (environmental hygiene, mycotoxin risk, digestive efficiency, immunity, digestive welfare).

PRP Technologies has also conquered the European continent thanks to stimulator products for animals.

The emergence of new natural technologies is bringing a revolution to the farming model and the dream is finally becoming true: traditional chemical products are no longer required to meet the needs of global farming and the increasingly pressing demands of consumers for food quality and safety.

The partnership between Olmix Group and PRP Technologies offers major benefits in nutrition and animal health. The ranges are very complementary and merge under the entity Olmix Animal Care.

olmix.com

More evidence that RFCs reduce *Salmonella*

by Sangita Jalukar,
Product Development and Research Coordinator,
Arm & Hammer Animal Nutrition

While *Salmonella* is not directly lethal to birds, occurrence is an important consideration for the industry since this pathogen, and resulting Salmonellosis, has been a public health concern for more than a century – and continues to be a major foodborne pathogen affecting people.

Recent independent studies evaluated the effect of the Refined Functional Carbohydrates (RFCs) in broiler breeder and broiler diets on *Salmonella* prevalence. The results indicate that RFCs offer opportunities to help reduce *Salmonella* levels in the food production chain.

• In the first study, broiler progeny from hens fed the control diet and receiving control broiler diets had 12.5% prevalence of *Salmonella* in the caeca. Broilers from RFC-fed hens and receiving 0 or 50g/MT of RFCs in the broiler diets had zero prevalence of *Salmonella* when samples were taken at day 34.

Table 1. Prevalence of *Salmonella* in caeca of broiler progeny of control fed breeders vs. RFC fed breeders.

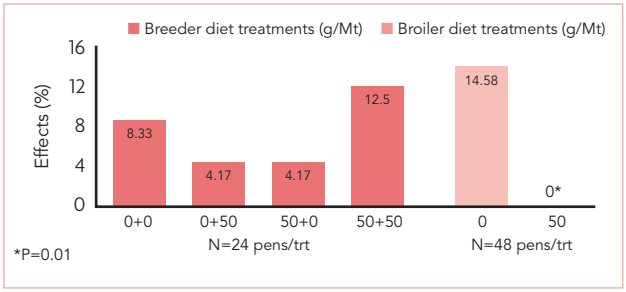
CONTROL	RFC
12.5%	0.00%

Broilers at 34 Days of Age

• In the second study, breeder hens and their broiler progeny were fed ±RFCs and *Salmonella* was monitored. *Salmonella* was detected in litter of breeder hens regardless of treatment with no significant difference within treatments. However, a strong treatment effect was observed for litter *Salmonella* prevalence in the broiler progeny from these breeder hens.

This research showed that supplementation of RFCs in the broiler diets reduced the prevalence of *Salmonella* in the litter. *Salmonella* prevalence was 14.58% compared to 0% in the RFC supplemented broilers (P=0.01). *Salmonella* was isolated in the caeca of broilers fed control diets and its prevalence was not affected by the breeder treatments. In contrast, *Salmonella* was not isolated in the caeca of broilers fed RFC-diets regardless of the breeder treatments. Breeder performance was not affected by treatments. RFC-fed female broilers had a tendency for improved body weight and feed-conversion ratio.

Fig. 1. Treatment effects on incidence of *Salmonella* presence in litter (%).



RFCS ARE EFFECTIVE

From these results, you can draw several conclusions, including:

• RFC supplementation in breeder diets decreased prevalence of *Salmonella* in the caeca of breeder hens, but did not eliminate *Salmonella* from the litter.

• RFC supplementation in the broiler diets reduced *Salmonella* prevalence in the litter and in the caeca compared to control-fed broilers.

Ultimately, these data show that RFC supplementation in the broiler breeder and broiler diets significantly reduced prevalence of *Salmonella* in the litter and caeca, thus supporting its benefit in a multifactorial *Salmonella* mitigation strategy in poultry production.

To learn more, visit www.AHanimalnutrition.com

International Mini Ads

internationalnews

Treatment for red mites

MSD Animal Health has launched Exzolt (fluralaner), the first systemic treatment for poultry red mite infestations – a novel approach that virtually eliminates poultry red mites in production houses of any size or type, including free range.

