



## Probiotics, Prebiotics and Digestive Enzymes Ensure a Happy & Healthy Horse

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The horse's body is designed to graze solely on plant matter as the gut is specifically modified to digest a diet of grasses and forage. This classifies them as herbivores in the animal kingdom<sup>3</sup> but their overall gastro-intestinal system is relatively vulnerable and must be cared for and supported to optimally function, and to prevent illness and disease. Thus, it is vitally important to maintain a normal gut function by allowing the digestive tract to process frequent small amounts of good quality forage throughout the day<sup>3</sup>.

From the moment food enters the horse's mouth it is biochemically broken down into its simplest forms by enzymes. In turn, this process of food breakdown in the body is called digestion, and allows for nutrients in the food to be absorbed into the horse's body. Digestive enzymes are produced in various areas of the body and are made of proteins that break the chemical bonds found in food sources and which make the nutrients more readily available in the body<sup>4</sup>. If these enzymes are not present in sufficient quantities, digestion cannot be completed and the horse is unable to utilize the nourishment of food. Digestive enzymes can be found in the mouth, small intestine (commonly referred to as the "fore-gut" in a horse) as well as in the pancreas and liver.

*Amylase* is the first enzyme food comes into contact with. It is secreted in the saliva of the mouth and breaks down carbohydrates into glucose which provides the body with energy. *Protease* is another important enzyme, typically found in the fore-gut of a horse to break down proteins into amino acids, which are converted in the body for energy and used to



build tissues. Lastly, *cellulase* is required for the break down of cellulose in grass and other plant matter to create an energy-rich nutrient known as volatile fatty acids (VFA). However, horses are unable to produce this enzyme and therefore rely on the "fermentation vat" (cecum and colon) to perform the job.

The fermentation vat is housed in the hindgut (large intestine) and is the section of the digestive tract which houses trillions of microorganisms that act on ingested plant fibres and release nutrients into the bloodstream. Some species of these microorganisms are considered good bacteria and others are less healthy and referred to as "bad bacteria"; however, there is nothing inherently good or bad about bacteria. Essentially

“good bacteria” are those whose waste products are not very harmful to the body, or whose waste products are seen as beneficial for keeping the body in good health<sup>2</sup>.

Good bacteria also crowd out bad bacteria in order to limit their numbers in the GI tract, as bad bacteria's waste products can produce disease and discomfort in the body. When the number of bad bacteria increases, the quantity of waste overwhelms the body's ability to process it and thus causes illness or disease in the animal<sup>1,6</sup>. This happens when broad spectrum antibiotics are prescribed but the drugs may contribute to a worst case scenario: not only do antibiotics destroy or inhibit the disease causing organisms; they also destroy the good bacteria as well. In order to replenish this imbalance, it is necessary to increase the number of good bacteria in the digestive tract by supplementing with probiotics. It is optimally beneficial for the horse to consume a variety of living good bacteria species, also referred to as probiotics, to discourage having a monoculture of any bacteria species and thereby maintain a stable and healthy balance. There are several probiotics that have been extensively studied and have been classified as “good bacteria”; they are *Lactobacillus acidophilus*, *Lactobacillus plantarum*, *Lactobacillus caesium*, *Lactobacillus bulgaricus*, *Lactobacillus rhamnosus*, *Lactobacillus brevis*, *Bifidobacterium bifidus* and *Bifidobacterium longum*<sup>1,4</sup>.

Prebiotics are a new concept that has been studied as a nonviable food component that confers a health benefit on a horse associated with modulation of the microbiota<sup>6</sup>. It's vitally important to sustain healthy microbial populations in the hindgut for the benefit of the digestive system of the horse, thus a prebiotic such as the naturally occurring carbohydrate fiber, fructo-oligosaccharides (FOS), is a food and energy source to support bacterial growth<sup>5</sup>.

Another important part of your horses' digestive health is the need for fibre. This component provides bulk to the stool which contributes to the peristaltic action of the intestinal tract, mixing bowel contents and thus the absorption of ingredients<sup>1</sup>. A common source of fibre for horses can be found in flax seed, which not only provides high levels of dietary fibre but also provides an adequate amount of omega-3 fatty acids to the body<sup>3</sup>. The components of flax seed have the ability to create a protective barrier or capsule around the good bacteria/probiotic to allow for transport through the acidic conditions of the stomach, into the digestive tract and into the fermentation vat where the bacteria are stored and needed for digestion purposes.

The use of probiotics, prebiotics and digestive enzymes are beneficial to the horse's digestive tract health and overall well-being by decreasing toxin load to the body, reducing stress levels, preventing illnesses and re-establishing the beneficial

flora population in the gut after antibiotics to ensure a happy and healthy horse.

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