8-1-2003

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COOPERATIVE EXTENSION SERVICE
SDSU

Extension Extra

ExEx 2039
August 2003
Animal and
Range Sciences

COLLEGE OF AGRICULTURE & BIOLOGICAL SCIENCES / SOUTH DAKOTA STATE UNIVERSITY / USDA

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Feeding a horse is probably the largest cost of horse ownership. The nutrition the horse needs and the availability (therefore, price) of the feed must be carefully balanced. Many options are available.

Traditional feeds for horses typically are grass or alfalfa hay, corn, oats, and/or a molasses-based sweet feed of some type. Some years, good quality forage may be too expensive or unavailable. In other cases, you may want to cut costs or better utilize more readily available feeds. Following is a guide to the safety and efficacy of feeds not traditionally fed to horses.

Forage Alternatives

Regardless of the class of horse (work category), the necessary forage diet cannot be abandoned even when traditional forage is difficult to find. The following feedstuffs can stretch the current forage supply or in some cases replace it.

Straw from cereal grains can be fed to horses almost exclusively as a fiber source. This may be a way to bypass buying additional hay when feeding a horse with high energy needs (obtained from a high grain/concentrate diet). Oat straw is generally considered best as it is softer and does not have the awns that are on barley and some wheat straw.

Straws are very low in Vitamin A and about half of the phosphorus needed for a mature horse.

Ground corn cobs offer a little more than half (50-70%) of the Digestible Energy (DE) in grass hays, but they are a significant source of fiber. This feed would offer little in terms of protein, minerals, or vitamins.

Hulls from most cereal grains are typically a safe feed and a low-cost forage alternative, especially for mature idle horses. Hulls help limit dietary energy intake yet satisfy appetite and curb associated effects (boredom, obesity, vices).

Soybean hulls, sunflower hulls, and wheat mids (essentially the tips of the wheat germ) offer approximately 50% less DE, protein, and phosphorus than grass hay but about 50% more fiber. Cottonseed hulls, peanut hulls, rice mill feed (containing parts of rice grain and hull) and even paper (free of dyes) can also be fed in limited amounts to horses to provide fiber.

Drawbacks of feeding hulls would be that they are often very dusty and contain no vitamin A or carotene.

A moderate- to high-protein feed (alfalfa or 16% protein mix) needs to be included to maintain appropriate protein, calcium, and phosphorus levels when feeding hulls.

Rice hulls alone offer almost no feed value and are not suitable for horses (due to their sharp edges) but may be used as bedding.

Millet, a fast-growing annual grass, may be a alternative feed during drought periods. This is particularly true of pearl millet. Pearl millet needs to be cut quite early, otherwise it will be a coarse, poor-quality hay. German or foxtail millet is reportedly unsafe and has been observed

to cause excess urination, though official studies have not been conducted.

Horses should not utilize pastures, haylage, or silage of sorghum, sudan grass, Johnson grass, Sudex, and other sorghum grasses as they may cause prussic acid toxicosis. Prussic (hydrocyanic) acid can result in cystitis (inflammation of the bladder), ataxia (incoordination), or death.

Sorghum hay that is properly cured and stored should not present these problems, because as the forage dries the hydrocyanic acid evaporates along with the moisture. However, sorghum hay should be fed with caution and increased observation of the horses and their reactions to the feed.

Nitrate poisoning (different than prussic acid poisoning) is not known to occur in horses. Horses can tolerate nitrate levels much higher than ruminants can because of the way in which nitrates are converted. In ruminants, microorganisms in the rumen convert nitrates to nitrites that, when absorbed, can reduce the blood's ability to carry oxygen.

Conservation Reserve Program (CRP) grasses should be acceptable nutrient sources, but there will be other issues such as palatability and adequacy, particularly for growing horses and lactating mares. Palatability decreases with plant maturity, and these grasses are likely mature when baled.

The presence of weeds—therefore of weed seeds—should be considered when assessing CRP hay quality. Once fed, those weeds will be an unwanted part of your grazing system.

Much of CRP hay in South Dakota will contain smooth bromegrass, big bluestem, little bluestem, green needlegrass, switchgrass, and wheatgrasses (crested, intermediate, tall, and western). Very little alfalfa was interseeded with these stands.

