Bird health starts with a healthy gut: effective management programme

The success of poultry production relies heavily on animal health, gut health, in particular, because the gut plays a critical role in ensuring efficient growth and animal welfare.

by Jules Taylor-Pickard, Alltech.

Numerous performance indicators are influenced by gut health, including obvious parameters such as feed efficiency, growth and mortality, reducing pathogen load in bedding and housing, improving immunity responses and maintaining gut epithelial integrity during processing, and other benefits.

The premise for establishing correct gut microflora and health through the Alltech Gut Health Management programme for poultry is based on ‘seed, weed and feed’ principles; in other words, ‘seed’ with the correct bacteria and gut conditions to begin with, ‘weed’ out the pathogens and prevent their colonisation, and ‘feed’ beneficial bacteria, as well as making more energy and nutrients available to the host bird.

A balanced approach

The gastrointestinal tract of chickens requires a balance of water, bacteria and pH for correct function. The best approach to support this is by promoting good bacteria, building natural defences from hatch (such as immunity) and maintaining them throughout the animal’s life.

The importance of early gut development does not always receive the focus it deserves, even though it is directly related to digestion and absorption efficiency throughout the bird’s life. Access to feed immediately after hatching, as well as supplying specialist technical ingredients such as prebiotics and acidifiers to promote correct microfloral balance, is key to developing the villi surface area and integrity of the epithelial lining of the intestine. The villi that line the epithelial surface increase surface area by approximately 600 times during development.

The gut wall regulates water and nutrient absorption continuously and acts as a physical barrier to prevent microbes and their toxic metabolites from entering the bloodstream, and hence into tissues and organs. The gut lumen contains micro-organisms that are beneficial in terms of assisting nutrient digestion and absorption, regulating pH and providing essential, energy-rich volatile fatty acids from fibre breakdown. It also contains pathogens that can cause disease through toxin production, which also leads to damage and erosion of the villi and gut wall, and poor water absorption, manifested as diarrhoea.

Vital relationship

The relationship between the gut microbiota and host is vital to normal gut function and any disruption in this relationship leads to a series of events ending with inflammation and gastrointestinal disease in the birds, thereby reducing animal welfare, health, performance and, ultimately, profitability.

Pathogen exposure in poultry can be from water, feed or the housing environment. Water quality is often overlooked in poultry production, despite chickens consuming two times more water than feed per day, on average. Water is a common vector for disease transmission, especially for Campylobacter spp., which poses a major risk to chickens and human consumers of resultant meat.

Acidifiers can be added to drinking water to lower the pH level and keep the intestinal pH at an optimum range, promoting healthy microflora and helping to maintain digestive enzyme activity, which is particularly sensitive to pH. Acid-Pak 4-Way is such an acidifier and, when added to drinking water, is readily consumed by poultry.

The supplementation of enzymes and electrolytes is also useful in maintaining gut and therefore animal health. Electrolytes assist by replacing daily salt losses, maintaining a proper range of sodium and potassium and balancing nutrient absorption.

Extensive research

Extensive research into the activity and effectiveness of Actigen has been conducted in the last 20 years, with meta-analyses showing consistent benefits in poultry performance, typically resulting in 129g more body weight, a 5-point improvement (0.05) in FCR and 0.8% more survivability at slaughter.

Actigen contains high levels of mannan-oligosaccharides. This latter activity allows the immune system to develop appropriate responses to harmful bacteria within the environment, feed and water that they are exposed to, without launching an energy-expensive, full-scale immune response.

Various in-feed strategies are available to ensure the best start possible for poultry, which are detailed and utilised in the Alltech Gut Health Management programme, including the use of a number of specific gut active products such as the prebiotic Actigen and Natustat.

Actigen contains high levels of mannan-oligosaccharides. This latter activity allows the immune system to develop appropriate responses to harmful bacteria within the environment, feed and water that they are exposed to, without launching an energy-expensive, full-scale immune response.
However, natural immunoglobulin production can be inhibited, reducing its efficacy when exposed to disease conditions.

