

# GUT HEALTH - THE KEY TO MAXIMIZING SWINE PRODUCTIVITY

As the industry's search for the most effective alternatives to in-feed antibiotics continues, and the body of research in this area continues to grow, one thing seems abundantly clear: achieving gut health in the animal is essential to achieving optimal cost and performance.



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But what exactly is gut health? Stephan Bischoff has described it as a balancing act that involves achieving homeostasis in interactions between the animal's gut microbiome, immune function and nutritive processes – a definition endorsed by eminent swine scientists such as John Pluske. While we know that stress can negatively impact this balance, as Marcus Kehrli, Director at National Animal Disease Center-USDA-ARS pointed out at DuPont's Maximizing Swine Productivity Conference, little has been known about the make-up of the swine microbiome because, until recently, less than 1% of the various bacteria – good and bad – found in a pig's gut could be cultivated in a lab. With genome sequencing costs dropping, we are starting to learn more.

## Nutrition and gut health

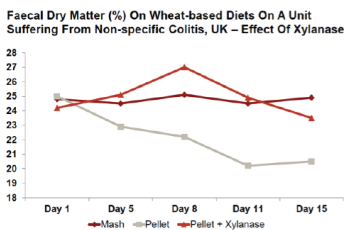
An increasing number of trials demonstrate the impact nutrition has on the animal's health and performance. Non starch polysaccharide (NSP) content in pig feed is one key variable as it affects satiety, gut motility, nutrient digestion and absorption, as well as changes in gut microbiota. Arabinoxylan is a key component of the NSP in many raw materials, and its varying solubility influences the amount of undigested substrate left to encourage microbial overgrowth. Higher concentrations of both NSP and starch substrates have been associated with an increased incidence of swine dysentery (Pluske et al, 1996), and trials have illuminated the correlation between a diet high in NSPs and non-specific colitis. Even simple corn diets contain arabinoxylans, with levels varying according to harvest and other conditions, so this is an issue for swine producers feeding high fibre diets.

## The part enzymes and other additives can play

We know that feed enzymes such as

xylanase help break down the insoluble arabinoxylans (hemicellulose) in both corn- and wheat-based diets (Myers and Patience 2013, Kiarie et al, 2014). In addition to reducing digesta viscosity through the hydrolysis of soluble arabinoxylans in the small intestine, certain xylanase generates arabino-xylo-oligosaccharides, which act as prebiotics, selectively stimulating the growth of beneficial bacteria. They also produce short chain fatty acids in the intestine, which can be used as an energy source by the animal.

Figure 1



Adding a fungal xylanase to pelleted wheat-based diets for pigs suffering with non-specific colitis resulted in a significant improvement in dry faecal matter content without resorting to a mash feed (Figure 1). The same xylanase has been shown to improve digestibility of cheaper raw materials such as corn DDGS (Kiarie et al 2013), and a xylanase/beta-glucanase combination has been shown to support piglet gut health and growth (Jiang et al, 2015).

There is still much to learn about pig gut health. Research continues to better understand the value other additives such as probiotics and essential oils can deliver, especially when feed antibiotics are reduced or eliminated. However, it is certain that nutrition will have a large part to play in meeting increased demand without reliance on in-feed antibiotic use.