Opportunities to Reduce Shrink in Silage Piles

Eugene Rodberg, Product Manager, Kemin Industries

Dairy producers understand that shrink (dry matter loss) in silage costs money. For example, if corn silage has a market value of $60-70 per as-fed ton, then every 1% increase in dry matter loss raises the price of the corn silage by $0.65 per as-fed ton. It may not sound like much; but, for example, a high-producing dairy cow consuming 50 lbs of corn silage per day at $65 per ton, typical dry matter loss of 20% increases feed cost per day by $0.325. For 1,000 cows, it is an extra $325 per day or $118,625 per year. Can you afford shrink?

Eugene Rodberg
Product Manager, Kemin Industries

Shrink can never be eliminated, but a certain portion can be reduced through various management practices. There are four types of dry matter loss:

Fermentation: Fermentation loss is a normal part of silage production and consumes 2-5% of silage dry matter depending on the sugar content of the forage being ensiled.

Leaching: Leaching loss is common when forages contain excessive moisture before the forage is ensiled. Leachate may also originate from the loss of plant cell contents (the liquid portion of the plant) including sugars, pectins, and proteins. Leaching losses can be 1-3% of silage dry matter.

Spoilage: Spoilage loss occurs when oxygen penetrates plastic covers, sidewalls, or seams for a prolonged period. The penetration of oxygen into the silage pack allows for mold growth which impacts animal performance. This accounts for 1-3% of silage dry matter loss.

Feed-out: Feed-out loss is associated with growth of yeasts and molds. When exposed to oxygen and temperatures above 60˚F, yeasts and molds grow rapidly in the silage, doubling in less than one hour. This rapid growth strips the forage of valuable starch and protein while causing silage to heat. USDA[1] estimates feed-out losses are equal to the combined losses from fermentation, leaching, and spoilage. Feed-out loss can represent 5-11% of silage dry matter.

What Can be Done to Combat These Losses?

First, promote good fermentation. Proper fermentation rapidly reduces pH, which slows or stops the growth of most microbes. These microbes can cause abnormal fermentation and later contribute to greater spoilage during feed-out.

Promoting good fermentation involves:

- Harvesting at proper whole-plant moisture, which is 60-70% for corn silage stored in bunker/piles.
- Rapid filling and packing to adequate density, with a target of 15-17 lbs/ft^3.
- Excluding oxygen through the use of sealing with sufficient plastic and tires.

Second, manage feed-out to limit oxygen penetration and minimize heat accumulation. The recommendation for minimum removal during feed-out is six inches during cool weather and 12 inches during warm weather.

Losses from harvest through feed-out can be further reduced by the judicious use of forage preservatives. Blended buffered acid products applied at harvest rapidly reduce pH and directly inhibit the growth and survival of yeasts and molds[2]. Acid blends work on a wide range of mold and yeasts; therefore, they offer better control than straight propionic acid. On the other hand, silage inoculants enhance fermentation during longer storage periods, normally greater than 60 days.

Proper forage management also requires the removal of spoiled or discolored silage. Typically, spoilage occurs in the top 12 inches or along the side of the silage pile. However, spoilage pockets can develop anywhere in the silage bunker. Train employees to recognize off-color silage and the proper safety associated with removing spoilage.

Taking simple steps with silage can ensure proper nutrient management. To enhance your forage preservation options, turn to trusted experts to provide products and services to improve the nutritional value and integrity of your feed. The unique growing conditions of 2013 have made forages more valuable than ever before. Proper silage management will reap dividends for your operation.

Keep in mind these simple steps:

1. Harvest at the optimum maturity and moisture (60-70%).
2. Utilize a quality, well researched silage additive.
3. Pack with the correct weight to exceed density requirements of >17 lbs/ft^3.
4. Seal with two layers of black plastic and plenty of weight to secure it.
5. Pitch any spoilage to protect ration integrity.
6. Feed off with the correct method and rates (12”/day).

References: [1]Muck, R.E. and B.J. Holmes. 2004. Bag silo densities and losses. ASAE Paper No. 041141, Amer. Soc. Agric. Engineers, St. Joseph, MI.; [2]Pelhate, J. 1973. Stabilisation de la mycoflore de maïs-grains Humides ensilés. Ann. Tech. Agric. 22:647-661.