

Broad spectrum ingredient offers double benefit for gut health

Achieving a healthy digestive tract is key to preventing gut disorders from compromising optimal nutrient uptake and interfering with average daily growth, feed-to-gain ratio and yield targets.

by Dr Marisol Castillo and Frederika Somers, Novus International Inc. www.novusint.com

Barrier function is a critical aspect of gut health. Teriklynck et al. (2011) found that undigested nutrients entering the hindgut, as is the case with diets high in protein, serve as a substrate and result in microbial overgrowth of *Clostridium perfringens*-causing dysbacteriosis, which is associated with an epithelial barrier failure and inflammatory responses in the intestines. This illness can result in reduced weight gain, poor feed conversion and a headache for producers.

Along with these gut health concerns, producers have an additional challenge in the form of the protein used to help grow broilers. Proteinaceous raw materials, such as soybean meal, sunflower or rapeseed, contain a certain amount of non-digestible protein, and amino acids, along with anti-nutritional factors, like trypsin inhibitors, that can impede protein digestibility. These factors can negatively impact costs as the bird is unable to optimise nutrient uptake.

One effective approach to promote gut

health and get as much benefit from the feed as possible is the inclusion of a high-quality protease enzyme in the formulated feed. A protease enzyme specifically reduces the non-digestible part of protein-rich, raw materials and degrades relevant anti-nutritional factors in these diet ingredients. There are many protease enzymes on the market that use different ingredients and modes of action to accomplish a shared goal: optimise protein digestibility.

A zootechnical feed additive

New types and varieties of feed additives have been introduced to the marketplace in response to regulations surrounding antibiotic growth promoters. This is particularly the case in the European Union since the ban on the use of AGPs went into effect in 2006.

There are currently five classifications of feed additives in the European Union: technological, sensory, nutritional, zootechnical, and coccidiostats and histomonostats. Of particular interest for this topic is the zootechnical designation that is intended for additives 'which favourably influence the performance of animals in good health or the environment'.

In 2015, the European Food Safety Authority published a positive opinion on the safety and efficacy of Cibenza EP150* feed additive from Novus International Inc as a zootechnical feed additive for use in

feed for chickens. This product is a preparation of a single strain of *Bacillus licheniformis*, a bacterium commonly found in soil and bird feathers, and its protease.

Changqing et al. (2015) described *Bacillus licheniformis* spores as having beneficial effects on gut health, such as enhancing the immune function, reducing the number of some potential pathogenic bacteria and strengthening digestive function. These results make the spores a powerful ally when partnered with a protease enzyme.

Cibenza EP150 combines the protease enzyme needed to optimise nutrient uptake with spores of the production organism to provide double the benefit.

Additive vs medicine

At the 22nd edition of the European Symposium in Poultry Nutrition (ESPN 2019) in Gdansk, Poland, Novus presented a poster concerning Cibenza EP150 and its efficacy against a mild challenge compared to the performance of a veterinarian medicine source.

Entitled 'Use of a novel feed additive preparation in broiler chicken; effects on performance and gut health', the objective of this trial was to evaluate the efficacy of the combination of the protease and *Bacillus licheniformis* spores in alleviating the negative impact of a mild *Eimeria* challenge on growth performance and gut health of broilers.

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Fig. 1. Impact of the combination of Cibenza EP150 on body weight of broilers, day 29.