In well established CRP stands, awns are not an issue, but if the forage contains foxtail barley, wheat, and rye, their awns can cause irritations or ulcers in the horse's mouth. Be alert to excessive salivation and difficulty eating if you are feeding forage containing these grasses.

The only way to know the nutrient content of hay or feedstuffs of any type is to have it analyzed. Extension Extra 4001 explains the process of taking an accurate forage sample.

Grain alternatives

Bran, typically wheat or rice, is very high in phosphorus (up to three or four times that of 'normal' grains), which can present a significant problem in all horses if they are not given a significant source of calcium. (The target ratio of calcium to phosphorus [Ca:P] is 2:1.) The DE, fiber, fat, and calcium content of bran is similar to that of oats, but protein levels are higher.

Bran is often thought of as a laxative, an aid in prevention or treatment of colic. There is no evidence of a laxative effect; therefore, in this respect, it does nothing for the horse, positively or negatively.

Corn stover or fodder can be used extensively for wintering idle horses, although they will typically need an additional protein source. Moldy corn disease can be of concern under certain conditions and seems to affect older horses more readily than younger.

Beet pulp has been fed for years. It is a safe horse feed with DE and fiber contents between most hays and grains. Protein content is similar to grains and good quality grass hay (7-8%). One significant benefit is that it is relatively high in calcium. Beet pulp is very low in phosphorus and B-vitamin content and contains no carotene or Vitamin D.

Potatoes are similar to corn in nutrient content but are less palatable and, because of a moisture content of around 77%, can cause loose stools. Choking also seems to be of greater concern when feeding potatoes. Green, rotting, or sprouted potatoes should not be fed to horses.

Co-products of the corn milling process can be used in horse rations and have been shown to have a very high crude protein content (around 30%), slightly higher energy content than some grains, and a greater amount of P than Ca, again illustrating the need for forages in the ration.

Corn gluten meal and corn gluten feed contain fiber and have a low starch content, yet pro-

vide adequate energy for mature horses. A publication by Cargill, Inc. recommends using corn gluten at a maximum rate of 5-7% of the diet for young and working horses and up to 10% for mature horses. Distillers dried grains with solubles (DDGS) have been fed to levels of 10% with no effect on palatability and at 20% showed an increase in feed intake. Broin Enterprises of Scotland, S.D., recommends that distillers grain should be kept between 10% and 15% of a horse's diet, depending on the individual.

One concern with feeding these co-products may be mycotoxins. Mycotoxins can survive the corn milling process.

Mycotoxins are sporadically produced by molds. Molding is a natural and necessary part of plant decay, but moldy feeds can easily cause long-term effects on the respiratory tract of horses, as well as a host of other problems. There are a few hundred chemically different forms of mycotoxins which can produce an equal number of various actions and effects. Drought and other stress can reduce plants' natural defenses against mold.

Moldy feeds that commonly affect horses are moldy corn poisoning and fescue toxicosis. However, all cereal grains and forages may mold.

Utilizing Alternative Feeds

Before making a feed or schedule change, take note (preferably in writing so you can refresh your memory later if you need to call in a veterinarian) of your horse's normal behavior. This will make it easier to spot even a slight change in personality or activity of your horse.

The change may be very subtle, a difference that may not be easily explained. The horse just seems to be "off."

It may be more noticeable—lethargy, slobbering, droopy ears and head, or a slow, stumbling gait. Lack of interest in feed, signs of colic, poor mucous membrane color, and increased temperature, pulse, or respiration may also be early warning signs of problems with, or sensitivity to, certain feeds.

Non-traditional feeds can offer necessary nutrients for horses when safe feeding management is practiced. Introduce any feed change, whether it be in amount, type, or schedule, with caution and do it gradually. At least a 2-week period for the change is highly recommended.

For more information on alternative horse feeds, see:

Lewis, L. D. 1996. Feeding and Care of the Horse. Williams and Wilkins. Philadelphia, PA.

Cash, D. 2001. Prussic acid in sorghum hay or pastures can threaten livestock. Montana State University Extension.

National Research Council. 1989. Nutrient requirements for horses, 5th ed.

Weigel, J.C., D. Loy, and L. Kilmer. Feed co-products of the dry corn milling process and feed co-products of the corn wet milling process. Cargill publication.

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ExEx 2039, 2003. Access at http://agbiopubs.sdstate.edu/articles/ExEx2039.pdf