Cattle Business in Mississippi – October 2011
"Beef Production Strategies" article

Managing Feedstuff Nutrient Variability

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Cattle producers often make decisions on feedstuff use based on assumptions about their nutrient composition. Yet individual feedstuffs vary in nutrient levels for a variety of reasons. Some feed ingredients even have relatively wide ranges of possible nutrient levels. Additionally, some individual nutrients (minerals, in many cases) vary more than others within specific feedstuffs. The end result is that precisely meeting nutrient requirements of cattle is difficult, especially considering that individual animal variation also affects achieving this goal. But with historically expensive feed prices, many producers are trying harder than ever before to improve the precision of their nutritional programs.

Why Feedstuff Nutrient Information Varies

There are several possible causes for nutrient variation within individual feedstuffs. The raw material used to produce a particular feedstuff (for example, the soybean plant used to produce soybean hulls and soybean meal) can vary in chemical composition because of variations in plant genetics or environmental conditions during production. Harvest and storage conditions may further create differences in the chemical composition of the raw plant product and later the co-product feedstuff produced from it. Plant cultivars (varieties) and geographic production locations are two such notable sources of variation.

Differences in grain processing methods can also affect the chemical composition of feedstuffs for cattle. Alterations to processing methods can be subtle or dramatic and affect the chemical composition of the final products accordingly. Changes to the ethanol production process over time and the resulting changes to the chemical composition of dried distillers grains are a good example of how manufacturing adjustments affect the nutrient makeup of co-product feedstuffs. Recent research indicates that variability in chemical composition of distillers grains plus solubles differs from one ethanol plant to another. The variability in sulfur levels differs over time, with some days having little variation among feed samples and other days having larger variation. In addition, across manufacturing facilities, fat levels vary more so than crude protein levels.

There is sometimes confusion when feedstuffs have similar names. Corn gluten feed and corn gluten meal are very different feedstuffs but are sometimes mistaken for one another because of the similarities in their names. The multitude of corn distillers co-products are also sometimes not easily identifiable as unique feedstuffs. Take, for instance, the true case where a producer purchased what he was told to be dried distillers grains with solubles and assumed that he was receiving a product with approximately 10% fat on a dry matter basis. It turned out that the feedstuffs was a

related product from a modified manufacturing process that actually contained closer to 4% fat on a dry matter basis. The blunder was discovered only after the cattle fed the product did not perform as expected. Close monitoring of cattle performance can help identify the need to adjust diet formulations that are plagued by inaccurate nutrient information or highly variable nutrient levels in their component feedstuffs.

Feedstuff nutrient level estimates can also vary, not because of differences in the chemical composition of feedstuffs, but because of difference in feed nutrient analysis methods. Evidence of this is found in several reports showing considerable variation in analysis results among laboratories when testing feedstuff samples from common sources. Even within a laboratory, different nutrient analysis results can be produced using the same feedstuff sample. In other words, some laboratories perform chemical analyses with more repeatability and are more accurate in their analyses than others.

Feedstuff sampling is another potential source of variability in determining nutrient levels. If two samples from the same source collected in a different manner or are not representative of the feed source, then the analysis results may reflect this. This then provides biased information to the feed manufacturers, nutritionists, and producers who use this data.

Nutrient Variability Awareness and Management

The annual *Feedstuffs* reference issue contains ingredient analysis tables for common feed ingredients, commodity co-products, and unusual feedstuffs. It is available online at *www.feedstuffs.com*. This reference lists various nutrient levels for a wide range of ingredients. The introductory comments to the tables note that many values may not have been recently verified and that significant differences in nutrient composition exist due to regional location, manufacturing process, and climatic condition differences. The information presented is intended to be used as a guide, and users are encouraged to invest in proper nutrient analysis as needed prior to diet formulation.

Feedstuff nutrient composition tables are often included in computerized cattle nutrition software programs and reference materials. These tables typically report average nutrient composition for individual feedstuffs. However, the likely range of nutrient values and probability that a specific value will occur is also of importance when considering feedstuff inclusion rates in cattle diets. Variation in nutrient composition of cattle diets can be reduced by choosing feedstuffs that have low nutrient variability or including ones with high variability only at low rates in the diet.

Purchasing commodities from a single source and using suppliers that have good quality control systems is another way to lessen diet nutrient composition variation. The importance of quality control also applies to the selection of manufacturers of blended feeds such as feed mills. Changes in feedstuff availability or price may prompt feed suppliers to substitute ingredients in feed formulations. Be clear with these suppliers on ingredient and nutrient expectations, and insist on clear communication with regard to potential ingredient changes. Otherwise, surprising changes in cattle performance may happen if cattle are fed new diet formulations. For producers that committed to

achieving a weight gain target as part of a marketing arrangement, this can lead to fewer total dollars received for cattle.

Feedstuff storage management can increase uncertainty in feed nutrient composition if not managed properly. Storage of feedstuffs in bays or bins that previously housed other feedstuffs can result in unintended mixing of feedstuffs. This takes place when feed storage facilities are not first thoroughly cleaned out prior to storing new feedstuffs. Older feed supplies could also contaminate fresh supplies with stale feed and possibly even mycotoxins.

Feed supplies are better matched with cattle nutrient requirements when nutrient composition information on the feedstuffs being used improves. This should allow for more precise diet formulation, lower risk of overfeeding and incurring unnecessary feed costs, and less risk of underfeeding and missing cattle performance targets. Producers should seek to learn more about the feedstuffs they are using or are considering using, select feedstuffs considering nutrient variability, insist on good quality control measures from suppliers, and manage storage and feeding systems to reduce variation in diets supplied to cattle. Ultimately, producers should attentively monitor cattle performance to ensure that any needed diet adjustments are undertaken in a timely manner. For more information about beef cattle production, contact an office of the Mississippi State University Extension Service.