

Foraging Around



By Dr. John E. Baylor
 Director of Market Development
 Beachley-Hardy Seed Company

storage. Hay harvested and stored at too high a moisture content will result in spoilage and possible spontaneous combustion. And, an accurate measure of moisture is essential for the proper use of chemical hay preservatives. Harvesting and handling hay when it is too dry results in excessive leaf loss and reduced feeding value in addition to the dry matter loss.

And, of course, harvesting forage for silage at too high or too low a moisture content results in improper fermentation which reduces feeding value.

Today, moisture testing devices are becoming a much more common tool used by forage producers. Moisture testers on the market are of two general types; those utilizing heat, and those utilizing electricity. Each has advantages and disadvantages.

Forced heated-air drying units such as the Koster Crop Tester are

accurate and easy to use. Wet forage or feeds are weighed, dried, and reweighed, and the moisture content either read directly from the scale or calculated. Disadvantages — the time to complete the test and the need for a power source to run the unit.

Electronic moisture testers, on the other hand, are fast. They can be taken directly to the field or feeding area and they're easy to handle. But they're generally expensive and are not as accurate as the forced heated-air units. Some units are totally unsatisfactory. Units that maintain uniform pressure or compaction on the forage are desirable. And units with probes require careful management and use compared to units with a chamber and pressure device.

Using Your Microwave Oven

You can also use your microwave oven to determine the moisture content in forages. And, authorities agree, it provides an accuracy close to that obtained by accepted research methods. Researchers in several states and in Canada have developed procedures for using your microwave oven to determine moisture. I've chosen to report a procedure outlined by a group of researchers in Animal Science and Agronomy at Purdue University.

All that is needed, these workers say, is a small scale, paper plate and a microwave oven. The accuracy of the results is dependent upon the quality of scales used. A \$25 diet scale, measuring in grams, will give reasonably good results, but an \$80 to \$100 balance scale weighing to 1/10 of a gram is preferred.

The moisture determination procedure as reported by the Purdue workers is as follows:

1. Place a preweighed large paper plate (9 inch minimum) on the scale and weigh out exactly 100 grams of the forage prepared as outlined in the following section. A smaller sample can be used but the 100 grams makes for easier calculations.

2. Spread the forage evenly on the paper plate.

3. Place an 8-ounce water glass, three-quarters full of water, in the back corner of the microwave oven; keep water level constant during oven use. This will protect the oven magnetron when sample moisture is low. The setting of adjustable microwave ovens should be 80 to 90 percent of maximum power.

4. Samples of wet legumes and/or grasses in the 50 to 70 percent moisture range should be dried initially for eight minutes. Then weigh and record sample weight. Replace in the oven for another minute, remove and weigh. If the weight has not changed more than one gram, use this value. If the change is greater than one gram, continue drying additional one-minute segments until the weight changes less than one gram. For greater accuracy, continue drying until the weight change is less than 0.5 gram per minute.

For forage with a moisture content of 25 to 30 percent, an initial drying time of four minutes should be used. Then weigh the samples following the same procedure as for the wet forage above using one minute drying intervals until the weight change is less than one gram. If greater accuracy is desired, for example in ration formulation, continue the one-minute drying intervals until the weight change is less than 0.5 gram.

5. Be careful not to char or burn the sample. If this occurs, it means the oven was set too high, the drying time was too long, or the 3/4 glass of water in rear of microwave oven was omitted. Discard the charred sample and repeat the test.

6. Use the following equation to calculate the moisture content. Keep in mind, since the wet weight and dry weight include the weight of the paper plate (unless scale can be tared to 0 with paper plate on scale), the weight of the paper plate must be subtracted from the wet and dry weight before making the following calculations.

$$\% \text{ moisture} = \frac{\text{wet weight} - \text{dry weight}}{\text{wet weight}} \times 100$$

If you have a scale which permits you to tare the paper plate (adjust the scale to 0 with the paper plate on the scale), the percent moisture can be calculated simply by subtracting the final sample (dry) weight in grams from 100 grams (the original wet weight). The final dry weight is the dry matter content of the sample.

But, remember the results are no better than the sample. So be sure to use a good sampling technique to assure a representative sample if you expect to obtain an accurate moisture reading.

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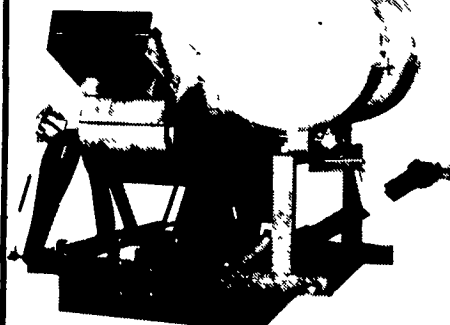


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