

Manage for Proper Protein Digestion

Forage digestion and performance depend on protein source.

by **BARB BAYLOR ANDERSON**,
field editor

Providing the right protein source improves forage digestion and animal performance.

As part of a recent webinar series on minimizing feeding costs, Ohio State University ruminant nutrition professor Francis Fluharty told producers the goal with protein is to feed the bacteria in the rumen. Microbial protein provides 50% of the amino acids used by an animal on a forage diet, and 80% of the amino acids needed for an animal on a high-grain diet.

“Ruminant animals in grazing situations need to maximize forage digestion in order to increase performance parameters such as average daily gain or milk production,” he says. “Ruminally speaking, degradable intake protein is the first limiting nutrient for beef cattle grazing low-quality forages. Highly available protein sources are urea, soybean meal and corn gluten feed.”

Nitrogen is needed for microbial growth and fermentation in the rumen, and is broken down into ammonia. Fluharty says some

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combination of proteins is needed to maintain ammonia.

“From a cost and protein percentage standpoint, there is never a cheaper or higher protein source than urea in a high-grain diet,” he says. “Substituting urea for a portion of degradable, true protein in supplements for range cows is a viable option. It also has applications for growing diets that are high in forage, as long as forage is adequate to accompany a lick tank with urea.”

Fluharty says urea is the most misunderstood protein supplement available, noting it is used most efficiently on high-energy, low-protein diets where there are readily available carbohydrates. Urea increases diet organic matter digestion with straw and increases microbial protein synthesis.

“When urea is fed, sulfur, potassium and phosphorus must be supplemented or available in sufficient quantities. If you are feeding any distillers’ grains, you may already have enough phosphorus. You need to check the rest of the ration for those minerals,” he says.

Producers also must be aware urea can create ammonia toxicity and reduce feed intake. Fluharty advises never exceeding 1% of diet dry matter and one-third of the total dietary protein with urea. Overfeeding urea can increase rumen pH and lead to ammonia toxicity.

“Don’t use urea in less than 300-pound calves or on highly stressed newly arrived feedlot cattle, either,” he says. “The first three to four days, cattle are getting used to a new feed. For receiving calves with no urea, use soybean meal to provide ruminant-available nitrogen.”

Other concerns with nutrient sources include heat-damaged proteins from the

milling process. Any browning creates off-spec product. “It still gets marketed, but you get what you pay for. If you use it as a protein supplement with cows and heifers, you may lose animals or see prolapses. Send in a feed sample so you know whether you are feeding less protein than animals need.”

Remember, protein requirements change with age and size. Fluharty says young animals need a higher percent of protein in their diet due to rapid tissue growth and low feed intake.

“The actual amount of protein requirement and intake increases as body frame or projected mature body size increases. Higher-growth-potential animals have bigger intestines and higher protein requirements,” he says. “Also, animals that grow faster or milk more than their counterparts have a higher gram protein requirement. As the animal grows, the gram protein requirement increases, but the percent of protein in the diet needed to meet the requirement decreases. I like to see a 13.5% to 14% protein from a variety of sources, not just urea.”



Editor’s Note: A former National Junior Angus Board member, Barb Baylor Anderson is a freelancer from Edwardsville, Ill.

Consider Grain Coproducts in Feedlot Diets

A viable supplement option, grain coproducts require analysis, feeding considerations.

by **BARB BAYLOR ANDERSON,**
field editor

When it comes to coproducts, no one size fits all. That's according to Ohio State University ruminant nutrition professor Francis Fluharty, who discussed the topic during a recent webinar.

"U.S. corn use for ethanol production has increased significantly, which has created more coproduct availability for animal feed rations," he says. "But differences in coproducts exist. To be sure producers feed for the best response, they need to have coproduct batches analyzed."

Fluharty says aflatoxins may not all be destroyed during ethanol production, which can cause a reduced growth rate. In addition, variance in both nutrient and sulfuric acid levels can occur at the ethanol plant level. For example, sulfuric acid levels may range from 0.5% to 1.8% sulfur, while the maximum tolerable level for cattle feed use is 0.4% of diet dry matter.

"Modified, wet, dried and distillers' solubles all have varied dry matter. Small producers who buy the coproduct one time and use it in a feeding program without doing sulfur analyses could be in trouble. They may incorrectly estimate

A big difference exists between corn kernel and dried distillers' grains sizes, for example. Fluharty recommends a smaller particle size for quicker movement through the rumen, as propionate increases glucose production, which means better average daily gain and marbling. Dried distillers' grains can be 20%-60% of the ration.

the percentage," he says. "Large feedlots with several loads a day can probably run 0.6%-0.7% with no problem if intake fluctuates."

