

The microwave method to determine corn silage moisture on the farm



by Dan Loy, Erika Lundy and Hugo Ramirez

Often the only difference between making good silage or poor silage is the moisture content at the time of ensiling. Optimum fermentation of both silage and haylage depends largely on moisture content. Once a decision has been made to harvest the immature corn crop as silage, it is easy to become too anxious. As with normal silage, the proper stage for chopping is 60 to 65 percent moisture.

Shown here is a method that will serve as a quick, on-farm moisture tester guide for your hay and silages. Of note, using this method for estimating moisture content of already ensiled silage may produce undesirable odors in the kitchen. Drying fresh-cut forage is often more tolerable.

Sampling standing corn

Important to any forage moisture test or feed analysis is getting a representative sample. Sampling standing corn presents a challenge because plants in different parts of the field may be drying at different rates and only a small sample is used in a moisture check. The most accurate estimate would be to actually field-chop a partial load of corn forage from an area or areas representative of the field. A few small grab samples from different parts of the chopped load best represent what will be ensiled. A frequently used method (but less representative) is to hand-chop a few corn plants. If this is the method you choose, sample standing corn by selecting two or three representative corn plants and cut at the height where it will be chopped by the forage harvester. Cut the plants finely with scissors or garden shears. A wood chipper works best! Then thoroughly mix the chopped forage before taking a grab sample.

What you will need:

- 1 - Microwave oven
- 2 - Kitchen scales (diet type) 16 ounce or 500 gram (a gram scale is best)
- 3 - Large microwaveable container
- 4 - Microwaveable glass
- 5 - Garden shears or wood chipper



1 Obtain three samples.



2 Chop the sample into thumbnail-size pieces until you have 100 grams (including the container). If your scales read in 1/10 ounces, chop until you have 10 ounces in the container.



3 Spread the chopped forage as much as possible throughout the container.

4 Put an 8-ounce glass three-quarters full of water in the back corner of the microwave oven. If you reset the oven, make sure the glass is three-quarters full of water.

5 Place the container of forage chopped for silage (estimated moisture 50 to 75 percent) in the microwave and set at 80 to 90 percent power for five minutes or place the container of forage harvested (estimated moisture 5 to 35 percent) in the oven and set at 100 percent power for two minutes. If the forage feels dry, weigh the container of material and record weight. If in doubt about the dryness, rotate the plate and set the timer for half a minute and weigh again at the end. Weight shouldn't change if the sample is dry.



7

Example:

Wet weight = 60 grams
Dry weight = 20 grams

Calculate: percent moisture
 $(\text{wet weight} - \text{dry weight}) / \text{wet weight}$
 $(60 - 20) / 60 = .66$ or 66% moisture

Calculate: percent dry matter
 $100\% - \text{percent moisture}$
 $100\% - 66\% = 34\%$ dry matter

6 You may continue drying in half-minute time settings as long as the glass of water is kept three-quarters full. If the forage chars, use the weight previous to the burning.

Caution: After the final weighing, allow the hot, dried forage to cool in the open air before discarding to avoid trash can fires.



Dan Loy and Erika Lundy are extension beef specialists and Hugo Ramirez is an extension dairy specialist with Iowa State University. Dan can be reached at dloy@iastate.edu. All photos by Erika Lundy.