changing horse ration too fast can cause colic

ORSES have evolved over millions of years as grazers and require a high level of plant-derived nutrients. In nutritional terms, fiber refers to the components of plant-derived feeds that are not digested by mammalian enzyme systems. These include the non-cell wall fractions such as cellulose, hemicelluloses and lignin and soluble fractions such as pectin and gums.

Traditionally, forages have served as the main source of fiber in the equine diet. Over the years, horse feeders have become an increasingly important component of many manufactured horse feeds.

Unfortunately, crude fiber, which is required on horse feed tags, does a poor job of describing the true fiber content of most feeds. For example, a feed prepared with some corn could be classed as a “superfiber” feed, even though corn has a fiber content of only 35-45% typically measured in forages.

The crude fiber method is traditional and it is currently the only method allowed by the United States Department of Agriculture. The resulting residue was originally thought to represent the indigestible portion of feed. In actuality, it is composed primarily of cellulose and variable proportions of other non-cellulosic polysaccharides and lignin.

The crude fiber method severely underestimates the total plant cell wall content of a feed and recovers only a portion of cell wall polysaccharides and lignin. However, the crude fiber method continues to be used today for animal feeds because it is an official American Organic Chemical Society (AOAC) method of analysis, because a large database has been accumulated for a wide variety of feeds and because it is an easy method of analysis.

Neutral detergent fiber (NDF) is a better method of fiber analysis for equine feeds. Developed by Peter Van Soest in the early 1960s, NDF uses chemical extraction (with a neutral detergent solution under reflux) followed by gravimetric determination of the fiber residue. NDF is a measure of hemicellulose, cellulose and lignin representing the indigestible cell wall. These three components are classified as cell wall material by Van Soest. They give the plant rigidity, enabling it to support itself as it grows, much like the skeleton in animals.

NDF, however, underestimates total dietary fiber since it fails to capture most soluble fiber (SF) fractions. As a result, NDF is not a true measure of the total dietary fiber content for pectin-rich feeds. Although widely used for fiber analysis of forages, the NDF procedure is not an official AOAC method.

Traditionally, the average crude fiber and NDF analyses from hundreds of samples of common feedstuffs are published in the Equi-analytical Laboratories in New York over the past 10 years. Compared to NDF, crude fiber grossly underestimates the insoluble fiber content of each of these feedstuffs.

The SF content of certain horse feed ingredients can be quite high. These SF components — mainly composed of pectin — are particularly important as energy sources for horses because they are highly fermentable.

Studies conducted at Kentucky Equine Research have shown that SF digestibility is greater than 90% in most equine feeds.

Beet pulp, in particular, is quite high, containing around 33% SF. Additionally, beet pulp is low in lignin, and its NDF is highly fermentable. Kentucky Equine Research has determined that the NDF digestibility of beet pulp is 75-80% in horses, compared to values of 35-45% typically measured in forages.

The combination of high SF levels and high NDF digestibility makes beet pulp an energy-dense feedstuff with a digestible energy content only slightly lower than oats. As such, beet pulp can be classed as a “superfibrous” feed source and has become a popular feed ingredient for performance horse feeds.

Direct measurement

Direct measurement of SF content and total dietary fiber (TDF) is difficult and expensive, but there is a good method to estimate both from commercially available feed analyses. Table 2 shows the non-structural fiber content of some feed ingredients listed in Table 1. NDF is the sum of the starch and water-soluble carbohydrates measured directly in a feed. NFC is a mathematical estimate of non-cellulose (non-fiber) carbohydrates consisting of starch, sugar, pectin and other SF. NFC is calculated as 100% - % crude protein - % NDF - % ash - % fat.

Table 1 contains the average fiber analysis of horse feed ingredients.

Nutraferma to increase output

To boost output of its fermented soy protein product (PepSoYGen), Nutraferma announced that it has initiated an expansion at its North Sioux City, S.D., location to double production capacity during 2012.

“Of course, some concentrates are less energy dense than others, so following recommended intake levels for these feed bags is a good practice,” Freeman said.

Many grain mixes will have significant levels of soluble carbohydrates, which provide energy efficiently.

“However, eating too much of these concentrates in one meal is a significant contributor to the frequency of colic and founder in horses,” he said.

Table 2 shows the non-structural fiber content of some feed ingredients listed in Table 1. NDF is the sum of the starch and water-soluble carbohydrates measured directly in a feed. NFC is a mathematical estimate of non-cellulose (non-fiber) carbohydrates consisting of starch, sugar, pectin and other SF. NFC is calculated as 100% - % crude protein - % NDF - % ash - % fat. NFC can be estimated as % NFC = % NDF - % SF.

Beet pulp, soy hulls and alfalfa meal contain each significant quantities of SF and TDF.

Nutraferma said its fermented soy product is suitable for swine, poultry and aquaculture diets because of the absence of anti-nutritional factors due to the solid-state fermentation process. Microbes utilized in the fermentation process, which are listed as generally recognized as safe, degrade available nutrients further through biological and enzymatic degradation — a natural neutralization method.

It's recommended that horse owners consult a veterinarian when changing horse ration too fast can cause colic.