

Reliving Life on the Road with Yea-Sacc^{® 1026} and Bio-Mos[®]

Throughout the ages, horses have been transported for many reasons, including breeding, military endeavors, competitions, ceremonial proceedings and pleasure activities. In the past, boats moved cavalry horses and horse-drawn vehicles took expensive racehorses to the track. Today, horses fly around the world! Whilst few contemporary equines lead such glamorous lifestyles, many do take regular trips by road and sea, and the humblest pony is likely to be transported to a new home. However, even for the seasoned traveler, long journeys are stressful!

Whilst everyone knows what stress is, it is not easily defined. For the traveling horse, stress can have many causes. Social isolation from stable mates, aggressive interaction with other horses during transportation, lack of security in novel environments, altered training regimes and interrupted feeding schedules. And we must not forget that, due to the constant movement, transportation is an athletic endeavor, requiring energy to maintain balance. This is an important consideration for competition or race horses, particularly if they are expected to perform upon arrival.

The stressful, athletic traveling environment impacts on health and well-being, with effects continuing long after the journey is over. During transport, toxic gases, such as ammonia or carbon monoxide, can cause damage to the lung epithelium, precipitating respiratory disease. Cold or hot conditions affect younger or sick animals much more severely than mature, healthy horses. However, the transportation of any horse in cold weather requires appropriate management of the diet to maintain body weight, growth, reproduction, or maximize performance. The final destination itself can also cause problems. Usually horses are transported to environments where they will be mixing with other horses. The mixing of horses from different environments with different infectious organisms and under stressful conditions further precipitates susceptibility to disease.

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Travel stress can have a severe impact on the equine gut. The stress of transportation is known to increase the incidence of gut ulceration in the horse, a painful condition reducing performance and causing colic-like symptoms. Stress can also slow the flow of digesta and alter the normal gut flora, resulting in digestive upset and possibly life threatening diarrhea or colic. Gut flora are a relatively stable mixed population of bugs, including ‘good’ bacteria, protozoa, yeasts and fungi that live in the large bowel of the horse. There are such huge numbers of bugs present in the normal equine gut that dead bugs provide approximately one third of the dung volume. The gut flora ‘pay’ the horse back for their nice intestinal home by leaving no room for ‘bad’ bacteria, such as Salmonellae, preventing them from growing in the gut and helping the gut lining to resist disease. Horses also benefit as the gut flora help breakdown carbohydrates (a good source of energy) which the horse would otherwise be unable to digest, and are involved in the production of some vitamins, amino acids and fatty acids. Gut flora can even help to increase the flow of digesta through the gut.

The effects of travel stress on the gut are compounded by the typical diet of the regular equine traveler. To maintain athletic ability, high performance horses are fed energy-charged diets containing increased levels of starchy materials, such as cereal grains. Unfortunately, this type of diet can reduce ‘good’ gut flora and promote gut acidity, further predisposing the horse to gut disturbance and ulceration. It is unsurprising that stressed, tired horses may not fulfill their potential on arrival, and may be subject to health concerns in the days following a long journey. Thankfully, it is possible to mitigate some of the effects of travel stress on the gut simply by nutritional supplementation. Yeast products used to supplement a horse’s diet can support the normal gut flora, modifying the intestinal environment and improving the horse’s digestion.

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One such culture is *Saccharomyces cerevisiae* (in the form of Yea-sacc^{®1026}, Alltech). Experiments were conducted to evaluate the effects Yea-Sacc¹⁰²⁶ on equine gut flora and gut acidity. Horses were fed either a high starch or a high fiber diet, both with and without supplementation of 10g of Yea-Sacc¹⁰²⁶ per day. Results showed that where there was an excessive amount of starch in the equine gut the addition of Yea-Sacc¹⁰²⁶ reduced gut acidity thereby, creating a more stable gut environment. Yea-Sacc¹⁰²⁶ also stimulated the activity of fiber-digesting bacteria in the hindgut of the horse for both types of diet. The result is maximized fiber digestibility and more efficient use of nutrients, including energy. Not only does this increase the energy available to the horse for performance on arrival, but it also counteracts the digestive upset associated with travel stress which may lead to ulceration and colic.

Salmonellosis is one of the most commonly diagnosed infectious causes of diarrhea in adult horses. Many cases develop after the stress of transport. The effects of travel stress on the normal gut flora allow an overgrowth of opportunistic *Salmonella* spp., which are present in the intestinal tract of many healthy horses. These bacteria then attach to the gut lining via a mannan sugar and penetrate it causing damage and resulting in diarrhea. Affected horses may show little or no signs, or may experience severe diarrhea and even death. One method of preventing or minimizing the attachment of these organisms to the gut lining is to provide an abundance of material that will bind the mannan sugar used as a means of attachment to the gut lining. It has been known for many years that a form of sugar found in the cell walls of certain yeasts can do this. This sugar compound is called mannan oligosaccharide or MOS. By preventing the colonization with ‘bad’ bacteria, the ‘good’ bacteria have an opportunity to grow and can therefore help support overall gut health.

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A MOS product (Bio-Mos[®], Alltech) has been shown to reduce the colonization of *Salmonella spp.* in the guts of poultry. Furthermore, it has been demonstrated that Bio-Mos augments the immune response to *Salmonella spp.* in poultry, potentially conferring an enhanced ability to fight infection. Whilst the poultry experiments may be applicable to transported horses which are at risk of infectious diarrhea due to *Salmonella spp.*, experiments have also been conducted to evaluate if feeding Bio-Mos would reduce infectious diarrhea in foals. Mares were fed 10g MOS/day from 2 months before until 1 month after foaling. Blood samples were taken before and after foaling. Colostrum and milk samples were also taken, together with data on foal growth and fecal score (to check the foal's gut health). It was consistently found that mares fed Bio-Mos had significantly higher colostrum and milk antibody levels. None of the foals from mares fed Bio-Mos suffered from diarrhea, whereas over 80% of the foals from untreated mares suffered a bout of diarrhea requiring therapy (at about 56 days of age). Whilst the increased antibodies in milk are likely to have improved the foal's ability to cope with microbial challenges to the gut, researchers also concluded that foals consumed Bio-Mos from their dam's feed-tub, receiving a direct benefit of lowered gut pathogen susceptibility. Bio-Mos can therefore both improve immune function and help foals cope with pathogenic challenges to the digestive system.

To summarize, travel is a very stressful, athletic experience for horses. The effects of travel can impact on gut health and increase energy requirements. This can result in reduced performance on arrival and overgrowth of 'bad' bacteria, leading to digestive upset, ulceration and possibly severe diarrhea or colic. Many of these effects can be prevented by supplementing the diet with Yea-Sacc¹⁰²⁶, which increases 'good' bacteria activity, reduces gut acidity and improves fiber digestibility and Bio-Mos, which acts as a decoy to 'bad' bacteria preventing them from attaching and colonizing.