



Fact sheet

Forage Substitutes for Horses

Sarah L. Ralston, VMD, PhD, dACVN, Associate Professor, Department of Animal Sciences

Forages such as long stem hay and/or pasture grasses and legumes are the traditional cornerstones of horse rations. A good source of forage should comprise at least 50% of a horse's daily intake, which would be 12 to 15 lbs of dry hay for the average adult horse. While an important source of energy, protein, minerals, and vitamins, forages also provide a "nutrient" that horses require—fiber. Long stem hay and pasture grasses contain over 20% crude fiber, whereas most grain mixes, even so-called "complete" feeds, contain less than 12% fiber. Horses can adapt to balanced rations that do not contain hay or pasture, but the absolute minimum of fiber necessary has not been established. However, low fiber/high concentrate rations have been documented to increase the risk of colic, gastric ulcers, and wood chewing behavior of horses.

Unfortunately, in times of drought, such as we experienced in the Northeast in 1999, or other adverse weather conditions, the pastures dry up and long stem hay is not only expensive, but hard to find. Local dealers and sources for hay are listed in the HayExchange website: <http://www.hayexchange.com>. But if hay costs soar to over \$300/ton, as some predict will happen, what is a horse owner to do?

Luckily we do have some options. Listed below are some forage "substitutes" that can be safely incorporated into horse rations to provide the necessary fiber.

"Complete" concentrates: Available in textured, pelleted, or extruded forms, these complete concentrates are mixtures of grains, hay or beet pulp, and vitamin and mineral supplements. They are designed to be fed without hay, grain, or other supplements while still meeting the horse's basic needs. Complete concentrates (or feeds) are available in a wide variety of nutritional profiles and so it is important to read the labels to determine which will

meet your horse's particular needs (ie., adult maintenance versus the young growing or performance horse). The label should contain the statement "designed to be fed without forage." Unfortunately, none of the products that the author is aware of contain sufficient fiber to satisfy the horse's need to chew. This will result in dramatic increases in wood chewing activity if no other source of forage is fed.

Usually 12 to 15 lbs of a complete feed are needed to meet the average 1000 lb horse's daily needs, which, if split into only two feedings, will overwhelm the horse's digestive capacity. Feeding smaller amounts (2 to 3 lbs per feeding) more frequently will not only optimize digestion, but will also keep the horse more occupied. Complete feeds should be used instead of, not in addition to, a horse's regular grain ration. Horses should be switched to the complete rations slowly, taking over a week to completely eliminate hay from their diet and to get them on the amounts of complete feed necessary to meet their needs. **CAUTION:** If fed without any other source of roughage, complete feeds may increase the risk of colic and/or laminitis.

Hay Cubes: Long stem hay, either alfalfa or a mixture of alfalfa and timothy hay, is dried, chopped, and compressed into cubes. These are usually sold in 50 lb bags which are easy transported and stored, making them more readily available from regions where the hay crop was good. Cubes made from a mixture of alfalfa and whole corn plants may also be available. We have used hay cubes as the sole source of fiber in several research studies at Rutgers with good results, feeding up to 12 to 15 lbs of cubes per horse per day. However, there was a dramatic increase in the incidence of wood chewing in every study, and two horses had problems with choking on the cubes when they were fed dry. The wood chewing can be reduced by feeding at least some long

stem hay or straw (see below), and the danger of choke is eliminated by soaking the cubes in water for 10 minutes before feeding them.

The mixed grass or corn plant/alfalfa cubes are recommended if fed as the sole source of forage to adult maintenance horses. Straight alfalfa cubes will contain more protein and calcium than the normal adult horse needs, but will not harm the horse as long as its kidneys are functioning properly. Alfalfa cubes are more appropriate either for lactating mares or growing horses and as a partial forage substitute. While up to 15 lbs or more can be fed per day, as little as 2 to 6 lbs of cubes per day can be used as a "hay extender" if only poor quality hay is available in limited quantities.

Straw: The stalks left over from harvesting wheat or other grain crops contains very little nutritional value, but straw is a great source of fiber. If the horse's energy, protein, mineral, and vitamin needs can be met by a complete pelleted, extruded, or textured concentrate, then bedding on straw will reduce the amount of wood chewing and satisfy the horse's desire to chew. If horses have not had access to forage and are suddenly placed on straw, however, there is a serious risk of impaction colic. Straw should not be considered as a source of nutrition for horses other than as a "chew factor" and fiber source.

Beet Pulp: A by-product of the sugar beet industry, beet pulp has gained popularity as a supplement for horses in the past 10 years. It is a good source of fermentable fiber, and is fairly high in calcium with only moderate protein (8%) and no vitamin content. It is available in its "raw" form, which looks somewhat like ground up old shoe leather or in pellets. Traditionally, the raw form is soaked in water for 1 to 12 hours before feeding. This can be a problem in hot, humid weather when it can become rancid. The pellets do not have to be soaked. It is a very common additive in the "complete" feeds.

Up to 10 lbs (dry) can be fed to the average adult horse, but it will need to be supplemented with a balanced vitamin/mineral supplement and perhaps protein. It should not be fed as the sole source of nutrition.

Wheat Bran: Though wheat bran is a good source of fiber, it should not be fed in large quantities for prolonged periods of time. It is extremely high in phosphorus and could cause potentially debilitating calcium/

phosphorus imbalances. It is also fairly high in protein (16%). If used as a supplement, it should be limited to 1 lb per day to adult horses, and the calcium/phosphorus ratio should be carefully balanced with calcium supplements. **Wheat bran is not recommended as a major forage substitute.**

Rice Bran: Recently promoted as a source of fat (energy) for horses, rice bran is also a fair source of fiber. Rice bran, however, has even higher phosphorus per pound than wheat bran. Some commercial rice bran products have added calcium to correct the imbalance, but, as with wheat bran, **rice bran is not recommended as a major forage substitute.**

Lawn Clippings/ garden refuse: Because many ornamental (see FS938) and garden plants (tomatoes, potatoes, rhubarb, etc.) are potentially lethal to horses, these are not recommended as forage substitutes or even supplements. Even pure lawn grass clippings are unacceptable. The small particle size and high moisture content of grass cut with a lawn mower results in rapid fermentation in warm weather. **Feeding lawn clippings and garden refuse can lead to colic, laminitis, and/or death and is not recommended.**

Summary

All of the above have their drawbacks as forage substitutes. Complete feeds and hay cubes are relatively expensive (\$200 to \$300/ton). It is most economical to use them as "hay extenders," especially if at least moderate quality hay is available at a lower price. Neither straw nor beet pulp should be used as the sole source of nutrition. Though they are both good sources of fiber and relatively economical, neither contain the proper balance of nutrients for any class of horse. However, if adequate quality hay is totally unavailable or costs over \$250 per ton, beet pulp based complete feeds and cubes can be used with straw to provide both the proper nutrient balance and fiber content to maintain gastrointestinal health and well-being. Bran, from either wheat or rice, though good sources of fiber, should NEVER be used as a main component of your horse's diet. Lawn and garden clippings should be avoided at all costs.