Vet Call

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Use of byproduct feeds

The largest annual cost for most cow herds is for winter feed. Cattle can graze dormant standing winter forage or crop aftermath at greatly reduced cost compared to using harvested forages. When cattle graze marginal to low-quality forages, supplemental protein or energy is often required to enhance either forage use or animal performance.

Depending on the cost of available byproducts and more traditional feedstuffs (grains and harvested forage), many producers may be able to cost-effectively use byproduct-based supplements to improve the intake and digestibility of dormant forage. Byproduct feeds vary substantially in price and availability throughout the year and by region of the country. Producers must monitor supplement needs and feed prices to take advantage of the opportunity to use alternative feed sources to reduce the cost of production.

Protein supplements

The primary purpose of protein supplementation is to provide the rumen microorganisms with the nutrients they need to actively digest forage. Dietary protein that breaks down in the rumen to ammonia is used by rumen microorganisms for growth and reproduction. Rumen microbes then pass into the small intestine where they are degraded and the protein is available for use by the animal. Protein sources that are degraded in the rumen and used in this manner are referred to as degradable intake protein (DIP).

To maximize forage digestion and intake, DIP requirements must be met. Therefore, if the diet is deficient in protein, a supplement high in DIP should be provided before energy supplements are considered. Examples of protein sources with high DIP values include soybean meal, legume hay, cottonseed meal, corn gluten feed and wheat middlings.

Digesters

Two types of rumen bacteria (fiber digesters and starch digesters) convert the energy sources presented to cattle into usable forms. The fiber digesters are important for forage-fed animals and are relatively slow-growing. Starch digesters are important for grain-fed ruminants. If starch is available, starch-digesting bacteria will "out-compete" the fiber-digesting bacteria and become the dominant type of microorganism in the rumen.

Energy from grain is primarily in the form of starch or nonstructural carbohydrate. When a small amount of starch-based energy supplement is fed (0.25% of body weight or less), forage intake and digestibility are either not affected or slightly improved. However, when grain is supplemented at higher levels, forage intake and digestibility decline because the population of starch digesters is increased and the fiber-digesting bacteria are reduced. If larger quantities of grain-based supplements (> 0.5% of body weight) are fed, the intake and digestibility of the base forage will decrease.

Many byproduct feeds provide energy in the form of highly digestible fiber. Because the energy is in the same form as that in the forage, high levels can be fed without decreasing forage digestibility, By-product feeds that provide energy in the form of highly digestible fiber include corn gluten feed, dried distillers grains, soybean hulls and wheat middlings. Some by product feeds can have high levels of starch (rice bran and wheat middlings from some mills and some milling runs); therefore, the amount of these types of feed is limited to fairly low levels for grazing cattle.

Minerals

Mineral profiles of byproduct feeds may be quite different from conventional feedstuffs. Many of the byproduct feeds are high in phosphorus and fairly low in calcium so that limestone (a calcium source) may need to be fed to provide proper mineral nutrition. By-products may be fairly high in potassium, copper and zinc. For many herds, a lower-cost mineral supplementation program may be used because of the minerals provided by the byproduct.

Handling byproduct feeds

Many of the byproduct feeds are difficult to handle in their "raw" form. Wheat middlings, cottonseed hulls, soybean hulls and others are light and are easily blown out of trucks and feedbunks. These types of feed are much easier to handle and transport if they are pelleted.

Some byproduct feeds are very high in water content, and unless you are located near the production plant, the cost of transportation on a dry-matter (DM) basis becomes expensive. In addition, some dry feeds wick moisture and bridge in metal bins and feeders. To prevent bridging or mold production in any storage facility, the structure should be waterproof and have good ventilation. Storage on the ground in an open-front structure that allows use of a front-end loader to handle the feed works well for many operations.

COMMONLY USED BYPRODUCT FEEDS

The following are commonly used byproduct feeds:

CORN GLUTEN FEED

Corn gluten feed is a byproduct of the production of high-fructose corn syrup used in soft drinks and the baking industry. It is available in wet and dry forms. In the meal form, the feed has poor flow characteristics, but corn gluten can be purchased as a pelleted product. Compared to corn grain, corn gluten feed is higher in protein (18%-23%) lower in energy (but the energy is in the form of digestible fiber) and has higher mineral concentrations. Because of the high sulfur content, polioencephalomalacia (polio) — a nervous condition that can result in blindness, staggering and even death — has been described when corn gluten feed is fed at very high rates, but not at the rates recommended for supplementing grazing cattle or if kept below 40%-50% of the dry matter for feedlot rations.

CONTINUED ON PAGE 202

CONTINUE0 FROM PAGE 199

SOYBEAN HULLS

During the processing of whole soybeans, the bean is rolled or flaked to remove the hull. The hulls are toasted to destroy the urease activity, ground to raise their density, and usually pelleted. Soybean hulls provide about 1 O%-14% protein and are an excellent digestible fiber energy source.

DISTILLERS GRAINS

Distillers grains are the byproducts of the distilling industry. Solubles left over from the fermentation process are usually added to the grains before drying. Distillers grains are high in protein (23%-30%), high in fat (1 0%-12%) high in phosphorus and potassium, and low in calcium. The drying process increases the bypass protein (also referred to as undegradable intake protein, or UIP) value of the feed compared to the original grain used. Therefore, if the forage being grazed is very low in protein, it is important to be certain that rumen degradable intake protein (DIP) requirements are met in order to maximize forage digestion. Flowability is variable and depends on the amount of moisture in the feed.

WHEAT MIDDLINGS

Approximately 2.3 bushels (137 pounds [lb.]) of wheat are required to produce 100 lb. of flour; the remaining byproducts from the milling process include bran, shorts, germ and flour. The byproducts from a mill are combined and sold as wheat middlings. Wheat middlings ("mids") vary considerably in composition from one plant to another (even over time from the same plant) because the actual product produced by the plant alters the amount of each of the byproducts produced. Protein content of wheat mids is high (16.5%-18%) and energy is high but variable between loads. Phosphorus is high, calcium is low, and copper and zinc levels are high.

WHOLE COTTONSEED

Cottonseed does not need to be ground or rolled to be utilized by beef cattle. Whole cottonseed is high in protein (22%) high in energy and very high in fat. Because of the high oil content, daily amounts should not exceed 5 lb. in yearlings and 6-7 lb. in adult animals.

This feed bridges easily in bins and does not flow well in feeders, nor does it auger well.

OTHERS

Other byproduct feeds that are commonly used include ammoniated wheat straw; fruit, vegetable and potato waste; sunflower meal; bakery waste; rice hulls; cottonseed hulls; and feather meal.

One source of information that lists various alternate feeds is the “By-Product Feed Prices” bulletin board published by the University of Missouri. This bulletin board is updated weekly and lists feed prices, locations and nutritional information. The bulletin board can be accessed at *etcs.ext.missouri.edu/agebb/anscl/dairy/index. htm.*

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