

Alltech look at game changers in poultry production

The recent 27th International Alltech Health and Nutrition Symposium took as its theme 'Game Changers' and was attended by some 2,600 delegates from 72 countries. Following the opening of the Symposium by Lexington's Mayor Jim Gray and Kentucky US Congressman Ben Chandler and the awarding of the Alltech Medal of Excellence to Prof. Inge Russell of Heriot-Watt University in Scotland, Damien McLoughlin from The National University of Ireland reflected on 'A time of Change in Agribusiness'. He highlighted that there are currently some 1.5 billion consumers in the world and that this figure will soon double. Nowadays, businesses need to be more than lucky and, to survive, a firm needs to reinvent its business over and over again. He gave delegates the following five take-home points:

● **No fads or fashions.**

Just change and success can come from long term change based on continually renovating and innovating products in a response to consumer health and wellness issues. This is the basis of Nestlé's success.

● **Don't be first, just be different.**

A good example of this in practice is Zespri Kiwifruit of New Zealand. They used new technologies to develop new strains of kiwi fruit, including Zespri Gold. The company now sells 30% of the world's kiwi fruit but collects 70% of the value from this market.

● **Know where growth comes from and go where growth is.**

In 2005, JBS was largely unknown outside Brazil but today is the largest protein firm in the world. JBS saw the growth potential of being a global protein supplier and they also realised the importance of having a significant presence in Australia and the USA and so they made significant acquisitions in these and other countries. Today JBS uses scale, market position and brand recognition to drive their global success.

● **Don't act now!**

Liuhé, which was founded in 2005, is now the number one animal feed company in China. Liuhé invests in management skills realising that this is where the greatest return is – not in technology. The company's philo-



Asian visitors at this year's symposium.

sophy is to be positive and simplify issues, work hard and well, learn and reflect and harmonisation with self, users and competitors.

● **It's about you and what you do.**

KFC China is now larger than KFC USA and opens a new outlet every 18 hours. Founder Sam Su believes that incremental change is not enough if you want to be great and emphasises the importance of high quality decision making and for this he relentlessly pursues good people. He believes in making bold and innovative decisions.

In closing off the first session Alltech's founder and president Pearse Lyons focused on the wealth of great opportunities now being presented by the technological revolution. Several speakers on the poultry programme focused on key issues for modern poultry production.

Controlling salmonella

Greg Cutler from California focused on salmonella in table egg layers. He stressed that controlling Salmonella enteritidis infection in laying flocks requires a multi-faceted approach and that it is essential to start with chicks that are free of *S. enteritidis*. These and pullets should be placed in salmonella free buildings and fed salmonella free feed. Strict biosecurity is essential and aggressive rodent and pest control is required.

Vaccination is now an important part of *S. enteritidis* control. Early on live vaccines are used, which probably also act as competitive

exclusion products and later killed vaccines are used to give longer term protection throughout lay.

Products such as Bio Mos and Actigen help prevent colonisation of the bird's intestinal tract as these products interact with the fimbriae of the *S. enteritidis* but do not act in a similar fashion with live vaccine strains of the organism.

The FDA's Egg Safety Rule requires the testing of table egg flocks at 15 weeks, 45 weeks and six weeks after moult. Greg recommends that 10% of chick box papers are cultured to reduce

the risk of introducing *S. enteritidis* with the day olds and testing a flock on removal.

Todd J. Applegate from Purdue University in the USA looked at intestinal challenges. Four types of defensive barriers comprise the innate immune response. These are anatomical, physiological, phagocytic and inflammatory barriers. Once the initial anatomical barrier is breached, the phagocytic and inflammatory response is initiated with a cascade of signals triggering what is known as an acute phase response (APR).

The APR is characterised by fever, production of acute phase proteins from the liver, muscle catabolism, and reduction in feed intake. The extent and duration of the response is determined in part by the duration of exposure to the antigen, level/dosage of the antigen, and virulence determinants.

Holistically, the nutrient use by the APR often reduces growth potential of the bird up to 50% more than what the reduction in feed intake alone costs. The APR and recovery from the response can vary within and between genetic strains of birds.

