The Role of Roughage in Cattle Diets

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Ruminant animals, such as beef cattle, have the unique ability to digest fiber-based feedstuffs and convert this into a high-quality beef product. Forage represents a key component of beef cattle diets in the Southeast US, whether through grazed or stored forage resources. Most fiber in forage is found in the structural component of cell walls. This includes cellulose, hemicellulose, and lignin. Roughage is an important component of the diet for rumen and digestive system health.

The neutral pH of the rumen (pH of around 7) creates an environment for digestive microbes to live and thrive. Fiber-digesting bacteria can break down the components of plant cell walls. Conversely, starch-digesting bacteria also exist in the rumen, along with other microbes such as protozoa. These microbes work together to break down the components of various feedstuffs and create usable nutrients for the animal.

During the winter months, the conversation surrounding roughage comes to the top of the list more so than other times of the year. Traditionally, we feed hay during the coldest months of the year, which represents a roughage source in animal diets. The quality of hay used impacts 1) how much of the forage the animal can physically eat and 2) how much can be digested and utilized by the animal. The greater the forage quality, the greater intake and digestibility of the forage. With decreasing forage quality, we have increasing amounts of indigestible fiber. The more indigestible fiber, the quicker the animal feels "full" while eating, which can lead to decreased daily dry matter intake. More indigestible fiber also means that it takes more work for rumen microbes to break down the forage, and results in less nutrients being digested by the animal.

For roughage in the diet to be effective, it needs to stimulate the rumen environment. The rumen has contraction-like movements, which helps move digesta up, down, and side to side in the rumen. This allows rumen microbes to attach

to the roughage source and begin breaking it down. When cattle graze or consume hay, they begin breaking down long-stemmed forage into smaller pieces. This is first done through chewing action, swallowing, and then regurgitating and rechewing, or ruminating. In a feed ration, some producers may consider chopping or grinding hay, baleage or silage as part of a feed blend. For the fiber to be effective in the rumen, a ½ inch chop length is a good target. Grinding the forage may make the particle size too small for the fiber to "work" in the rumen and is less effective than chopping.

Dry weather conditions this fall limited early winter grazing availability and led many people to begin feeding hay sooner than normal. Alternative roughage sources can be considered either a partial or full replacement of hay in the diet, depending on the type of feedstuff used. Some producers may consider bringing an alternative roughage source into the diet to stretch hay supplies or grazing availability. Cotton gin byproduct (also known as gin trash or cotton burrs) is equivalent to low quality hay in feed value and is used as a roughage source in beef cattle diets. The texture of cotton gin byproduct stimulates rumen function. A recent research trial at Auburn University evaluated cow performance of dry, pregnant cows (1,300 lb body weight) fed gin byproduct in a 60-day feeding study. Cows were fed at a rate of 2.0% of animal body weight per head per day of gin byproduct, along with 0.5% of body weight per day of a digestible energy supplement (i.e. soyhulls). Cows maintained a body condition score of 5.5 or greater during the 60-day trial, demonstrating the use of this byproduct in cattle diets with lower nutritional needs. Gin byproduct can also be blended with other feedstuffs, generally at a rate of 10 to 30% of a feed ration, to help extend a feed mix. It does not add significant energy or protein value to a feed blend, but instead, adds fiber value to the feed. Producers may consider this strategy if they are trying to stretch feed supplies or add texture and palatability to a feed mix.

When considering alternative roughage supplements, it is important to have these sources tested for their nutritional value. Some byproducts of cotton, corn, and peanut production can be used as roughage in the diet, but the extent of use or forage replacement potential is generally limited. The following resources have additional information on roughage in the diet and feeding strategies during the winter months (scan the QR code with your phone/device camera). Contact your local Animal Science and Forages Extension Agent to help determine which roughage sources might be a fit for your operation.

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Coping with Winter Feed Needs

Alabama Hay Directory

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