

# Safeguarding intestinal health in poultry for optimum performance

Ensuring gut health is one of the cornerstones for optimum production performance of birds. Factors like continuous selection for improved growth rate and feed efficiency and the ban of antibiotic growth promoters increased the incidence of intestinal health problems of fast growing birds.

This is a major concern for the farmer and the nutritionist. Antibiotic free feeding programs need more attention and security – security that comes from an interplay between anti-oxidative effects, digestive responses and effects on the gut microbiota.

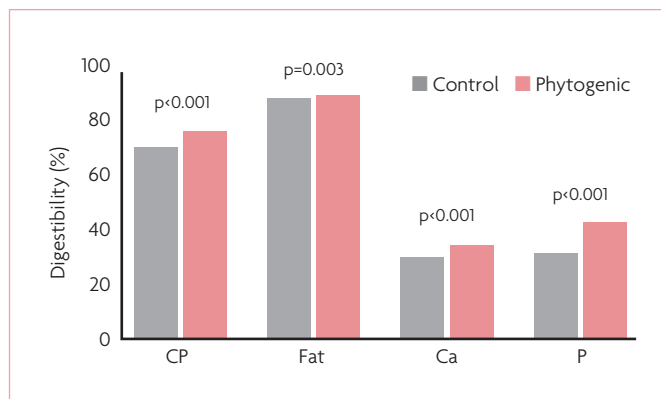
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Biostrong Forte is Delacon's answer to support and secure intestinal health. It has been developed to combine the beneficial effects of phytogetic actives in Biostrong 510 with the beneficial effects on gut microflora of esterified short and medium chain fatty acids.

## Improve nutrient digestibility and reduce oxidative stress

The main target of the phytogetic actives in Biostrong Forte is to enhance nutrient digestibility and to provide anti-oxidative effects.

Studies with these phytogetic actives have shown an increase of



**Fig. 1. Effects of phytogetic actives used in Biostrong Forte on nutrient digestibility in 21 day old broilers.**

different digestive enzymes (Table 1) leading to an increased breakdown of starch and protein.

In addition, it is assumed that an increased villus height is paralleled by an increased digestive and absorptive function of the intestine due to an increased absorptive surface area, expression of brush border enzymes and nutrient transport systems.

Recent research has shown the functional benefits of the phytogetic actives on gut morphology in broilers. Increasing the activity of digestive enzymes and enhancing the absorption active surface finally leads to an improved nutrient digestibility in poultry.

A meta-analysis of 11 digestibility trials in broilers have shown a significant increase in digestibility of crude protein, crude fat, calcium and phosphorus (Fig. 1).

Phytogetic substances have been

shown to improve intestinal integrity via their anti-oxidative properties. As described in several publications, depending on their molecular structure, essential oils act via two ways. On one hand essential oils carrying phenolic rings are able to directly scavenge reactive oxygen species (ROS), whereas on the other non-phenolic essential oils can stimulate the production of anti-oxidant enzymes.

Superoxidase dismutase (SOD) and glutathionperoxidase (GSH-PX) are two important anti-oxidant enzymes that inactivate harmful ROS.

A study in broilers has shown that

the addition of the phytogetic actives in Biostrong Forte stimulates the synthesis of these enzymes, thereby supporting the endogenous antioxidant system (Fig. 2).

## Esterified short and medium chain fatty acids

Dietary short and medium chain fatty acids can be present as free fatty acids or as mono-, di- or triacylglycerol (esterified).

Short and medium chain fatty acids in Biostrong Forte are present in esterified form. Depending on the length of the fatty acids used, they primarily support the development of enterocytes (butyric acid) or have clear antibacterial effects (caprylic, capric and lauric acid).

Capric and lauric acid have antibacterial effects against *Clostridium perfringens*, a toxin producing bacterium that causes necrotic enteritis.

## Supporting birds under challenge conditions

Providing the combination of antioxidative and anti-inflammatory as well as antibacterial effects is crucial to support birds under certain challenge conditions.