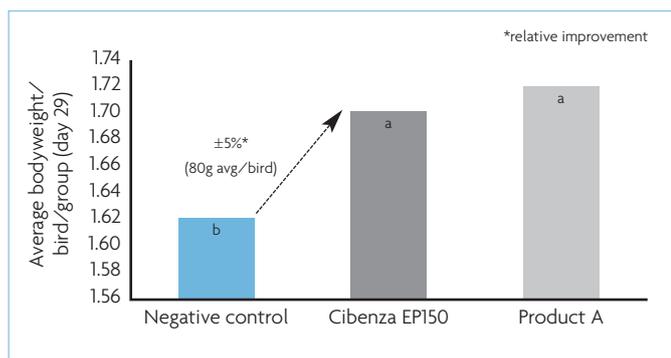
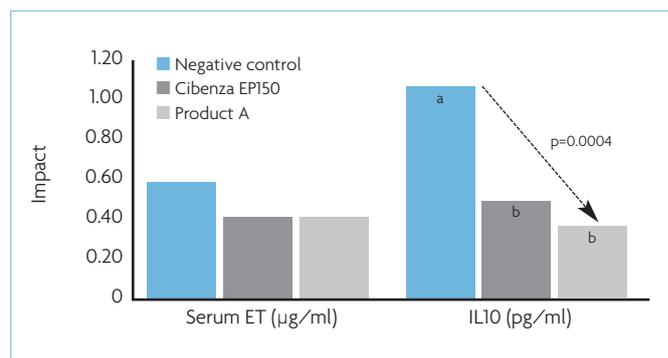


Fig. 2. Impact of the combination of Cibenza EP150 on gut inflammation and intestinal barrier function, day 30.



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For the trial a total of 792 day-old broilers were divided into three groups. All of the animals received a corn- and soybean meal-based diet (Negative control) or the same standard diet.

The diets were then supplemented with either Cibenza EP150 at 500g/ton or with bacitracin methylene disalicylate (Product A) at 500g/ton.

All diets were pelleted and the starter diet was crumbled after pelleting. All birds were challenged on day 15 through an oral gavage with a coccidiosis vaccine at five times the recommended dose.

Performance was then measured at days 14, 21 and 29. On day 30 three birds per pen were euthanised to measure the concentration of inflammatory cytokines and enterotoxin levels in the serum, the first one as parameter for gut inflammatory response, the second being a marker for gut barrier failure.

Data was subjected to one-way ANOVA analysis; means were separated by Fishers' protected LSD test. A P-value ≤ 0.05 was considered statistically different.

The results showed that the broilers supplemented with Cibenza EP150 and Product A achieved a significant higher body weight at day 29 (1.70kg and 1.72kg, respectively) versus the birds within the control group (1.62kg; $P=0.04$) as shown in Fig. 1.

Researchers saw a tendency for improved feed efficiency through numerical reduction of the average feed conversion ratio: 1.46 and 1.45 for the birds supplemented with Cibenza EP150 and Product A respectively, versus 1.49 for the non-supplemented control birds ($P=0.07$).

Mortality was numerically lower in the Cibenza EP150-fed broilers, compared to the other two groups (7.5% versus 10.9% and 12.8% for EP150, Product A and the control group respectively, $P=0.09$).

When analysing the impact on inflammation in the gut, the findings showed a significantly lower serum cytokine IL-10 level in the supplemented chickens (0.49pg/ml for Cibenza EP150 and 0.38pg/ml for Product A) compared to the levels found in the control birds (1.08pg/ml, $P<0.01$).

Enterotoxin levels concentration in the serum as an indication of intestinal barrier dysfunction tended to be lower in the broilers from the treated groups with Cibenza EP150 at 408.9pg/ml and Product A at 411.6pg/ml versus the control group with 589.2pg/ml, $P=0.086$.

Proactive poultry production

From a cost/loss standpoint alone, it is important that poultry producers are proactive in ensuring a healthy intestinal tract. As the largest immune organ in the

body, a chicken's gut serves as a selective barrier to both take up nutrients and fluids into the body and reject undesirable molecules and pathogens.

Optimising the nutritional value of the basal diet to manage intestinal health is a first important step to reduce the risk of dysbacteriosis/necrotic enteritis development within the bird.

Research has found that formulating diets with Cibenza EP150 accelerates the dynamics of protein digestion, works to destroy anti-nutritional factors and supports an equilibrium of the intestinal ecosystem for optimal bird performance.

This trial demonstrated that the unique combination of a protease with *Bacillus licheniformis* spores can decrease serum immunoregulatory cytokines, supporting its beneficial effects on broiler gut health while improving bird performance. ■

References are available
from the author on request

Cibenza EP150 is a preparation of Bacillus licheniformis (ATCC 53757) and its protease (EC 3.4.21.19). EU legal classification 4d12. It is not approved for sale in all countries. Consult your local Novus sales representative for availability.