

# Tips for Harvesting and Storing High Quality Corn Silage

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Corn silage forms the backbone of many winter and year-round feeding programs for dairy cows and heifers. With today's dairy economic situation of tight to non-existent profit margins, corn silage is an excellent source of energy that can reduce the costs of providing energy (starches) in the dairy cow's diet while also serving as a digestible fiber source. Paying attention to a few details while harvesting and storing corn silage can help ensure that a high quality feed is preserved. These details are outlined below.

- **Spend time getting equipment ready before harvest-** General maintenance, such as greasing equipment and sharpening knives, needs to be done well in advance of anticipated chopping date. Advanced planning is important for timely harvest at the proper moisture content.
- **When should I start harvesting** - Harvesting at the correct moisture promotes favorable fermentation in the silage crop and decreases storage losses. Thus, the moisture content of the chopped plant should be the determining factor for when to harvest. For bunkers, silage should contain between 32 to 38% dry matter (62 to 68% moisture). Upright silos and bags can be a little drier at 35 to 38% dry matter (60 to 62% moisture). Silage that is put up too wet results in a butyric acid type fermentation which decreases feed intake and can result in ketosis in early lactation cows. Silage that is too dry will have more and larger air pockets which results in a poorer fermentation and less beneficial acids for cows to use to make milk and meat.

The moisture content of fresh corn plants can be determined by chopping a small amount and using a microwave or Koster tester to determine moisture content. A small digital scale that measures to the tenth of a gram helps obtain more accurate results. Agronomists generally estimate that the corn plant dries down 0.5 to 1.0% per day. To estimate the percent dry matter, you can use the grab test. Squeeze a handful of chopped material as tightly as possible for 90 seconds. Release your grip and if the ball of material expands slowly and no dampness appears on your hand, the material contains 30 to 40% dry matter. However, this method only allows a general estimation of the moisture content of the chopped silage.

During "normal" growing conditions, corn is harvested approximately 40 to 45 days after tasseling. In the past, the appearance of brown leaves was used as a factor in determining the optimum harvest window. With today's corn genetics, corn plants stay green longer and this target is not an appropriate benchmark.

Moisture content is related to the stage of maturity of the corn grain. Corn is harvested for silage at a  $\frac{1}{2}$  to  $\frac{3}{4}$  milk line. However, weather and growing conditions can change

the optimum stage of maturity for harvest. An experiment showed that the stage of maturity of the corn plant only correctly predicted harvest moisture content 68 to 85% of the time. Thus, the strong recommendation is to actually measure the moisture or dry matter content of representative chopped corn plants.

- **Correct length of chop:** Silage needs to be chopped fine enough for good packing to quickly eliminate oxygen and to establish a good fermentation process. At the same time, the chop length needs to be long enough to promote cud chewing. Thus, the recommended theoretic length of chop (TLC) is a compromise between these two factors. Alfalfa haylage or silage should be chopped at 3/16 inch, unprocessed corn silage at 3/8 to 1/2 inch, and processed (kernel processor) corn silage at 3/4 inch.
- **Adjusting silage choppers with on-line kernel processors-** The optimum moisture content of silage harvested with a chopper containing a kernel processor is 62 to 65% (35 to 38% dry matter) to capture additional starch accumulation in the corn kernels. Most nutritionists want to see the most of the corn kernels pulverized to a similar size. To optimize starch digestion and provide adequate effective fiber, the recommendation is to cut to 3/4 inch theoretical length with an initial roller clearance of 1 to 2 mm. If kernel breakage is not adequate, the roller clearance should be decreased. To test whether adequate kernel damage is occurring, collect a silage sample from several loads in a 32 ounce cup. Pick out and count the number of whole and half kernels. If the number of whole or half kernels exceeds 2 or 3, improve kernel damage by adjusting the roller clearance. Essentially, the goal is to have between 55 to 64 percent of the kernels damaged.
- **Keep knives sharp and properly adjusted throughout the filling process:** Sharp knives prevent the shredding of silage, resulting in a more uniform chop. This allows for maximum forage compaction, good fermentation, and sufficient particle size to prevent health problems in the cow.
- **Fill silos rapidly:** Silos should be filled quickly to help eliminate air from the feed. Silos should be filled within a week to prevent dark brown and black bands within the silo. Silage bags should be placed in an area that can be protected from damage by birds, rodents, and other wildlife. Bunkers should be filled from the back to the front by adding forage on a wedge and not from the bottom to the top in layers.
- **Pack, pack, and pack some more:** Tightly-packed silage ferments more quickly and contains fewer yeasts and molds than loosely packed silage. Packing silage helps decrease the size of oxygen pockets resulting in fermentation end products the cow can use better to make milk. For a bunker, the statement that when you think you are done packing, you should pack that much more is definitely true. For silage stored in a bag, it is important to monitor the diameter of the bag to achieve the proper packing density.
- **Cover silos immediately after filling:** Bunkers or piles of silage need to be covered with 6 mil plastic tarps and weighted with tires (*tires should touch each other*) or sand bags immediately after filling. The sides of bunkers



also should be lined with plastic. Upright silos should be leveled and capped with a silo cap immediately after completion of filling. Uncovered silos lose a tremendous amount of feed and feed nutrients.

- **Let silage ferment 3 to 4 weeks before feeding (if possible):** Unfermented feed is higher in fermentable sugars and can cause cows to go off-feed. Gradually transitioning cows over 7 to 10 days to newly-fermented silage is recommended, if possible, or use dry hay to buffer cows through the transition.
- **Is silage done fermenting 3 weeks after harvest?** Maximum starch digestibility may not be achieved until 6 months after ensiling. Does this mean we do not feed newly harvested corn silage in the fall? No, but these data may explain why your cows milk better on silage around the first of the year.