Coproduct fat levels also vary. Fluharty says the more distillers' fed, the greater the chance of urinary calculi if phosphorus is being supplemented. Full-fat distillers' grain research shows fat should not be more than 6%, as fat will coat feed particles in the rumen. Coated particles do not allow bacteria to attach in the rumen and ultimately lower feed digestibility.

"On a growing forage diet, keep the dietary fat level below 4%. Otherwise fiber-digesting bacteria attach to the forage and the fat limits the attachment," he explains. "With grain feedlot diets and fat at 6%, you can increase the diet energy

density. That may be beneficial to animal performance, especially in hot weather."

Adding too much fat or too much sulfur can result in abnormal animal behavior. Resulting hydrogen sulfide gas can be eructated by the animal and then inhaled. The gas directly enters circulation through the pulmonary system and may disrupt energy metabolism in the brain.

To prevent such problems, Fluharty says producers can add monensin (Rumensin®) to rations.

"Animals fed 60% dried distillers' grains in the ration along with monensin and haylage may see rumen pH fall six to 14 hours after feeding. The hydrogen sulfide gas is then more acceptable, and cattle have the best gain," says Fluharty, citing feedlot research.

Coproduct particle size is another consideration. A big difference exists between corn kernel and dried distillers' grains sizes, for example. Fluharty recommends a smaller particle size for quicker movement through the rumen, as propionate increases glucose production, which means better average daily gain and marbling. Dried distillers' grains can be 20%-60% of the ration.

"Between 20% and 40%, there is no difference in average daily gain. Average daily gain and feed to gain are better at a 40% dried distillers' inclusion rate than at zero versus an all-corn diet," says Fluharty. "About 25% is good, but at 50% protein and sulfur may be too high. Crude protein also is a negative, depending on how you value and handle manure. While there are no differences in marbling scores or ribeye, more research needs to be done before we can recommend more than 40% distillers' grains be fed."

Fluharty adds corn gluten is another option that is 80% ruminally degradable and improves fiber digestibility. Soy hulls are highly digestible, and used for fiber, but not energy or protein.

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Maximize Lean Growth with Grain-based Diet

by **BARB BAYLOR ANDERSON,**
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If you want a growing diet that maximizes efficiency throughout the life of your feedlot animals, a grain-based diet is the way to go, says Ohio State University ruminant nutrition professor Francis Fluharty. He says grain rations with as little

forage as possible help maximize use of propionate within the rumen so animals can make the best use of feed for lean growth.

“Growing diets are used for bone and muscle growth for small-framed breeds

like Angus,” he says. “Many producers think they need to feed as much as the animals will take with high-grain diets, but that is not the case. The animals can also use haylage and corn silage in feedlot situations with moderately high-fiber feedstuffs and byproducts. Gains may average about 2.2 pounds (lb.) per day with 50%-70% grain and 30%-50% fiber.”

Fluharty notes grass-fed cattle grow more slowly and have a higher maintenance energy cost because of the low digestibility of forage that leads to greater visceral organ weights. Grain-fed cattle also get visceral fat but grow faster and more efficiently in a feedlot.

“Fat is not all the same. High-concentrate diets fed at restricted intakes may be used effectively because they do not lead to more seam and back fat. Seam fat is the largest fat depot between the muscles. By the time steers have $\frac{1}{10}$ of an inch of backfat, there is already a lot of seam fat, and that means weight fat is greatest in the rib and chuck areas,” he says.

Fluharty adds forage in feedlots to prevent digestive disorders. “Roughage particles should be relatively small when highly processed grain diets are fed, or undigested grain will pass through the rumen,” he says. “It also helps maximize net energy for gain intake by cattle. Don’t provide unlimited access to a round bale of hay. Feed has to be in the bunk and be controlled.”

To maximize lean growth and feed efficiency, Fluharty recommends a prescription or programmed intake corn-based diet.

“We want to control pattern of growth, improve efficiency and change composition of growth. Try to get the cattle to gain with propionate and limit the visceral organ weight,” he explains. “If you feed cattle *ad libitum* all the way through, it costs you unnecessary feed. But you don’t want to over-restrict your cattle on feed, either.”

An automated feed delivery system can reduce human error, he says, as well as limit feed waste and metabolic disorders that may decrease feed efficiency.

“You can control intake and improve feed efficiency and reduce overall feed costs. Work with a nutritionist to increase gain over time and remove visceral fat, increase propionate and marble well,” he says. “Increasing levels of protein must be fed as intake is reduced or it reduces the animal’s ability for lean tissue growth. You end up with fatter, lighter-weight cattle.”



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