World Nutrition Forum's Asian debut focuses on pig nutrition

Biomin recently held their World Nutrition Forum in Singapore and some 800 delegates from 75 countries attended. This was the first time the event was held outside Austria and, with the right balance of social and scientific sessions, everyone who attended, including International Pig Topics, hailed the meeting a great success. The theme of the Forum was NutriEconomics – Balancing Global Nutrition and Productivity: People, Performance, Profit and Planet and here we highlight the key messages to come out of the event.

On the pig front there were several really informative papers presented at this Forum.

Barton S. Borg from the USA looked at the roles of feed efficiency and future technologies in cost effective pork production, which is important as the percentage of production costs represented by feed increases with increasing corn and soya prices. The goal should be the optimisation of feed conversion and giving due consideration to costs.

The FCR of a group of pigs can be tremendously impacted by dietary energy/nutrient content, health status (morbidity and mortality), placement and sale weights, additives such as ractopamine (Paylean), sex of the pig, use of pellets or mash, feed waste and genetics.

It has been found that for FCR to be a valuable measurement the feed conversion outcome value must be adjusted to a standard set of criteria such as a standard weight of 270lb or to a common energy content and a common mortality value. Then the true differences between groups of pigs can be identified so that improvement actions can be implemented.

When it comes to dietary energy, concepts like particle size (Table 1) and reductions in grains and other feedstuffs will influence nutrient utilisation and are a great opportunity for cost improvements.

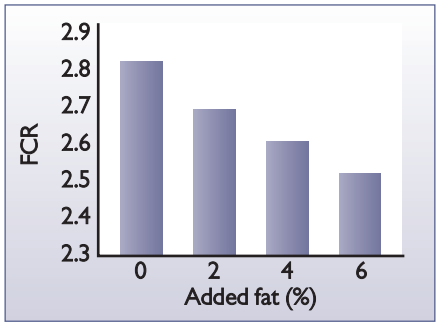

Fig. 1. The impact of increasing metabolisable energy by adding fat to the diet between 27.3 and 118.2kg.

Addition of fats and oils can impact dietary energy content of the feed or be used to offset the energy reduction, while other lower energy alternative ingredients are used to improve costs.

Understanding the impact on feed conversion and gain due to modifying the dietary energy content is the key to be able to make the right decision on cost optimisation. Fig. 1 shows the impact of increasing metabolisable energy by adding fat to the diet.

Other technologies that are well known and significantly impact on FCR include the use of ractopamine and products that influence male hormone secretion by vaccination (Improvest).

Key opportunities include the use of enzymes such as phytase and xylanase and an increasing number of studies are highlighting the benefits of using these substances (Fig. 2 and 3).

Shengyu Xu and colleagues from China then presented information on Fusarium toxins, zearalenone and deoxynivalenol, and their effect on the reproductive performance of sows.

Table 1. The effect of particle size on performance of finishers.

Apparent digestibility (%)	Particle size (µm)			
	1,000	800	600	400
Dry matter	82.81	83.28	82.57	85.46
Nitrogen	75.83	76.30	76.16	79.94
Gross energy	82.54	82.82	82.34	85.96

Zearalenone is similar to oestradiol and influences the hormone secretion and cell proliferation of granulosa cells, interferes with the normal meiosis of oocytes and decreases oocyte quality.

Deoxynivalenol can reduce oocyte and embryo development. Compared to pregnant sows, the prepubertal gilt reacts more sensitively to deoxynivalenol. The fusarium toxins increase the weaning to service interval of lactating sows.

Fusarium is the most common mould that contaminates feed ingredients and its toxins are a variety of its toxic metabolites. Both zearalenone and deoxynivalenol reduce sow fecundity and today many countries pay a lot of attention to the toxic effects of these two mycotoxins.

Erich Erber, Biomin's founder and director of the executive board, welcomed delegates to the Forum with an interesting and thought provoking presentation.

The EU says that the level of zearalenone in piglet diets should not exceed 0.1mg per kg feed and for sows and fatteners the level should not exceed 0.25mg per kg of feed. The highest level for deoxynivalenol is 0.9mg per kg. German levels are 1.0mg deoxynivalenol per kg of feed for all pig categories and 0.25 and 0.05mg zearalenone per kg of feed for cycling sows and prepubertal pigs respectively.

