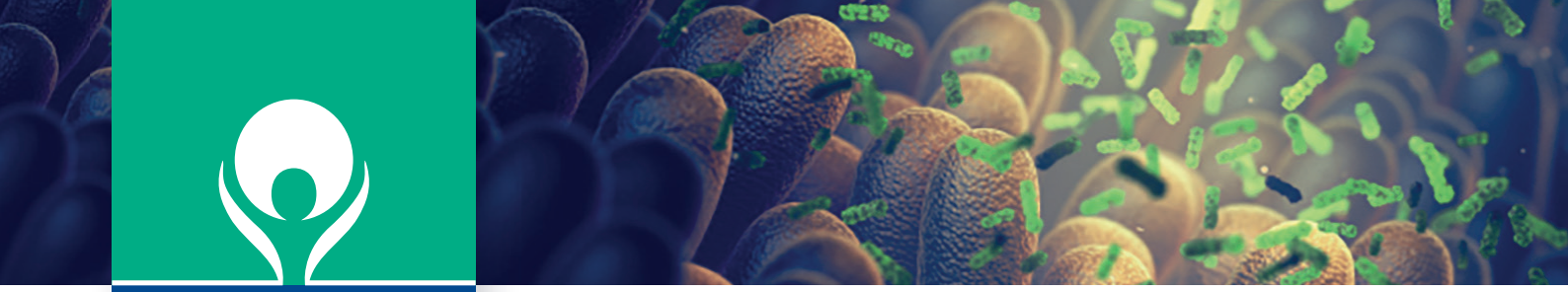

Boost animals' intestinal health to counteract the negative effects of DON

Mycotoxin contamination in feed negatively affects animal health and performance. The inclusion of a mycotoxin adsorbent in the feed is important to alleviate this threat. However, some mycotoxins such as the trichothecenes (DON) remain difficult to bind. Therefore, it is recommended to include a broad spectrum solution that not only binds mycotoxins, but also uses other strategies to protect the animal against the harmful effects of mycotoxins. DON is known to negatively affect intestinal epithelial cell integrity and impacts villi length and tight junctions. This highlights the importance of supporting the intestinal barrier and intestinal health upon consumption of DON contaminated feed. Besides the inclusion of a broad spectrum mycotoxin binder, this can be achieved by the use of certain feed additives; Excential Butycoat, Excential Beta-Key and Excential Selenium 4000.

Butyrate, butyric acid, is an organic acid that is used as the main energy source by intestinal epithelial cells. It is known for having a wide range of positive effects on intestinal health, for example on villus height, mucin production and tight junction proteins. It is therefore an important additive in supporting gut health during challenges with DON. Orffa presents **Excential Butycoat**, which is a micro-encapsulated source of 30% sodium butyrate. Micro-encapsulation ensures gastric passage and a slow release of butyrate alongside the entire gastrointestinal tract. Figure 1 shows how the addition of Excential Butycoat at 300 ppm or 500 ppm can increase villus height, and therefore supports intestinal health.

Betaine, a vitamin-like compound, has several functions as a feed additive, including the improvement of gut health. It supports intestinal cells against osmotic stress, allowing for increased villus height, enzyme activity and nutrient absorption. Betaine is known to protect the trans epithelial electrical resistance (TEER), which is an important indicator of intestinal barrier function. DON is known to modulate the intestinal barrier and decrease villus height. **Excential Beta-Key** is a solution provided by Orffa, containing betaine hydrochloride. Orffa recently obtained a patent for the use of betaine against DON related effects. Figure 2 shows how Excential Beta-Key can counteract the negative effects of DON on the TEER of Caco-2 cells.

The harmful effects of DON can partly be attributed to oxidative stress and an increase in production of reactive oxygen species (ROS). Oxidative stress has detrimental effects on the intestinal barrier function. By counteracting this DON-induced oxidative stress, negative effects on intestinal health can be reduced. Selenium is an essential trace element with applications in reducing oxidative stress. **Excential Selenium 4000**, a source of 100% L-selenomethionine by Orffa, will improve the animals' antioxidant status which supports the animal upon DON contamination.

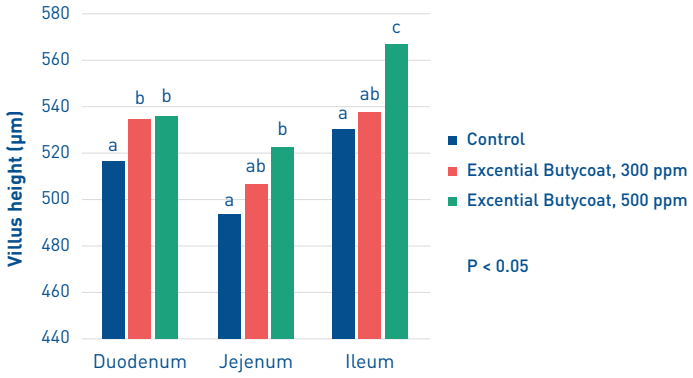

Figure 1: Villus height for different concentrations of Excential Butycoat

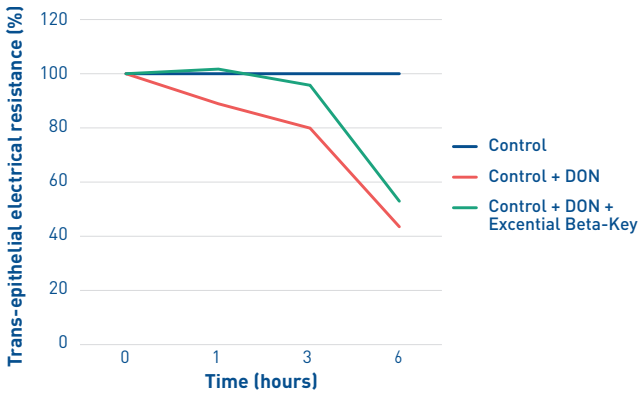

Figure 2: Trans-epithelial electrical resistance upon challenge with DON

DON negatively affects intestinal health

Excential Butycoat supports intestinal health

Excential Beta-Key counteracts DON-induced intestinal damage

Excential Selenium 4000 reduces oxidative stress

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