Combinations of essential oils

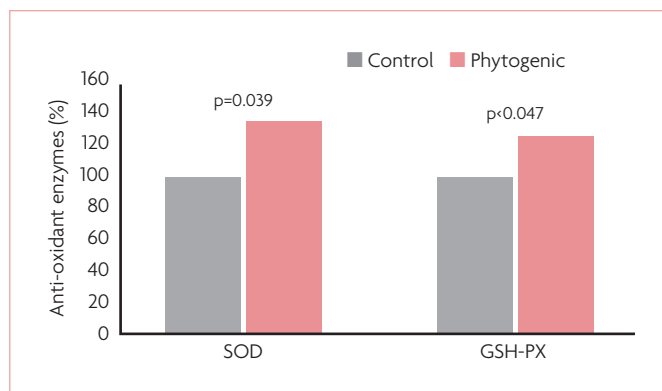
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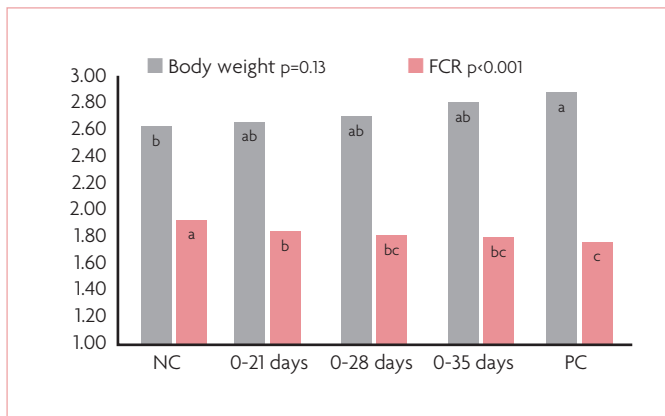
**Table 1. Effect of Biostrong 510 on protein content in jejunal tissue and jejunal maltase and sucrase activities in 42 day old broilers.**

	Control	Biostrong 510
Protein content (mg/g tissue)	8.97 ± 1.98 <sup>b</sup>	8.45 ± 0.91 <sup>b</sup>
Sucrase (U/g protein)	152 ± 0.32 <sup>b</sup>	175 ± 0.21 <sup>a</sup>
Maltase (U/g protein)	670 ± 151 <sup>b</sup>	743 ± 135 <sup>b</sup>

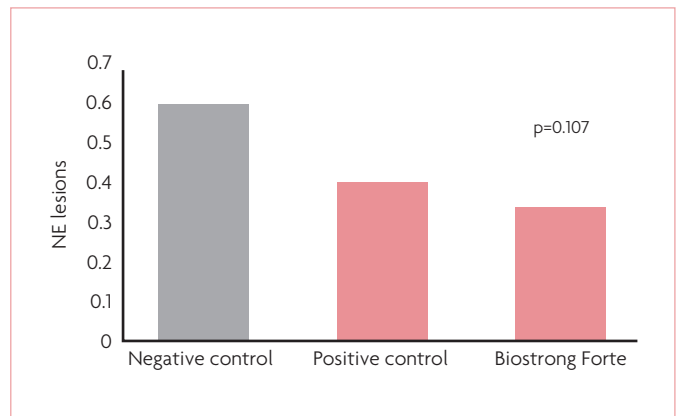
Different superscripts in the same line show significant differences at P<0.05.

**Fig. 2. Phytogetic actives in Biostrong Forte significantly increase production of anti-oxidant enzymes (Superoxidase dismutase (SOD) and Glutathionperoxidase (GSH-PX)) in broilers.**





**Fig. 3. Effects of the duration of supply of Biostrong 510 in combination with a mixture of medium chain fatty acids (known as Biostrong Forte, dosed 750mg/kg) as a feed additive to broiler chickens.**



**Fig. 4. Effects of Biostrong Forte on the severity of necrotic enteritis lesions scored 0 (no lesions) to 3 (severe lesions) in the small intestine after a Clostridium perfringens challenge.**

Continued from page 7 with esterified short and medium chain fatty acids have been shown to improve the efficacy of the latter.

To evaluate the efficiency of such combinations in Biostrong Forte, a necrotic enteritis challenge trial was conducted.

Results show that with increased duration of application of Biostrong Forte (followed by Biostrong 510) feed conversion ratio (FCR) and body weight (BW) on day 49 were improved (Fig. 3).

Compared to the positive control including 20ppm virginiamycin, no differences in performance were observed when Biostrong Forte was applied for at least 28 days.

These results indicate that this combination is an effective feed additive in drug-free broiler production.

At three weeks of age, five birds per replicate were selected and examined for the severity of necrotic enteritis (NE) lesions in the small intestine (on a scale 0 to 3: 0 for normal intestines (no NE

lesions), 1 for slight mucus covering and loss of tonus, 2 for severe necrotising enteritis, and 3 for extreme necrotising enteritis with presence of blood in the lumen.

Results show that the addition of Biostrong Forte tended to reduce the incidence of NE lesions by 40%, being similar to the positive control.

These results show the positive effects of Biostrong Forte on gut health under challenge conditions.

To support intestinal health in poultry the right nutritional strategies are crucial.

### Combination to reduce intestinal disorders

Combining these strategies with Delacon products like Biostrong Forte improves resilience against intestinal infections, enhances performance and reduces mortality under intestinal health challenge conditions and improves profitability of poultry production. ■

References are available from the author on request