

World Nutrition Forum reaches new heights in Austrian Alps

Biomim recently held their third World Nutrition Forum in the Austrian Tyrol and producers and nutritionists from some 66 countries around the world attended. International Poultry Production was also there and in this review we highlight some of the issues that were discussed that are relevant to poultry producers.

In the general sessions there were many observations pertinent to poultry production. Did you know that over the last 50 years total global meat production has increased from 45.7 to 280.9 million tonnes and that poultry meat has increased from 14.4 to 92.9 million tonnes?

Currently, poultry meat accounts for 33.1% of all meat consumed globally compared to 35.8 and 24.2% respectively for pork and beef.

Asian and African growth

One interesting, but somewhat alarming, fact is that 89.7% of future human population growth will be in Africa and Asia. This increase in population size will be further compounded by dramatic increases in per capita consumption of meat as incomes rise.

Looking to the future, a key limiting factor in human food production could be the availability of water. Interesting statistics on this were shown.

Parameter	Control	Plus Biotronic SE Forte	Plus competitor
Mean weight (kg)	2.01591	2.02988	1.86824
ADG (g)	56.47	56.88	52.21
FCR	1.735	1.723	1.796
Livability (%)	98.32	99.29	98.27

Table 1. Acidifier trial showing economic efficiencies at day 35.

Did you know it takes 450 litres of water to produce a kg of maize, 1,150 litres to produce a kg of wheat, approaching 3,000 litres are required to produce a kg of poultry meat or pork and 15,977 litres of water are required to produce a kg of beef. Thus, with water scarce in many parts of the world there is a strong argument for being vegetarian or a poultry and pork eater rather than a beef eater.

When it comes to producing animal proteins for human consumption we only utilise some 20-30% of the protein nitrogen in the animal feed. This could be significantly improved by more use of phase feeding in poultry and pig production. Similarly, statistics were available for phosphorus utilisation.

R. D. Mitchell from Perdue farms in the USA reflected on trends in the USA's poultry industry. Some recent changes have come about as a result of pressures from technology, regulation and social desires and

in his presentation he focused on changes in housing, nutrition and production practices.

Over the last five years turkey and broiler housing has focused on increasing air speeds with tunnel ventilation to allow birds to be grown to heavier weights. It has been found that solid side wall housing gives the following advantages:

- Improved fuel efficiency.
- More environmental control.
- High static pressure which enables wider houses to be built.

Typically farms are becoming larger so better returns are generated, but although larger farms may be more economical they create challenges associated with biosecurity, bird health, environmental impact and bird welfare. Currently solar panelled houses are being evaluated so as to reduce fuel usage and alternative bedding materials are being looked at.

Californian egg ballot

He also highlighted a ballot initiative in California which is being sponsored by the Humane Society of the United States and will allow voters to decide whether to ban cages by 2015. California is the fifth largest state in terms of egg production with some 19 million layers. If this legislation is passed, other states are likely to follow California's example.

When it comes to nutrition one can not ignore the impact of biofuels and the biofuel byproducts that are now available. Dried distillers grains with solubles (DDGS) have been introduced into poultry diets over the last five years but this has further increased during the last year. It would appear that the poultry sector has most to lose as DDGS has a lower value in poultry than in other

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Biomim's founder and president, Eric Erber, with this year's speakers.



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species because of the bird's inability to utilise fibre.

Until recently, dietary energy was relatively cheap in North America and the Americans tend to use excess energy to optimise live cost. This higher cost of dietary energy has stimulated changes such as moving to high yield breeds to produce more white meat and improving housing to minimise winter energy costs.

In North America the rise in fat costs coupled to the need to improve efficiency and reduce costs of enzymes has led to a dramatic increase in the use of non-starch polysaccharide type enzymes. Phytase is now widely used because of competition in the

	Control	Probiotic in feed and water	Probiotic in feed only	Avilamycin at 2.5mg per kg feed
Body weight (g)	2216	2276	2198	2314
Feed intake (g)	4012	4031	3930	4001
FCR	1.81	1.77	1.79	1.73

Table 2. The trial results for a multi-species probiotic.

phytase market coupled to highly priced feed phosphorus.

The use of antibiotic growth promoters has reduced over recent years and this has been primarily consumer driven. Their removal has not had any major adverse effects. One consequence of this is the emergence of RWA (Raised Without

Antibiotics) labelling. Initially producers used ionophore anticoccidials, but recently USDA has declared that ionophores are included in antibiotics for RWA labelling purposes.

It is thought that the removal of ionophores to comply with this will generate a much greater challenge for the sector than the original removal of antibiotic growth promoters.

Single sex growing

In the turkey sector hens are commonly processed at 12kg despite a poorer FCR at these weights. This obviously greatly favours single sex growing and the broiler sector is likely to revisit this concept despite the costs associated with sexing.

R. Ducatelle and colleagues then considered feeding for improved gut health in broilers. They highlighted the complex interaction between feed, the gut microflora and the bird. The importance of the gut microflora can not be underestimated as in the lower gut there are some 10^{12-14} bacteria per ml of gut contents!

Most of these micro-organisms are harmless, some are beneficial (probiotics) and some can be harmful (obligate pathogens, facultative pathogens and opportunists).

