Support gut health with a unique combination of fatty acids and phytogenics

Ensuring gut health is the cornerstone for optimum production performance. For years the focus of broiler breeding companies has been the improvement of growth rate and feed conversion. This 'less for more' strategy has put tremendous stress on the health of the animals.

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Continuous selection for improved growth rate and feed efficiency was indicated to negatively impact adaptive immunity and increase the incidence of metabolic diseases. The intestinal health of the fast-growing bird is a major concern for the farmer and the nutritionist.

Antibiotic-free production

Worldwide, there is a clear demand to reduce antibiotic use in poultry and, in this way, reduce the risk for antimicrobial resistance. Antibiotics are widely used to prevent, control, and treat diseases and infections.

In the 20th century, livestock and poultry producers incorporated antibiotics into their comprehensive animal husbandry practices. But there are global concerns that antibiotics may be used too often. In 2006, for example, 96% of all birds slaughtered were treated with an antibiotic globally. This overuse of antibiotics in the poultry industry can cause antimicrobial resistance, a considerable threat to the human population.

Antibiotic-free feeding programmes need security, which is provided by an interplay between digestive responses and effects on the gut microbiota. A combination of short- and medium-chain fatty acids with phytogenics has the potential to support gut health under challenging conditions, as demonstrated under the conditions of field studies described below.

Phytogenics

The inclusion of phytogenic feed additives in feed optimises the performance of broilers. There are several categories of phytogenic feed additives, which all have a different effect on the animal, including essential oils, spices, bitter substances, and saponins. Essential oils may positively impact the secretion of digestive juices and nutrient absorption. Spices and bitter substances can potentially increase bile flow in the gut, which is essential for fat digestion. Lastly, saponins have the potential to improve the permeability of the gut wall leading to improved absorption of nutrients and minerals.

A mixture of essential oils, pungent and bitter substances, and saponins has been shown to positively affect pancreatic enzyme secretion and brush border enzyme secretion. When this mixture was added on top of the feed, in vivo trials showed that trypsin production was increased by 13%.

Trypsin is an important enzyme involved in protein digestion. Other enzymes associated with carbohydrate digestion were also increased, including amylase (+25%, digestion of starch), sucrase (+15%, digestion of

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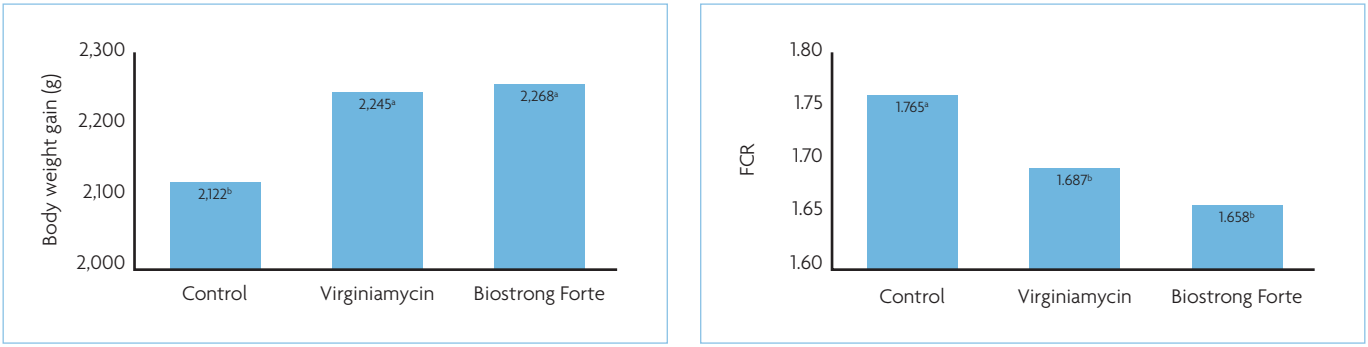
Fig. 1. Bodyweight gain and FCR of Biostrong Forte compared to virginiamycin at day 42.



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sucrose), and maltase (+11%, digestion of disaccharide maltose). As a result of the beneficial impact of this mixture of phytogenics on birds' gut health, this may lead to optimised performance.