Conveniently administered via drinking water, Exzolt also improves poultry welfare by reducing stress associated with other forms of treatment, and minimises the exposure of workers and birds to chemical sprays.

"Poultry red mites are among the most threatening pests in Europe, contributing to increased stress levels, decreased weight gain and diminished egg quality and production in infested birds," Dr Taylor Barbosa, Head of Poultry, MSD Animal Health, told International Poultry Production.

"It is important to effectively treat poultry red mites as infestations not only affect the birds' welfare, but also result in significant economic losses for poultry producers."

Poultry red mites are a top five cause of economic loss in European layer and breeder operations and in many other countries, as infestations cause significant stress to poultry, decrease reproductive potential in males, egg production in females and weight gain in young birds. The total annual cost of poultry red mite infestations in the European egg laying industry is estimated to be €360 million, with more than 430 million hens in all production types – pullets, breeders and layer hens – suffering from infestations.

Previously available treatment options are labour-intensive and/or have achieved limited success in eliminating or controlling infestations.

Mite infestations affect poultry workers as well, causing gamasoidosis, a skin condition characterised by rash and itching.

The safety of Exzolt has been established through comprehensive clinical research studies. These studies demonstrated that Exzolt virtually eliminates poultry red mites in production houses, and is safe for the birds and for human handling. No significant adverse events were reported.

"With a zero day withdrawal period, eggs from chickens treated with Exzolt are safe to consume, making the product ideal for maintaining the health, performance and welfare of flocks, while continuing to meet market demands and avoiding economic loss for producers," adds Dr Barbosa.

msd-animal-health.com

Revolutionary layer farm opens

The most state of the art layer farm in the world has now officially opened. The Kipster farm is located on the Wusterveld in the town of Venray. This area is intended for innovative agriculture, with a focus on animal welfare and the environment.

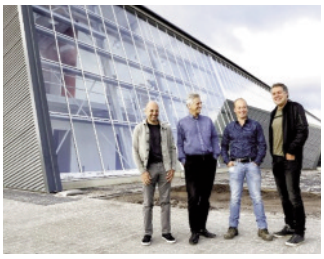
Hendrix Genetics is a proud partner in this concept and will be delivering Dekalb White laying hens to be housed there.

A great deal of innovations are used on this farm. The concept is designed around the instincts and needs of the chicken and 1,100 solar panels make the farm energy-positive. Fuel emissions are limited to an absolute minimum using energy systems not previously used in the agricultural sector.

The facility includes an area for visitors and a centre for education and information. The chickens eat newly developed feed made from surplus foodstuffs from the food industry, which minimises the environmental impact and does not compete with food for human consumption.

Kipster is the initiative of four entrepreneurs – Ruud Zanders, Olivier Wegloop, Maurits Groen and Styn Claessens – combining expertise in the fields of poultry, sustainability, farming and communication.

hendrix-genetics.com



internationalnews

APPOINTMENTS

DR ATTILA KOVÁCS
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MARIE-CHRISTIN REISMANN
Leiber GmbH
Product Management Monogastrics
www.leibergmbh.de

DR GENE SHEPHERD
Cobb-Vantress
Managing Director of World Quality Assurance and Veterinary Services
www.cobb-vantress.com

HELEN HOUGHTON
Anpario
Corporate Development Director
www.anpario.com

FRANK LUTTELS
Chore-Time
Layer Product Manager
www.choretime.com

PATRICK NICHOLLS
Hubbard
Technical Sales Manager for the United Kingdom and Ireland
www.hubbardbreeders.com

Coccidiosis and necrotic enteritis

At the 20th Poultry Science Association Meeting held in Orlando, USA, Dr Greg Mathis, Director of Southern Poultry Research Inc, reminded the audience that according to a recent survey, coccidiosis and necrotic enteritis are the top two priorities for the poultry industry, especially in drug-free broiler feeding programs. Dietary interventions can mitigate impaired gut integrity.

A study conducted at an SPR facility tested the effect of zinc source and dose on Clostridium perfringens challenged birds.

