

## Yeast Supplementation, Soy Hulls Useful in Some Equine Diets

In an effort to determine the **effect of yeast on digestion** in horses, researchers in France carried out a study to look at the influence of feeding a preparation of *Saccharomyces cerevisiae*, a strain of yeast, on microbial profiles and fermentation patterns in the large intestine of horses fed a high-fiber or a high-starch diet.

To provide adequate energy for their work, horses performing a high level of exercise are often fed large amounts of cereal grains. At the same time, these horses may be given low levels of forage. This type of dietary management increases a horse's risk for colic and laminitis because the **small intestine's ability to digest starch may be overwhelmed by the sizable grain meals**. If this happens, undigested starch reaching the cecum may seriously upset the activity of the bacteria that normally populate this organ and aid in digestion. Any management technique aimed at minimizing such an upset is desirable because it enables feeding high-grain diets without risking digestive and metabolic upsets. Supplementing the horse's diet with yeast may be one way to avoid changing the balance of microbes, thereby keeping fermentation at a normal level.

In this study, eight horses were put into four groups of two horses each. All horses were given wheat straw. In addition, each smaller group was given a different dietary treatment. Treatment group one was given a high-starch ration containing 45% barley. Treatment group two was given a high-fiber ration containing 46% dehydrated alfalfa. Treatment groups three and four were given either the high-starch or the high-fiber ration supplemented with 10 grams daily of a *Saccharomyces cerevisiae* preparation. The rations were split into two equal feedings each day for a 21-day adaptation period.

The horses were surgically prepared with fistulas (openings into the digestive tract). At intervals during the next two weeks, samples of cecal and colonic contents were withdrawn through the fistulas. Lactic acid levels, pH, and numbers of yeast cells and various bacteria were determined.

Results of the study showed that **feeding the high-starch diet resulted in a large amount of undegraded starch reaching the colon**. This allowed the rapid increase of starch-utilizing bacteria such as lactobacilli and streptococci, which in turn produced lactic acid in quantities up to four times greater than when horses were fed the high-fiber diet. In contrast, supplementing the high-starch diet with yeast culture led to more nearly normal pH values in the hindgut. The authors suggest yeast supplementation could have led to an increase in bacteria that utilize lactic acid in relation to those producing lactic acid. Another possible explanation of the buffering effect is a yeast-produced enhancement of fiber breakdown in the hindgut. The same trends were seen in all horses in the study, although figures for microbial and biochemical parameters showed large variations among the subjects. Other factors such as time of feeding and exercise regimen could also influence how a horse might respond to a particular dietary component. In spite of individual differences, results of this study suggest that supplementation with *Saccharomyces cerevisiae* can reduce variations in pH and lactic acid concentration in the horse's hindgut. This stabilizing influence may allow horses to avoid the digestive upsets that are sometimes caused by feeding a high-starch diet.

Because these results agree with findings of some previous studies, but differ from others, the authors suggest that more research is needed before nutritionists can fully understand the direct effects of live yeast culture preparation on lower gut microflora and metabolic activities in horses.

**Triad Fermentation Blend**, a product available at [www.kerx.com](http://www.kerx.com), is a scientifically formulated blend of yeast and yeast cultures designed to support the digestion of vital nutrients. In research trials, Triad was found to increase digestibility of protein, carbohydrates, and minerals such as calcium, phosphorus, copper, and magnesium.

Another study looked at **soybean hulls as an alternative feed for horses**. This study, which was carried out by researchers from Iowa State University and North Carolina State University, used soybean hulls as a substitute for part of the hay ration. Because soy hulls are digested mostly in the cecum and contain relatively small amounts of starch, their use in equine diets **should not pose a high risk for colic and laminitis**. Their use in ruminant diets has been evaluated, and this study looked for similar data when soy hulls were fed to equines.

Four Quarter Horse geldings were used in the trial. All horses had four hours of free exercise each day and were housed in stalls the remainder of the time. Horses had constant access to water and trace mineral salt blocks. Body weight was measured once a week.

The horses were given alfalfa/bromegrass hay as a fiber source with 0, 25, 50, or 75% **replacement of the hay with unpelleted soybean hulls**. Each horse was given one dietary treatment for 21 days, and all horses experienced all diets during the course of the study. Analysis showed that chemical composition of the soybean hulls was comparable to the hay being fed, although the soybean hulls had 70% less lignin than the hay.

Samples of cecal contents were taken on the first and seventeenth days of each treatment period. The samples were taken about 90 minutes after the morning feeding and were analyzed for pH, ammonia, volatile fatty acid concentration, neutral detergent fiber, acid detergent fiber, cellulose, and hemicellulose. Total fecal collection was done the last three days of each treatment period, and material was analyzed for dry matter, organic matter, protein, neutral detergent fiber, acid detergent fiber, cellulose, and hemicellulose.

Feed acceptance was good throughout the study, although a slight decrease in palatability was seen at the higher inclusions of soybean hulls. No respiratory or gastrointestinal problems were seen. Level of inclusion had no effect on digestibility of dry matter, organic matter, neutral detergent fiber, acid detergent fiber, cellulose, or hemicellulose. There was an increase in total cecal volatile fatty acid production as inclusion increased, indicating that soybean hulls are readily fermentable in the cecum. Horses can use volatile fatty acids to meet their energy requirements.

Higher levels of soybean hull inclusion were associated with chemical changes suggesting altered microbial populations, pH, and available substrate in the cecum. The drop in pH was not great enough to cause digestive problems. A higher level of propionate favors the formation of glucose from noncarbohydrate molecules. An additional benefit was a drop in the amount of energy lost as gas during the fermentation process.

The results of this study indicate that **soybean hulls, which have a chemical composition close to that of medium-quality alfalfa/bromegrass hay, may be an acceptable replacement for up to 75% of total forage in diets for horses**. Soybean hulls, which are often readily available and economical, may find a use in areas where hay is unavailable due to drought or other climatic conditions.

As with any change to a horse's feed program, the **addition of soybean hulls should begin gradually**, with only a handful being mixed into the standard meal the first day. The amount of new feed should be slowly increased until the entire amount is being offered. This allows the horse's digestive tract to adapt safely to the revised ration and minimizes the risk of colic or laminitis.



**Reprint Courtesy of  
Kentucky Equine Research, Inc.**

3910 Delaney Ferry Road  
Versailles, KY 40383  
Phone: 859-873-1988  
Fax: 859-873-3781  
Order Department: 800-772-1988  
[www.ker.com](http://www.ker.com)  
[info@ker.com](mailto:info@ker.com)