Gut Health in Horses

Ask the Expert

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What do you think is the most important part or process of the equine digestive system?

The most important thing is that the whole system is working together. Whilst fibre fermentation and digestion in the hind gut probably rightly gets the most attention, it requires all of the earlier processes to be working correctly – chewing and saliva production, the chemical and mechanical processes in the stomach, and digestion and absorption in the small intestine.

Why is fibre such an important component of an equine diet in terms of digestive health?

Throughout most of their evolution horses have lived on rough pasture. Not only have their digestive systems evolved to suit digestion of this long fibre, but also their resident microbes have evolved with them. Despite pressure from owners and riders to feed according to their needs rather than their horse's, we must try to match the diet of the modern domesticated horse closely to their ancestors.

From nose to tail, fibre is vital to maintain good health. Long, rough fibres wear the teeth, helping to prevent overgrowth, and encourage saliva production; a fibre matt protects the squamous gastric mucosa from the gastric acid; and of course fibre feeds the resident gut microbes in the hind gut and the enterocytes.

What effect does starch have on the digestive system?

High starch foods tend to be low in fibre, easily masticated, and eaten quickly. This reduces dental wear and saliva production. As saliva has an acid-buffering effect, this reduction can contribute to the stomach contents becoming more acidic. Starch also increases the production of volatile fatty acids, and of lactic acid by certain bacterial species which further increases acidity. These factors form the current explanation for the link between starch feeding and gastric ulceration.

Starch is broken down and absorbed efficiently in the small intestine, and theories relating to true 'over-spill' of starch into the large bowel are somewhat speculative. However, changes in the large bowel environment are well documented following high starch feeding which does suggest a causal link. Starch is readily metabolised by certain bacterial species in the large bowel, including *Streptococcus bovis* which is generally considered to be detrimental to health. Such bacterial species metabolise starch and produce lactic acid, amongst other metabolites, reducing hind gut pH, which can have a detrimental effect on mucosal health. This acidosis drives a further shift in the colonic microbiota away from the health positive fibre-digesting bacteria, towards health negative lactic acid producers, perpetuating the negative changes further.

What is the role of hind gut microbes and how can they be supported?

Hind gut microbes are absolutely vital for equine digestion and general health. Microbes ferment or break down elements of the diet (especially fibre) – providing essential nutrients and supporting the cells in the gut lining, as well as producing certain key vitamins such as vitamin B12. In other species an imbalance in the gut microbes has been linked to allergic diseases such as asthma and eczema, stress, anxiety, diabetes, obesity, and even autism and Parkinson's. In horses, a link is emerging between the gut microbes and laminitis, equine metabolic syndrome and a variety of other diseases.

The gut microbes are best supported by proper diet, specifically by feeding lots of fibre, and limited starch, and reducing stress. To further supplement the levels of health positive microorganisms, a probiotic-prebiotic supplement should be fed.

What are probiotics and prebiotics? How are they similar and how do they differ? What effect does yeast have?

Pro and prebiotics both act to increase the levels of health positive microorganisms in the gut. Probiotics, including yeast, are microorganisms which when fed in adequate amounts confer a health benefit to the host. By flooding the gut with health positive microorganisms ('good' bacteria/yeast) we can reduce the space and nutrients available to potential pathogens, promote healthy digestion, reduce inflammation in the gut lining, and support the immune system. The yeast *Saccharomyces cerevisiae* is the only organism licenced in the EU due to its safety and effectiveness. *S. cerevisiae* survives passage to the hind gut where it promotes the growth of lactic acid utilising bacteria, making the gut less acidic. These bacteria tend to be good at digesting fibre, allowing the horse to make more of its food whilst potentially decreasing the risk of laminitis or obesity. Prebiotics are non-digestible food sources that stimulate the growth and activity of specific bacteria – usually by being selectively fermented by these species. In the simplest terms they are food for good bacteria.

What are key initial signs horse owners should look for in terms of digestive ill health?

The signs of digestive ill health are highly variable, and we must think much more broadly than simply considering diarrhoea, weight loss or colic as the only digestive issues. A subtle malaise, lack of appetite or change in attitude could signal the early signs of a digestive imbalance. This may progress to noisy gut movements or a change in consistency of the droppings.

How does a horse's lifestyle impact its digestive health? How can the horse lessen this effect?

Any sudden change in diet or lifestyle can negatively impact the horse's digestive health. Consequently any changes should be made gradually to allow the horse and its resident microbes to adapt. A sudden switch to fresh spring grass, or rich forage, can overwhelm the gut, causing an imbalance in the microbes, rapid transit and watery droppings. Equally, coming in from fresh grass with its high water content, to dry hay in the stable can cause problems, including large bowel impaction.

When coming in for the winter, or on box rest, it is important to encourage the horse to move (ideally by walking out), and maintain water intake – i.e. by soaking the forage, or providing supplementary salt by means of a salt lick. Travelling and exercise have both been proven to upset the gut microbes, and even cause changes to the immune cells in the blood. A two hour trip in a trailer has been shown to cause changes in the gut and blood associated with stress. These changes can be mitigated by providing supplementation with a pro/prebiotic and proper nutrition.

When thinking about stomach health and preventing ulceration, it is important to reduce any periods of starvation, whether this is before riding, or overnight if stabled. Any stressors – such as noise, lack of companionship, or simply being stabled – can increase the number or severity of gastric ulcers.

What is the ideal feed size to bodyweight ratio? Why should feeds be little and often?

Feeding little and often matches the eating habits of the horse in the wild. It leads to more consistent saliva production, and a more stable gastric pH. Rather than thinking about feed size to bodyweight ratio, it may be more helpful to calculate the nutritional requirement of the horse, associated with its activity level and bodyweight, and split the requirement across as many meals as is practical for the horse and owner.

What is a common myth you find yourself addressing when advising customers?

That their horse isn't too fat!

That a horse which is 'out of sorts' or lacking in energy will always benefit from a bucket of oats or some antibiotics. If the observed lethargy or grumpiness is due to an imbalance in the gut bacteria, a bucket of starch topped with a broad spectrum antibiotic will most likely make the situation worse. A standard course of antibiotics has been shown to reduce the number of bacteria which break down fibre by 100-1000 fold! Concentrate on proper nutrition, meeting the fibre requirement, and keep antibiotics for when bacterial disease has been diagnosed.

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