



1. PURPOSE

The purpose of this standard operating procedure (SOP) is to determine the DM% of herbage using the 60°C oven.

Dry matter is usually expressed as a %, and is the quantity of sample remaining once all the moisture has been removed by drying. DM% is dependent on a variety of factors, including species, stage of maturity, ploidy, season and weather conditions.

Accurate determination of DM% is critical for balancing the diets of ruminants and analytical results are reported on DM basis to allow meaningful comparisons of feeds.

For the majority of forages, it is necessary to partially dry them prior to fine grinding. Subsequent analysis is dependent on both the chemical and physical composition of a sample. However, it is important to be cognisant that drying can cause thermo-chemical degradation of the sample, which destroys or modify some plant components, such as amino acids. A balance needs to be found between drying the sample for subsequent analysis and maintaining sample integrity.

Before sampling it is crucial to determine the drying method (eg oven or freeze drying) and procedure (temperature and time) for each sample, as these will affect the sample composition.

The objectives of drying samples at 60°C is to remove moisture (to allow for DM% determination and/or fine grinding) from the sample, but having minimal impact on DM% content, chemical composition and feed value.

2. SCOPE

- This SOP is applicable to fresh herbage only.
- This SOP is applicable to all personnel determining the DM% of herbage samples using the 60°C oven.

3. DEFINITIONS/ABBREVIATIONS

- SOP - Standard Operating Procedure.
- DM- Dry Matter
- Wt- weight
- %- Percentage

4. EQUIPMENT AND MATERIALS

Equipment

- Top loading Balance

- Trays –Mesh bottom steel trays
- 60° C drying oven
- 4° C Cold Room and cold room label
- Plastic bag to put sample into
- Marker/Pen to label the plastic bag
- Pre-printed tickets (located in the ‘Ticket Folder’ within the Grassland Laboratory oven room). Please note each ticket include the trial code, unique sample number and oven temperature (See Figure 2 below);

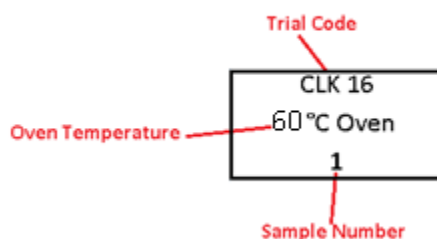


Figure 2: Sample ticket

Materials

- Herbage sample

5. PROCEDURE

- Take a well-mixed, sub sample (300g) from a representative area of the paddock, and place in a clearly labelled bag [Refer to the relevant field sampling SOP's for greater detail regarding taking of individual samples].
- In the laboratory, no more than 1 hour after cutting, weigh 100g of this sample onto a balance, which has been previously tarred to zero with a steel tray.
- Ensure each tray is labelled with the pre-printed tickets detailing the trial code, sample number, oven temperature.
- Disposed of the unused sample laboratory moiety in the dungstead [Refer to the relevant laboratory waste SOP for greater detail].
- The samples are stored in the 4°C Cold Room (with a cold room label detailing the Trial Code and Oven Temperature) until they are ready to enter the oven.
- Samples dried for a minimum of **48 hours at 60°C**.
- Remove from oven using the necessary PPE and allow air to equilibrate for 15mins.
- Weigh the sample and record into appropriate database.
- Retain the sample for further preparation and analysis.
- Ensure the sample is neatly, placed within the tray. Poorly stored samples (See figure 2 below) are likely to fall from the steel tray, and therefore affecting DM% results.



Figure 2: Poorly weighed/stored samples

Expression of 60°C Oven Sample Results:

DM results are usually expressed as a %. DM is the quantity of sample remaining once all the moisture has been removed by drying.

$$\text{DM\%} = \frac{\text{Wt. of fresh sample (kg)} - \text{Wt. of dried sample (kg)}}{\text{Wt. of fresh sample}} * 100$$

$$\text{DM\%} * 10 = \text{gDM/kg grass}$$

6. RESPONSIBILITY

- It is the responsibility of all personnel to assure that this SOP is performed as described
- It is the responsibility of the research officer to ensure appropriate training and instruction is given before this SOP is undertaken.
- It is the responsibility of all personnel to report any problems that may occur while performing this procedure to their supervisor.

7. ENVIRONMENTAL HEALTH AND SAFETY:

- Exert caution when using the oven.
- Please refer to Teagasc Laboratory Safety Manual for additional information.



- Please refer to Teagasc Bio-Safety Manual for additional information.

8. ASSOCIATED RISKS

- Burns
- Slip/trip/fall
- Electric shock

9. RECOMMENDED PPE

- Heat resistant gloves
- Laboratory coat
- Gloves

10. HELPFUL LINKS AND PHONE NUMBERS

- Grassland Laboratory Manager: Michelle Liddane: michelle.liddane@teagasc.ie
- [SOP_GL_3_Lab_waste_Grassland_Laboratory.doc](#)
- [SOP_GL_6_Weighing_Scales_in_Field_and_Laboratory.doc](#)

Please contact Researcher in charge if you have any queries regarding this lab procedure
For further information please consult the manual of any equipment required, the SDS for the chemicals involved and any other relevant SOP's!