It was shown that intestinal lesion score, mortality and broiler growth could be improved when feeds were supplemented with high doses of potentiated zinc oxide (HiZox, Animine).

animine.eu

Vaccination is not enough

At the recent World Veterinary Poultry Association Congress in Edinburgh, Ceva hosted a scientific symposium 'Mastering In Ovo Vaccination – A closer look at key details' which focused on the critical success factors for in ovo vaccination: embryo age and development, new solutions for improved chick quality and the essential steps to optimise in ovo vaccination.

With ever increasing demands on the poultry sector to produce in the most sustainable, safe and welfare minded way possible, further improvements of efficiency in the hatchery are critical to achieving these goals.

Ceva has invested significantly over the last decade developing the most complete portfolio of new technology vaccine products, such as Transmune, Vectormune ND, in-ovo vaccination equipment with Egginject and now hatchery automation equipment with Laser Life.

Laser Life identifies all live eggs, vital in the in ovo process, as one dead or contaminated egg can spread contamination through injecting equipment causing severe disruption and waste.

In what Ceva believes is an important advance in ovo vaccination, its latest Egginject adapts to every egg, as compared to older systems that inject to a uniform depth, which can result in poor uptake.

Ceva is also making excellent progress on the roll out of its C.H.I.C.K Program, which earlier in the year became the first quality services program to be independently certified by Bureau Veritas.

The program has now been officially approved in South Africa, Spain, Turkey, The Philippines, Mexico, Russia, and Poland.

ceva.com

Investment in Vietnam

Neovia has entered into exclusive negotiations to acquire a production site in Quy Nhon in central Vietnam.

The acquisition of the production site in the Binh Dinh province, about 600km from Ho Chi Minh City, will help Neovia increase its production capacities by 50,000 tonnes per year and consolidate its position in central Vietnam. This region is strategically located to effectively supply a growing market estimated at over three million tonnes of feed and expand the company's export activities to South East Asia.

With this in mind, Neovia will make additional investments in the factory to continue to modernise its facilities, increase its production capacities, and offer products in line with the requirements of its livestock farming customers and distributors in the area.

In addition to this major project, Neovia is strengthening its industrial tools and service offering in general by building a new factory in Ha Nam, creating a new production line at the Dong Thap site, and expanding its storage capacities in Binh Duong.

neovia-group.com

Hy-Line gains ground in India

Hy-Line has begun a new partnership with Srinivasa Farms to distribute Hy-Line commercial layers throughout India. Srinivasa Farms began supplying day-old chicks in August.

Hy-Line Layers Private Ltd will continue to oversee the production and distribution of parent stock.

"We see the enormous potential of genetically superior Hy-Line layers to feed the growing population of India an inexpensive source of protein through a partnership with Srinivasa Farms," Jonathan Cade, president of Hy-Line International, told International Poultry Production.

"They have earned a reputation of being one of the best poultry breeding companies, adopting international standards of quality, hygiene and efficiency."

The company was founded by C. Jagapati Rao and Dr K. Somi Reddy and had a modest beginning of 6,000 layer parents in 1978 through 1979, and has grown to a stage of 440,000 layer parent stock with a diverse presence across multiple sectors including poultry breeding and feed.

hyline.com

Diary 2017

Poultry India
22-24th November
Hyderabad, India
www.poultryindia.co.in

2018

IPPE
30th January - 1st February
Atlanta, Georgia, USA
www.ippexpo.org

VIV MEA
5-7th February
Abu Dhabi, UAE
www.vivmea.nl

Ildex Vietnam
14-16th March
Ho Chi Minh City, Vietnam
www.ildex.com

Poultry Focus Asia
21-23rd March
Bangkok, Thailand
www.positiveaction.co.uk

Victam Asia
27-29th March
Bangkok, Thailand
www.victamasia.com

Livestock Asia Expo and Forum
19-21st April
Kuala Lumpur, Malaysia
www.livestockasia.com

Pig & Poultry Fair
15-16th May
Stoneleigh, UK
www.pigandpoultry.org.uk

PIX/AMC
3-5th June
Brisbane, Australia
www.pixamc.com.au

6th Mediterranean Poultry Summit
18-20th June
Turin, Italy
www.wpsa.com

VIV Europe
20-22nd June
Utrecht, The Netherlands
www.viv.nl