Since digestion of the feed is improved, fewer nutrients are available for undesirable bacteria, limiting their population growth and the detrimental consequences typically associated with this uncontrolled growth.

Short- and medium-chain fatty acids

Dietary short and medium-chain fatty acids can be present as free fatty acids or mono-, di- or triacylglycerol (esterified). Delacon is using a mixture of both forms. Depending on the length of the fatty acids used, they primarily have the ability to support the development of enterocytes (butyric acid) or have proven antibacterial effects (caproic, caprylic, capric, and lauric acid).

In broilers, necrotic enteritis due to Clostridium infections is emerging. Clostridium perfringens, an alpha-toxin-producing bacterium, is an enteric pathogen for poultry, causing necrotic lesions in the small intestinal mucosa. The results vary from a reduction in feed intake and body weight gain to the condemnation of carcases at slaughter due to liver abnormalities. Outbreaks of necrotic enteritis might also lead to high mortality rates. Medium-chain fatty acids are well known to exert excellent antimicrobial properties.

The minimal concentration of these acids needed to inhibit microbial growth is shallow, and in that way, medium-chain fatty acids are a very efficient tool in feed production. Especially capric and lauric acid have solid antibacterial effects against Clostridium perfringens.

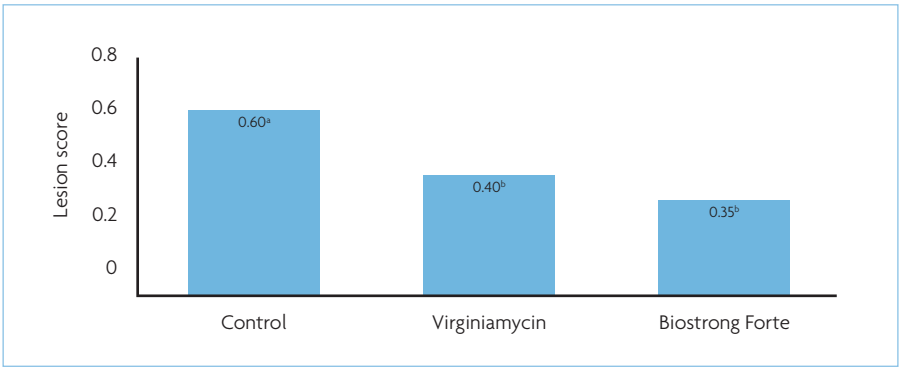

Fig. 2. Lesion score of Biostrong Forte compared to virginiamycin at day 21.

Short and medium-chain fatty acids and phytogenics

The combination of phytogenics with short and medium-chain fatty acids (Biostrong Forte) has shown a more efficient antibacterial effect against Clostridium perfringens. A necrotic enteritis challenge trial in broilers was conducted to evaluate the efficiency of such a combination.

Results (Fig. 1) show that a combination of short and medium-chain fatty acids and phytogenics improved significantly ($P<0.05$) feed conversion ratio (FCR) and body weight (BW) on day 42.

Compared to the positive control, which had 20ppm of Virginiamycin, no differences in performance were observed when Biostrong Forte was applied. These results indicate that this combination has the potential to be an effective feed additive in drug-free broiler production.

At 21 days of age, five birds per replicate were selected and examined for the severity of necrotic enteritis lesions in the small intestine on a scale of 0 to 3:

- 0 for normal intestines (no NE lesions).
- 1 for thin mucus covering and loss of tonus.
- 2 for severe necrotising enteritis.
- 3 for severe necrotising enteritis with the presence of blood in the lumen.

Results show that adding short and medium-chain fatty acids and phytogenics reduced the incidence of necrotic enteritis lesions by 42%, similar to the positive control (Fig. 2). These results show the positive effects of Biostrong Forte on gut health under challenging conditions.

Conclusion

There is no 'magic bullet' alternative feed additive that covers the full spectrum of antibiotic effects.

Combining short and medium-chain fatty acids and phytogenics under the trial described above improves the resilience against necrotic enteritis infection and enhances performance, resulting in optimised profitability of poultry production. ■

References are available from the author on request