Chinese limits have been set at 0.5mg zearalenone per kg of feed and 1.0mg deoxynivalenol per kg of feed.

Studies have shown that weight gain, feed intake and FCR are increasingly adversely affected in gilts with increasing dietary zearalenone contamination. Vulval swelling and

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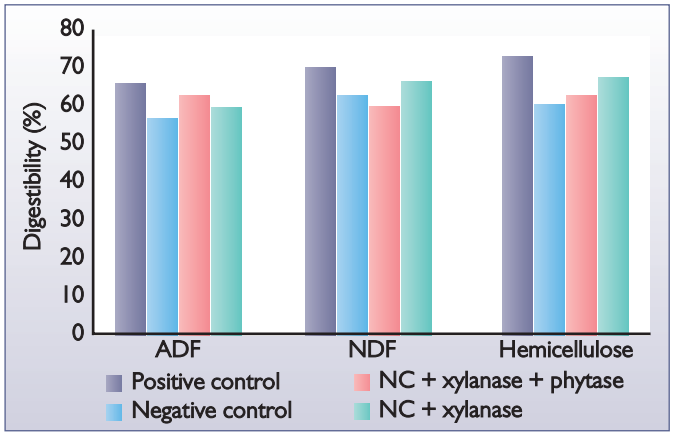

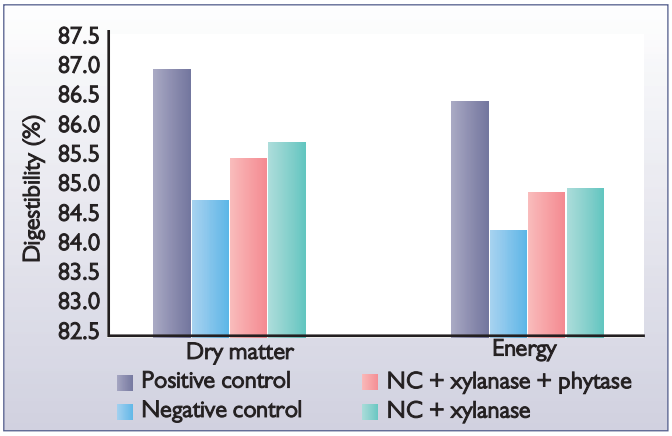

Figs. 2 and 3. Apparent digestibility of nutrients for the overall grow-finish period.

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redness are seen in prepubertal gilts fed ad libitum a diet containing 10mg zearalenone per kg for 3-5 days. Puberty also came early.

Zearalenone (5-30mg per kg feed) contaminated feed fed to pigs immediately after mating caused no adverse effects but at 60-90mg per kg no living foetuses were seen at 40-43 days of pregnancy.

Diets naturally contaminated (5.5mg deoxynivalenol and 0.3mg zearalenone per kg feed had significant adverse effects on the pregnancy and increased the stillbirth rate.

There have not been many reports of the effects of Fusarium mycotoxins in lactating sows other than enhanced body weight loss and increased weaning to service intervals.

Five mechanisms are proposed for the action of fusarial mycotoxins on reproductive performance, namely:

- Interference with the neurotransmitter 5-HTP.
- Stimulation of lipid peroxidation.
- Direct impact on hormone secretion and cell proliferation of the granulosa cells.
- Disturbed oocyte meiosis.
- Sow liver and spleen damage and liver mitochondrial damage in the foetuses.

W. Age and colleagues from Holland discussed ammonia emission. Negative aspects of pig production on the environment have already led to legislation that limits the use of animal manure and/or the expansion of pig operations in some countries. Limits are also set on ammonia emissions in the EU.

Nutritional measures that can reduce environmental pollution by reducing nitrogen excretion and ammonia emission are practised. Ammonia emission can be significantly reduced by:

- Lowering the crude protein intake by the use of additional limiting amino acids.
- Shifting nitrogen excretion from urine to faeces by the addition of dietary fermentable carbohydrates.
- Lowering the pH of urine by adding acidifying salts to the diet or altering dietary electrolyte balance.
- Lowering the faecal pH by including fermentable carbohydrates in the diet.

By combining these strategies a total reduction in ammonia emission in growing-finishing pigs of 70% should be possible. ■