



Measuring the Dry Matter Content of Feeds

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Adjust rations for the dry matter (DM) content of each feed, especially when wet feeds, such as silage, are fed. Small changes in the DM content will change the nutrient profile of the ration. For example, a ration that was formulated to provide 25 pounds DM per cow corn silage is mixed for a group of 100 cows. If the corn silage contains 35 percent DM, weigh 7,140 pounds into the mixer wagon. However, if the DM content were actually 32 percent and the same amount of corn silage was fed, the ration would provide 2.2 pounds DM per cow less from corn silage. If no change were made in the amount of feed offered to the cows, milk yield would decrease by 3.6 pounds per cow. This small change in the amount of corn silage fed increases the proportion of concentrate in the diet and could result in cows going off feed because of subclinical acidosis. The potential results of not monitoring the DM content of wet feeds and adjusting rations accordingly are a combination of problems including decreased animal performance and feed efficiency and increased health problems and feed cost.

Fortunately, the DM content of individual feeds can be measured easily on the farm. The two most commonly used methods for measuring DM on farm involve using either a Koster Crop Tester or a microwave oven. Either method can work well, but both are subject to error because of the small sample size, mistakes in weighing, or loss of sample during handling. Because of the potential for error, run multiple samples to verify the results. Commercial laboratories typically run two or three samples for analysis for this reason. The Koster Crop Tester can be purchased with a scale, but you may want to buy a set of digital scales that are more accurate and easier to read. The specifics for determining the DM content of feeds for each method is outlined as follows.

Koster Crop Tester* Method

1. Weigh approximately 100 grams of sample into the tester container.
2. Place the sample and container on Koster Crop Tester and dry for approximately 20 minutes. If samples are extremely wet, an initial drying time of 30 minutes is recommended.
3. Weigh the sample and container, record the weight, and dry the sample and container for an additional 5 minutes.
4. Continue to dry and weigh in 5-minute intervals until there is no change in the scale reading from the previous reading.
5. Calculate the DM content.



**Manufactured by Koster Crop Tester, Inc.,
Medina, Ohio 44256.*

Microwave Oven Method

1. Weigh approximately 100 grams of sample onto a paper plate or container that is microwave safe. Spread the sample evenly over the plate.
2. Place a small cup of water in the microwave to prevent excessive heating of the sample during drying.
3. Dry wet feeds at the highest setting for 4 minutes. Drier feeds, such as hay, are dried initially for 3 minutes at a medium setting.
4. Weigh and record the weight, gently stir the sample and place it back in the microwave for 1 minute at a medium setting.
5. Continue to dry and weigh in 1-minute intervals until there is no change in the scale reading from the previous reading.
6. Calculate the DM content.

Calculating DM Content

The difference in the initial sample weight and the final dry weight of the sample represents the amount of water in the sample. The DM content is 100 less the proportion of water. A simple formula for calculating DM is:

$$\%DM = 100 - [(original\ weight - dry\ weight) \div original\ weight] \times 100$$

Remember to adjust all weights for the initial weight of the empty container. Some digital scales allow the user to tare the empty weight of the container or plate so the actual sample weights are displayed. If your scale does not have this function, simply subtract the container or plate weight from the weights before completing the calculations.

Common Problems and Sources of Errors

Several potential problems or errors can occur. Most are common mistakes, which is the reason for running multiple samples. If you realize that a mistake has been made, start another sample rather than continue with the one you are working with. Some common problems are:

- Some sample is lost during the drying process, i.e., some sample spilled during stirring, breeze (air conditioner or wind) blows some sample away, etc.
- Larger samples may not get completely dried if not stirred between weighing.
- Failure to dry sample completely.
- Sample is dried too long and gets scorched or burnt.
- Using non-microwavable container resulting in a big mess.
- No water in the microwave and sample burns.
- Scales were not zeroed.
- Failure to subtract container or plate weight.

Converting DM to As Fed

Once the DM content of the feed has been determined, adjust the amount of that ingredient included in the ration. To convert from pound DM to pound As Fed (AF), divide by the percent DM. For example a ration includes 25 pounds DM per cow from corn silage and the corn silage contains 35 percent DM. Then, 71.4 pounds (25 lbs. DM per cow \div 0.35 = 71.4 lbs. AF per cow) of corn silage will be fed.

Summary

Measuring the DM content of feeds and adjusting rations routinely will help maintain a more consistent diet. The DM content is easily measured on farm using either a Koster Crop Tester or a microwave oven.