Microwave oven test

This method will provide a reasonably quick (5–30mins.) measurement of DM, depending on how wet the sample is. Experience in using the oven for this purpose will soon reduce drying times to the minimum required.

The final result should be accurate to within 1% – 3% percentage units but is less accurate for very dry samples, i.e. above about 80% DM such as baled hay. Required is a microwave oven with at least 500 watts, suitable microwave proof container (preferably flat), scales that will measure accurately to at least the nearest gram, glass and supply of cold water and a calculator.

Method to test for sample moisture

1. Collect the representative sample of material.
2. Mix and sub-sampling if excess is collected.
3. Cut the forage into lengths of 1- 3 cm, the shorter the better for more accuracy.
4. Tare the container or record its empty weight if a tare option is not available.
5. Place a glass of water in the back corner of the microwave oven. This helps to reduce the odour produced and minimises the possibility of the sample catching fire in the later stages of drying. If the sample is reasonably wet (<25% DM), then the glass of water may be left out for the first drying down phase.
6. Weigh 100 - 500 grams of material. Record this as the **initial wet weight**. The arithmetic is greatly simplified if exactly 100 g is weighed out.
7. Place the sample in the oven and dry for several minutes. For a wet sample (wilting material which is still green and obviously containing a lot of moisture, <25% DM), use full (high) power for 3 to 5 min. intervals initially. This period will be affected by chop length, sample size and initial DM content. Total drying period may be 8 – 12 mins or longer until experience in the method is gained.
8. After the initial drying, reweigh the sample and record the weight to the nearest gram. Turn and fluff up the sample and replace and reheat for a shorter time on a lower power setting. Replace the water when it becomes hot.

9. When the difference in recorded weights are becoming much smaller, dry for 20 - 30 second periods. Change water.
10. When the sample weights do not alter after a couple of drying periods, it should be 100% dry (within 1 – 3%). This is the **final dry weight.** If the sample chars or burns, use the previous weight. Don't forget to allow for the plate weight if the scales were not tared originally.

Calculation of dry matter content

Use the following formula to calculate the % dry matter:

Final Dry Weight (g) / Initial Wet Weight (g) x 100 = … % Dry Matter

Source: Victorian Department of Primary Industries