Numerous compounds show some effects on specific functions within the acute phase response, however more work is needed to demonstrate if they can lessen the detrimental effects (loss of nutrients towards the APR and reduction in feed intake), while effectively 'clearing' the antigen and speeding the bird's recovery from the challenge.

As the gastro-intestinal tract (GIT) is one

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of the predominant physical, physiological, and immunological barriers for the bird, it accordingly consumes around 20% of dietary energy, replenishes its protein content by 50-75% per day, and 25% of proteins made by the body are secreted into the GIT to support digestive and barrier functions.

Thus, balancing the digestive and absorptive capacity of the GIT and maintaining its barrier capacity comes at a cost to growth or egg production capability.

The GIT barrier is far from static and responds to many challenges through changes to peristalsis, enterocyte turnover, mucin production, adaptation of commensal microflora, innate immune responsiveness

(including inflammation and acute phase responses), and/or alterations to secretions.

The extent and duration of each of these responses encompasses the nutrient and growth 'cost' for maintenance of this barrier function. For example, the presence alone of 'normal' microflora increases the turnover rate of the intestinal epithelium anywhere from 40 to 240%.

If pathogens, such as coccidia, are introduced, then this turnover increases another two to three fold faster. While most antibiotic replacement strategies are not capable of similar physiological and microbiological responses, recent research has identified compounds/feed additives that are able to modify specific functions in the GIT including:

mucin production (amount and composition), preserve intestinal tight junctions and the life cycle of the enterocyte, as well as alterations to the inflammatory responses within the intestine thus influencing maintenance 'cost' of the GIT.

Abel Gernat from Escuela Agrícola El Zamorano in Honduras looked at the use of by-products from sources that would not negatively affect grain availability or price. Palm kernel meal (PKM), created during the production of palm oil, is one such by-product. Due to its poor nutritional quality, the use of supplements such as enzymes is needed to enhance the availability of its nutrients.

For example, Allzyme SSF is a complex of enzymes that is able to improve the nutrient availability of PKM by increasing the availability of protein, energy, amino acids, calcium and phosphorus.

Allzyme efficacy evaluated

A study was conducted to evaluate the effect of Allzyme SSF on the performance of broilers fed diets containing 0, 5, 10 and 15% PKM. A total of 3,136 male broilers were housed in 56 pens and offered feed and water ad libitum. The birds were distributed into a completely randomised block design with eight treatments and seven replicates in a 2 x 4 factorial scheme (with or without Allzyme SSF, 4 PKM levels: 0, 5, 10 and 15%).

The birds fed the enzyme had higher weights at 42 days of age. At 21 and 42 days of age, the birds fed higher PKM levels had lower body weight, probably due to the increase in dietary fibre (2.0, 3.2, 4.4 and 5.6% of fibre).

Significant differences were observed in the interaction at 42 days of age, with higher body weights at the different PKM levels when Allzyme SSF was added to the diet.

No significant differences between treatments were observed for feed conversion, weight gain or mortality.

In conclusion, Allzyme SSF was found to have a positive effect on broiler body weight when included in diets containing different levels of PKM.

Fabio G. Nunes, a poultry processing consultant from Brazil, highlighted that the world will need to produce more meat than in the past to feed the increasing numbers of consumers. Among the animal protein production chains, the chicken meat chain seems to have striking advantages over that of beef or pork as chicken meat is the cheaper protein, has no religious restrictions of any kind, possesses fantastic functional properties, is less damaging to the environment, is nourishing and, last but not least, is said to be healthier than either beef or pork!

Chicken meat production experienced an amazing growth worldwide over the last few decades, thanks to advances in avian genetics, improved health status, upgrading of

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flock management techniques, and important advances in animal nutrition. Altogether, these advances have been pushing production volumes up and production costs down.

However, live chicken production is not the end of the business, but its beginning. A year round secure supply is needed to fulfil processing plant daily requirements: proper live weight, flock uniformity, defect-free carcasses, and high meat yield.

