

# The importance of starting young animals right



**An exogenous protease enzyme helps get animals off to the right start by improving the digestion of proteins and amino acids, helping make valuable nutrients more**

**available for growth and performance, while minimizing the negative effects of undigested protein in the hind gut explains ANNAFE PERINO\*.**

**T**he ongoing battles against African swine fever (ASF) and Covid-19 have caused major challenges globally affecting both food production and food security. This has been especially evident in swine production where most top pork producers and exporters were affected by either or both ASF or the pandemic. These challenges have also significantly affected pork supply in Asia, specifically China and Vietnam where pork production has been previously reduced due to ASF. Due to these challenges animal producers are looking for innovative ways to continue to produce and

supply quality meat to feed a growing population currently facing economic difficulty due to the pandemic.

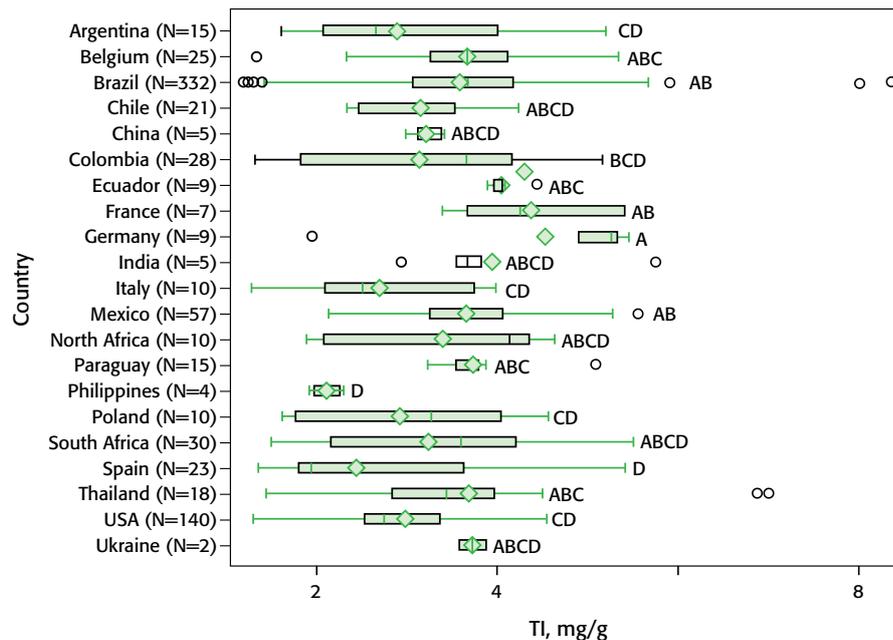
With all of the uncertainties currently, the pressure to produce animals cost-effectively and efficiently becomes a focus as food security becomes a top priority. To be able to produce a sufficient supply of animals, a key stage that producers should turn their attention to is young animals. The early stage of production is likely to be the most affected by stress and diseases as this is when the animals are most vulnerable. High mortality and poor performance at this stage can be attributed to trauma, ▷

starvation, scouring and respiratory disease in swine while malabsorption, diarrhea, necrotic enteritis and coccidiosis are the main culprits in poultry. Research has shown that for every 500 sows, there is an additional USD2075 savings per cycle if pre-weaning mortality was reduced by 10%. These are the reasons why scientists or nutritionists are putting a lot of effort in improving gut health – because the better we can manage health in the young animal stage, the better will be the survivability of the animal to reach harvest weight.