The growth and/or activity of beneficial bacteria in the lower gut can be selectively stimulated by certain non-digestible feed ingredients. These are called prebiotics and a good example is inulin and inulin-derived fructo-oligosaccharides which have been shown to stimulate gut development and improve performance in broilers.

Pathogenic micro-organisms can exert their harmful effects in various ways. Micro-organisms in the gut lumen can cause damage by releasing toxic substances and others can block nutrient absorption sites.

A lost option

Antibiotics can be for control purposes but they can also wipe out a large proportion of the 'good bacteria' as well. Some benefits are seen at low doses but the use of antibiotic growth promoters is not an option in many parts of the world.

Butyric acid is a major breakdown product of NSP and it is considered to be a major energy substrate for epithelial cells in the lower gut and it also plays a major role in mucosal repair and has other functions.

In broilers numerous trials have been carried out to assess the beneficial effects of

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Level of ochratoxin A (ppm)	Level of Mycofix Plus (kg/tonne)	Feed consumption (g) Week 6	Body weight (g) Week 6	FCR
None	0	3838	1743	2.19
None	1	3683	1709	2.15
None	2	3894	1822	2.13
0.5	0	3515	1454	2.43
0.5	1	3578	1558	2.29
0.5	2	3454	1769	2.13
1.0	0	3403	1224	2.79
1.0	1	3465	1436	2.41
1.0	2	3527	1536	2.30

Table 3. The evaluation of Mycofix Plus in Starbro broilers.

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butyrate in various formulations. Dietary sodium butyrate at levels of 500mg per kg or higher increases the villus height to crypt depth ratio in broilers and it has been shown that butyrate can protect broilers from long term Salmonella enteritidis infection.

Under natural conditions in the healthy digestive tract butyric acid is mainly produced by Gram +ve bacteria and some of these feed on lactate.

Conversely, other bacteria produce lactate. Thus, cross feeding can keep lactate levels down and optimise butyrate production.

Over the years numerous feed additives have been designed to improve digestibility and counter anti-nutritional factors which can, and do, induce a subclinical inflammatory response in the gut.

Probiotics and prebiotics

In a recent review paper (de Vrese and Marteau, The Journal of Nutrition 137 803-811) the authors summed up the currently known effects of probiotics and prebiotics in man. Several probiotic bacteria not only prevent infectious diarrhoea in children, especially those who are malnourished, but a curative effect has also been seen.

Feeding certain probiotics has given promising results in the treatment of inflammatory diseases both in the gut and elsewhere in the body.

The future for improving gut health through feed additives probably lies in the administration of quorum sensing like molecules that are perceived by the beneficial bacteria as positive signals and by harmful bacteria as stop signals. Coated butyric acid could be considered as a pioneer compound in this context.

I. Vacaru-Opris and colleagues from Romania then consider acidifiers.

They highlighted a commercial trial that used a flock of 36,000 broilers that compared Biomin's Biotronic SE Forte and a competitor product. The results are shown in Table 1.

K. C. Mountzouris and K. D. Fegeros from Greece then looked at the efficacy of a multi-species probiotic in broilers. It was

shown that the multi-species probiotic product displayed a growth performance effect similar to that seen with the antibiotic avilamycin (Table 2).

In an interesting presentation I. Giannenas

and I. Kyriazakis, also from Greece, reflected on the potential for aromatic plants and their extracts for the control of coccidiosis in chickens.

Alternative strategies

With the likely ban on anticoccidials, alternative strategies for countering coccidiosis are in everyone's minds.

One strategy involves combining the benefits of prebiotics with coccidiosis vaccination, while another approach is the use of aromatic plants or their extracts.

This work is in its early days including the elucidation of mechanisms of action.

In a presentation by N. Q. Hanif and colleagues from Pakistan the use of the toxin deactivator Mycofix Plus in broilers was evaluated (Table 3).

B.R.A.I.N. Award

The Biomin Research and Innovation Network (B.R.A.I.N.) is a program created to support young and highly skilled scientists. Its aim is to foster and fund groundbreaking research projects and innovative ideas in the area of animal nutrition and animal health.

An expert jury evaluates submitted research proposals (B.R.A.I.N. Projects) and the best and most innovative projects will be realised, i.e. funded by Biomin.

Within the last two years B.R.A.I.N. had close to a hundred applications, out of these 28 projects were carried out and successfully finished, 35 projects are currently evaluated or already conducted.

The B.R.A.I.N. Internship provides skilled students the opportunity to actively participate in one of Biomin's R&D projects.

Students become part of a Biomin research team for up to a year, which establishes very often the basis for further cooperation and employment.

Dr Kostas Mountzouris, a nutritional biotechnologist from the University of Athens, Greece was nominated the B.R.A.I.N. Award 2008 winner.

He is an academic lecturer in nutritional biotechnology at the University of Athens, Greece. His primary research interests concern the study of the effects of bioactive functional food/feed components on host digestive function and gut ecology parameters such as microflora and immune function. Dr Mountzouris (second left in photograph) received a monetary award of €5000 and was invited to present his paper at the World Nutrition Forum 2008.