Role of nutrition

To meet these daily requirements, poultry nutrition plays a decisive role. Consequently, nutrition personnel can no longer work apart from processing personnel, but rather, must work in very close cooperation.

With this new perspective, the nutritionist must understand that his internal client is no longer the grow-out department only, but also the processing plant, where he must share his best efforts and knowledge to secure the supply of top quality, high yield raw material every day.

Fabio stressed that the nutritionist must continue to focus on how broilers perform on farm, but must also focus on how carcasses perform at the processing plant to ensure the competitiveness of the chicken meat in a meat-hungrier world!

James Pierce from Alltech then focused on

algae which is an area in which his company are pioneering the use.

Microscopic algae have allowed life as we know it to exist on Earth for millions of years. Now algae provide an exciting new platform for innovation – from pharmaceuticals to biodiesel, from carbon sequestration to aquaculture.

He focused on the potential of algae to produce functional animal feed ingredients. Algae provide opportunities to produce fats, proteins, and carbohydrates with many nutritional and health applications within an efficient biological platform. The growth rate of algae can be as much as 30 times faster than that of terrestrial plants and they can be harvested in as little as one to 10 days.

It is estimated that there are over 800,000 species of algae that produce more than 15,000 novel compounds. Four algae genera of particular interest to Alltech for their potential to produce pigments, antioxidants, and proteins include *Arthrospira*, *Dunaliella*, *Chlorella*, and *Haematococcus*.

- *Arthrospira* contain 55-60% crude protein on a dry-matter basis and have been used in the secondary treatment of effluent from a methane generator to recover nitrogen, carbon and other nutrients. Their protein has high biological value and is very heat stable.

- *Chlorella* are rapidly growing, single-celled green algae that offer tremendous potential for both food and energy produc-

tion. While they contain up to 45% protein that is heat sensitive, they can be an excellent source of omega-3 fatty acids.

- *Dunaliella* are known for their high antioxidant and high beta-carotene content and are routinely used in the manufacture of cosmetics and dietary supplements.

- *Haematococcus* are freshwater algae that are a good source of astaxanthin, a pigment used in aquaculture and poultry diets worldwide.

Livestock and poultry producers are positioned to take advantage of this renewable, traceable protein, fat, and carbohydrate source. Algae are truly at the very heart of the future of energy and agriculture and the key to building a sustainable future for our planet.

Phillip Smith from Tyson Foods stressed that the industry needs higher prices for their products to offset the higher feed cost and transportation cost. If the broiler meat market does not go up, many operations will continue to lose money and possibly go out of business. The poultry industry will respond and is in a great position with management efficiencies to be the meat protein of choice in the marketplace. This will result in a broiler industry that is leaner and stronger in the future.

Feeding the hen

Sally Solomon from France looked at game changing approaches to feeding the hen. Unfortunately the sequence of events culminating in egg formation and oviposition is far from simple and a defect or interruption in the functioning of any of the systems involved can have serious repercussions on the end product.

A layer trial was initially set up to monitor the effect of the inclusion in the diet of: A) sodium selenite, B) negative control, C) Sel-Plex, and D) Sel-Plex + Bioplex on a variety of shell quality parameters including the ultrastructural integrity of the shell.

Mortality in Groups A, B and C escalated at mid lay and an unanticipated disease challenge was identified. Post-mortem examination of the oviducts revealed the presence of ovarian and oviducal cysts, salpingitis and oviducal breakdown at various levels.

The reduced values for egg shell breaking strength and fracture toughness were consistent with the inclusion of a variety of irregular crystal forms in the basal layer of the shell. However, the Group D birds, fed the standard diet supplemented with Sel-Plex + Bioplex, continued to produce structurally sound eggs at 70 weeks of age.

Their oviducts were normal and the synthesis of a copious thick albumen ensured that the first determinant of a good quality shell was in situ before shell membrane release. From these results it was concluded that the synergistic action of these two products equipped the Group D birds to achieve the critical balance necessary for normal shell production in the face of adversity. ■