The dairy nutrition industry has come to rely on corn silage as a high-energy, relatively inexpensive feed. How well the cow digests that corn silage relates directly to feed efficiency.

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The dairy nutrition industry has come to rely on corn silage as a high-energy, relatively inexpensive feed that can easily be grown, harvested and ensiled. These many positive qualities have resulted in rations that call for more than half of the diet to be composed of corn silage.

The quality of what we feed cows is inevitably influenced how well they can digest the feed and, therefore, influence rumen microbial populations as well as the rate and degree of feedstuff breakdown.

Corn silage basis

If formulating rations utilizing highly indigestible corn silages, much of the feed will pass through the rumen and be turned to waste rather than being broken down in the rumen and turned into usable energy and essential nutrients.

It makes it especially important that producers feed high-quality silage hybrids with optimal digestibility rates.

The starting point when formulating rations based on corn silage digestibility is a forage analysis. Testing provides the necessary information to identify highly digestible corn silage hybrids. It also recognizes which forages contain high levels of lignin — the indigestible cellulose cows pass through as waste.

Nutrient-dense corn silage hybrids bring more to the table than just energy typically associated with diets formulated with conventional forages.

- **Softer kernels.** Softer kernels are more easily broken down by rumen microbes, improving rumen fermentation so cows more readily absorb key nutrients.
- **Lower lignin levels.** Lower lignin levels mean more digestible matter. Whether it’s more starch, protein or fiber, the rumen should be able to best utilize each pound of feed.
- **More digestible fiber.** Improved fiber digestibility results in more energy available for daily performance in the milking parlor, breeding pen and the feedbank. Hybrids from nutrient-dense traits are 3.5-6.0% higher in net energy for lactation than conventional corn silage hybrids, improving efficiencies and reducing the amount of expensive grain needed to achieve the same production levels.

A 2007 University of Missouri study (Sampson and Spain) confirmed just how well cows utilize nutrient-dense corn silage hybrids.

In the study, researchers divided 63 cows into one of two groups. The control group was fed conventional corn silage hybrids, while the experimental group was fed silage hybrids with NutriDense traits. Results showed that cows in the experimental group produced the same amount of milk while eating 2 lb. less dry matter, resulting in a 6% improvement in feed efficiency.

Another study at the University of Kentucky (Akay and Jackson, 2001) found that corn silage hybrids with NutriDense traits, 3.5% fat-corrected milk production jumped 8 lb. per cow, while remaining similar to the control group. Feed efficiency also improved significantly, moving from 1.38 lb. to 1.43 lb.

Rumen bugs reign supreme

The ration a nutritionist recommends to a producer-client is at the mercy of rumen microbes, which are ultimately responsible for the breakdown and digestion of nutrients.

When fed properly, rumen microbes have the ability to break down more feed, releasing more energy for use by the cow and, thus, improving feed efficiency.

In high-corn silage and corn diets, nutritionists typically walk a fine line between supplying a higher-quality feedstuff and not meeting the cow’s energy requirements.

When energy levels rise above recommended levels by using corn grain, the rumen pH drops, lowering dry matter intake and resulting in rumen acidosis. Silage hybrids with NutriDense traits provided the necessary balance of corn grain and digestible fiber to reduce overfeeding energy and promote rumen health.

In the University of Missouri study, research also measured the amount of volatile fatty acids (VFAs) in the rumen. VFAs are produced by rumen microbes during digestion and are a good measure of ration digestibility.

Results of the study demonstrated that cows fed high-quality corn silage hybrids produced 13% more VFAs, showing an improvement in digestibility while ensuring a healthy rumen environment.

Other ration considerations

There are other nutritional factors that influence how well cows respond to a ration and the diet. Protein, carbohydrates, fat and starch all play a key role in how well cows respond, making their job one of the most important on the dairy.

Here are a few other recommendations for maximizing efficiency.

- **Net energy of lactation.** Beyond fiber, testing for net energy for lactation can influence how well cows respond, making their job one of the most important on the dairy.
- **Dairy matter.** Moisture is necessary for dairy matter intake. As dairy matter increases, palatability and intake drop, which can lead to lowered milk and component production as well as rumen health disorders.

For corn silage, moisture should be between 60% and 70% in order to maximize rumen fermentation, microbial growth and feed efficiency.

- **Ash levels.** Especially after this summer’s weather patterns, the amount of ash in forages may vary greatly. In areas that were flooded, ash may have gathered on the stalks as they were harvested. Ash is indigestible, so even an increase of a few points in ash can lower the digestibility of the diet.

As the business of dairy nutrition continues to connect past ration ideals with today’s present options, nutritionists can recommend a ration that will optimize production levels and maximize efficiencies.

Research continues to identify the positive role silage hybrids with NutriDense traits play in the diet to maximize performance and maintain rumen health, resulting in additional producer profitability even in the midst of rising input costs.

References
