

Making the Best of Silage from Immature Corn

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The 2014 corn crop was, to quote Yogi Berra, “Déjà vu all over again.” The season started slowly in many regions with persistent rain that prevented timely planting. Once producers finally finished planting the crop, the cold, wet summer failed to supply the growing degree days needed to maximize growth. Then, just as harvest started, rain fell which further delayed harvesting and silage chopping. Meteorological data shows 2014 was similar to 2009. Déjà vu indeed! So what did we learn in 2009-2010 to apply today?

Feeding Immature Corn Plants

Bill Mahanna, nutritional sciences manager at DuPont Pioneer, has said “Immature corn silage is a unique feed. While yield has been compromised at the field, the overall energy content is similar (not same) to more mature corn silage with kernels containing normal starch fill. Poor starch fill (and grain yield) can cause photosynthetic energy to remain as sugar in the stover and leaves, thus diluting fiber content, but not yielding the expected net energy associated with normal grain yields.”

The important nutritional distinction lies in how the nutrients are partitioned (stover sugars and more digestible fiber vs. kernel starch) in the plant and what feed sources nutritionists use to complement this unique mix of sugars/starch/fiber in the ration.

The decline in energy in slightly immature corn is not as great as one might expect. This is because the stover cell wall fraction (ADF, NDF) is more available due to reduced complexity of the bonding within the cell-wall carbohydrate complex, in cells that have not yet senesced. Another offsetting factor to early harvest, even considering the reduced starch fill, is that kernels in this higher moisture crop are more likely to be broken from the mechanical action of chopping for easier rumen microbial access.

Unfortunately, the environment can further complicate the issue as it did in 2009. The increased fiber availability expected from immature stover was somewhat offset by the cool growing season experienced by the corn plant. The ADF in crops grown in different weather or season are not of equal value because of differences in lignin to fiber ratio that change with environmental temperatures and plant stress. For example, wet and cold conditions cause greater NDF lignification (up to 16%) and reduction in NDF digestibility (up to 20%) in corn silage, yet reported levels of ADF and NDF are not much different from normal.

Feeding Strategies that Seemed to Help in 2009-10

Query Midwestern dairyman about the 2009-10 winter and they will likely share observations about cows down 10-20% in milk and yet dry matter intakes were near normal despite higher fiber levels in alfalfa and corn silage. Manure was firm and cows lost body condition. Extension personnel and nutritional consultants had some success by employing some the following strategies:

- Providing energy in a low non-structural carbohydrate (NSC) form helps. This will help offset acidosis potential from rapidly available NSC in immature corn silage by substitution of 5-7 lbs of soy hulls, beet pulp, corn gluten feed, or hominy for low quality forages.
- Coarse grinding high-moisture corn or adding dry grain in herds feeding very wet high-moisture corn and immature corn silage, in an attempt to slow the rate of rumen starch availability.
- Shifting some of the protein to more degradable sources such as soybean meal, urea, or raw soybeans in order to supply rumen bacterial populations with adequate levels of soluble and degradable protein to offset lower levels in overly mature legumes/grasses.
- Adding 1-1.5 lbs of supplemental fat. However, make sure the total ration does not have excessive levels of fat.
- Adding barley, food grade starch, and/or reducing grain particle size by extensive processing in low corn silage and high grain (light test weight, not excessively wet) rations, in an attempt to increase ruminally available NSC.
- Adding 4-5 lbs of high-quality hay to the ration. Wet corn silage will sink in the rumen faster, reducing the mat of forage necessary to digest forage efficiently. Adding less than 3” of chopped dry hay will help to ‘float’ the corn silage in the rumen. High quality hay will also provide necessary nutrition which straw cannot deliver.
- Alternatively, you may want to consider use of a propionic acid-based silage preservative at harvest to quickly lower pH and allow epiphytic bacteria to flourish. And you should consider adding a preservative containing both mold inhibitors and antioxidants into your mixer wagon to control heating at the feed bunk.