Therefore, Natustat helps to strengthen the bird’s natural defences, optimise gut integrity and overall animal performance. Eimeria colonisation has been shown to work in collaboration with the pathogenic bacteria Clostridium perfringens to cause necrotic enteritis, leading to major gut wall lesions and damage, poor nutrient absorption, reduced growth performance and higher mortality.

Damage to the gut walls makes them fragile and prone to tearing during processing, increasing the number of downgraded carcasses in the slaughter plant.

Study in turkeys

A study on the effect of the yeast and organic mineral blender on histaminases (blackhead) has been conducted in turkeys, where birds were split into four diet treatment groups: non-challenged and non-supplemented (CON), challenged and non-supplemented, challenged and supplemented with the anti-coccidial drug Nitarsone at 0.1875kg per tonne of feed and challenged and supplemented with the yeast and organic minerals blender at 1.925kg per tonne of feed.

The results showed that the drug Nitarsone significantly improved FCR and reduced caecal lesions; however, the blender performed better by increasing bodyweight at day 42, decreasing FCR at day 28 and day 42, and decreasing caecal and liver lesion scores. Hence, the data showed that Natustat can replace Nitarsone successfully for the control of histaminases.

Research using turkeys challenged with cochllosoma was conducted where the birds were divided into five dietary treatment groups:

- Non-challenged and non-supplemented.
- Challenged and fed no supplement.
- Challenged and supplemented with the coccidostat drug Monensin at 0.0794kg per tonne.
- Challenged and supplemented with the coccidostat drug Nitarsone at 0.1875kg per tonne.
- Challenged and supplemented with the yeast and organic minerals blender at 1.925kg per tonne.

Birds were challenged using infected litter from an Eimeria-positive farm from one day old and specifically infected with 2x10^7 Cochlosoma anatis organisms via oral gavage at day 14. The results showed that the challenged birds had increased intestinal lesions and poorer performance compared to unchallenged turkeys.

The yeast and organic minerals blender, Monensin- and Nitarsone-supplemented, diets were statistically equal in improving the bodyweight of the challenged birds.

The results showed that dietary supplementation with these products in challenged birds’ diets reduced the severity of intestinal lesion scores compared to the unsupplemented, challenged birds.

Research investigating coccidiosis and performance using combined product supplementation or the anticoccidial drug Salinomycin was conducted using coccidian-vaccinated broiler chickens. The birds were split into five groups:

- No feed additive.
- The yeast and organic minerals blender supplemented at 908g per tonne from days 18-35.
- The blended supplemented at 908g per tonne at days 0-42.
- Actigen-supplemented at 400g per tonne from days 0-18 then the blended at 908g per tonne from days 18-35 and Actigen again at 200g per tonne from days 35-42.
- Salinomycin-supplemented at 40g per tonne from days 18-35.

The supplemented feeds all improved bird performance in the presence of a coccidia vaccination programme. However, feeding diets containing the yeast and organic minerals blender either throughout the growing period or during peak coccidia challenge significantly improved performance, and Salinomycin only during peak challenge significantly improved performance.

Results

The results effectively demonstrated that the combination of the blender and Actigen supplementation performed the best. The aim of Alltech’s Gut Health Management programme is to nurture beneficial micro-organisms within the intestinal lumen by creating an ideal environment and minimising colonisation opportunities for pathogens. The combined benefits from the different modes of action – acidified environment, maximising and protecting villi and epithelial structures and promoting immune responses – all contribute to the welfare and performance of the animal.

As pathogens compete with the bird for nutrients and reduce absorptive capacity of the villi, negating their presence allows extra productive performance, as well as limiting potential disease development.

Using these technical ingredients in feed and water systems from the first day assists in early gut development, the establishment and maintenance of a correct gut environment and bird immunity, ultimately leading to better animal health and productive performance.

Using tools such as Alltech’s Gut Health Management programme will help producers select and implement the best water and feed supplements to maintain health status on-farm. Bird health starts with a healthy gut.

References are available from the author on request.

*Not included in European Union