### Protein digestion in young animals

Why are animals more susceptible to diseases or stress during this early stage? Research has shown that young animals, particularly piglets and chicks, have an underdeveloped gut system making them more prone to physiological and nutritional changes. As an example, young animals require a high protein diet to be able to build muscles, connective tissue and organs but at the same time, they do not have enough endogenous enzymes such as trypsin to digest protein in the diet. And yet we feed our young animals with a diet that can have a potentially high content of trypsin inhibitors such as in soybean meal. In a trial in chickens, it was noted that trypsin, the enzyme that helps to digest protein, is still at a minimum level until day 14 and only starts to reach the peak level at day 21. It is the same case for piglets where trypsin and chymotrypsin enzymes

**Figure 1. SBM surveyed for trypsin inhibitor content globally.**

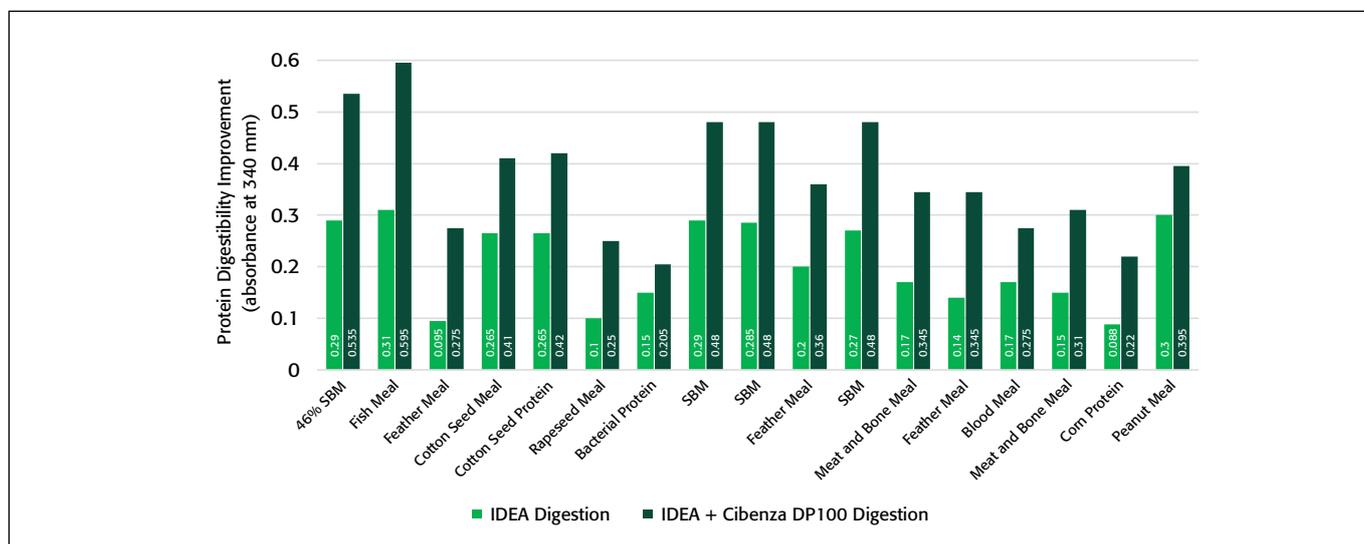


(that help with protein digestion) are just starting to develop until day 28 and then increase to reach peak levels at day 42. In a survey done by Novus International in 2014, a total of 775 samples of soybean meal from different parts of the world were evaluated based on their trypsin inhibitor (TI) content (Figure 1). The research showed that the level of trypsin inhibitors in soybean meal varies throughout the world. This is an important piece of information since young animals still have low levels of trypsin enzymes, and a high incidence of TI in their diet will adversely affect their performance, particularly gut health. When gut health is impaired

at the young animal stage, there has been shown a negative impact on their ability to absorb and digest nutrients, which is much needed to reach target body weight and feed conversion ratio (FCR).

When well-balanced nutrition is provided to young animals, there is corresponding weight advantage at harvest time. In a study conducted by a poultry breeder company in broilers (Aviagen), the results showed that a 10g advantage on day 7 resulted to a 50-70g weight advantage at day 42. A similar study in swine showed that a 1kg advantage at 7 days post-weaning resulted to 3kg advantage at day 156 and four days

**Figure 2. Cibenza DP100 increases in vitro protein hydrolysis in various ingredients.**



IDEA = Immobilized Digestive Enzyme Assay

shorter time to market. Knowing that there is definitely an advantage when we invest in the young animal stage, what can be done to ensure that young animals perform better? It seems that maintaining good gut health during this critical time is a key to make sure that animals get the nutrients they need to grow.

