Corn Silage BMP's: Proper Ensiling Improves Quality & Production

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High-quality forages are a critical part of a dairy diet and directly impact milk production and feeding efficiency. To ensure high quality forage, proper preparation and storage are pertinent. When harvested and ensiled properly, dry matter loss is reduced while retaining nutritional value and palatability.

Once corn silage is chopped and packed, bacteria use the natural sugars and starches to initiate the fermentation process converting some of those sugars and starches into a number of different acids that preserve the organic matter. Lactic acid is the strongest and most abundant acid produced during an ideal fermentation. Lactic acid at a level of 6-8% of the total dry matter is optimum. The more lactic acid produced during an efficient fermentation the more palatable and digestible the corn silage becomes.

Acetic acid is also present in silage but at lower levels than lactic acid. Acetic acid levels of greater than 3% of the total dry matter indicates a slower, less efficient fermentation. You may notice the familiar smell of vinegar in the silage when acetic levels are too high. The presence of higher levels of acetic acid in corn silage indicates lost dry matter due to excessive respiration and the formation of other volatile end products, such as alcohol.

The most critical factor affecting silage quality is the moisture level at harvest. Trials have repeatedly shown that the moisture level at the time of harvest has the greatest influence on fermentation and dry matter recovery. Corn silage tends to ferment more efficiently when dry matter ranges from 28-34%. Silage that is wetter than 26% tends to produce higher levels of acetic acid relative to the lactic acid levels. Corn silage that is dryer than 36% shows a drop in lactic acid levels indicating a less efficient fermentation.

The rate at which silages are packed can impact silage quality. Whether you are putting the silage in a silo, bunker, pile or bag, silage should be packed as quickly as possible. It is imperative that the air is squeezed out of the feed quickly so that the pile will stop heating. It takes air to create heat. Excessive heat in a pile of silage will alter the proteins in the feed. Because lactic acid fermentation is an anaerobic process, the faster the air is removed the sooner fermentation will begin. A well-packed corn silage should have a density of 45-50 lbs/ft³ in the pile. A good rule of thumb when packing silage is to provide 800 lbs of weight for every ton of forage delivered per hour. Therefore, if you can harvest 100 tons/hour you need 80,000 lbs of packing weight on the silage 100% of the time the feed is being delivered.

When proper packing is finished the forage must be covered as soon as possible. A proper seal plays two important roles in bunker silos: it provides an anaerobic environment on the top of the pile for lactic acid producing bacteria, and a proper covering protects the forage from weather. Weighing down the plastic is critical. If the plastic is not kept tight to the silage, it can act as a bellow, drawing air into the silo. Covering properly will return 6-10 times the cost of plastic and labor handling it.

Finally, serious consideration should be given to applying a high quality microbial inoculant on your silage to aid in the fermentation and preservation of the silage dry matter. Studies conducted at the U.S. Dairy Forage Research Center in Madison, WI, have indicated a 3-5% improvement in milk production when cows were fed inoculated silages vs. the controlled sample. Inoculants can also improve palatability and the digestibility of starch and fiber.

By the time a corn crop is ready for harvest dairy producers have a sizable investment in their corn crop. Even though they are faced with multiple challenges when it comes to harvesting and storing corn silage, it is still worthwhile to incorporate Best Management Practices when ensiling.