## Benefits of exogenous protease

### Improved protein digestion

With the high protein requirement during the early life stage coupled with the inability of young animals to properly digest proteins, it makes sense to use a protease enzyme that is fast-acting and efficient in improving digestibility of amino acids from both plant and animal protein sources. Trials have shown that an exogenous protease enzyme (Cibenza DP100, Novus International) supports improved performance at the early stage. In an *in vitro* trial, results showed that protease enzyme can improve protein digestibility with an average of 7.5% in a variety of raw materials. As shown in Figure 2, whether the protein used in diet is from plant or animal source, animals were able to utilize more protein and amino acids for growth and muscle development with the help of a protease enzyme.

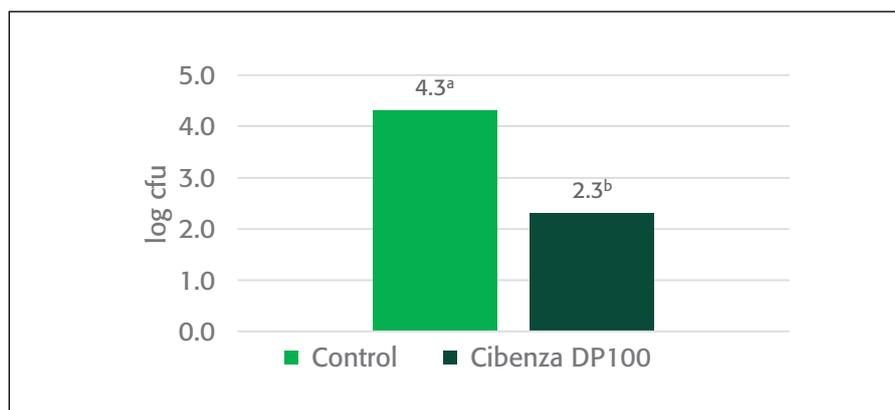
### Reduced pathogen proliferation

Protease enzymes can also help reduce pathogen proliferation in the gut by minimizing the amount of undigested substrate available to pathogenic bacteria. *Clostridium perfringens*, *Escherichia coli*, *Salmonella* and *Campylobacter* use this fermentation substrate to flourish in the hind gut and ultimately outcompete beneficial bacteria thereby causing damage to the gut and compromising gut health. In a study (Figure 3), a protease enzyme helped to reduce undigested protein in the gut resulting in a decrease in pathogen population. This trial shows that using protease enzyme can reduce *C. perfringens* population by 90% (2 log reduction).

### Improved zootechnical and economic performance

Improving young animal gut health also provides an overall improvement in animal performance as well as

**Figure 3: Ileal *C. perfringens* (log cfu), High CP diet.**



Yan et al., 2017

**Figure 4: Performance Improvement in Broilers.**



Yan et al., 2012

return on investment to attain higher profitability. Based on a Novus trial, adding protease in young broilers can improve body weight by 8% and reduce FCR by 2.4% (Figure 4).

With the advantage of 10g weight at day 7, evidence suggests there would be a 60g advantage at harvest time of 35 days and also a reduction of four FCR points based on the trial results. These benefits can provide additional profit of at least USD 75 per 1000 birds. A similar cost-benefit analysis in swine was also conducted and the additional profit estimated was at least USD 2.70 for every pig sold.

## Conclusion

As the industry is slowly rebuilding and restructuring in the wake of ASF and the Covid-19 pandemic, investing in the young animal is one of the ways producers can create a positive head start. Improving

protein digestibility to support the animals for faster growth is important especially when producers want to improve their costs. Using protease to hydrolyze trypsin inhibitors and reduce undigested proteins thereby decreasing pathogen production in the hind gut should be seen as a way of improving a young animal's overall performance. Simply, investing in young animals incurs minimal cost and the benefits greatly impact animal performance and profitability at harvest time. **AF**

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