

Residual humidity

Introduction

1. Principle

The soil, even when apparently dry, continues to capture ambient humidity. This faculty obviously depends on the water content of the air but also on the rate of hygrophilic matter in the sample (clays and organic matter), although the determination of the humidity rate does not allow them to be quantified with precision. However, values between 4 and 8% are observed for clay textures (values above 8% indicate imperfect drying of the sample!), whereas a sandy horizon with little humus will have a %RH below 1.

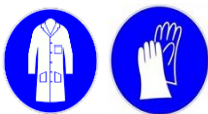
The residual humidity value is also very important for further analysis. The results are typically expressed in terms of the dry mass (at 105 °C) of the sample. If you don't want to put each test sample in the oven at 105 °C for one night before analysis, it will suffice to correct the air-dried soil masses by the residual moisture content (or its corollary, the dry matter content).

The moisture content of the soil is one of the important parameters to be determined on fresh peat. In particular, it will make it possible to relate the fibre content to the initial dry mass.

2. What is being measured?

L'humidité résiduelle (HR) est la masse de perte observée après passage à 105°C d'un échantillon de sol préparé pour l'analyse, c'est-à-dire séché à l'air (ou au four à 45°C).

Safety Equipment



* Protective gloves for heat

Labware

- Pyrex crystallizer or porcelain crucible (if followed by loss on ignition see chapter Loss on ignition).
- Analytical balance (0.0001 g).
- Oven at 105 °C.
- Desiccator.

To save time, it's preferable to couple the analysis of residual humidity and loss on ignition straight away by weighing the fresh soil samples directly in the porcelain crucibles.

Procedure

- Take and **weigh** a porcelain crucible.
- Note its mass « **B** », **in g**.
- Precisely **weigh 10 to 20g dried soil** sample into the crucible. Glass containers do not absorb humidity; it is not necessary to precede weighing by drying in the oven. However, the drying phase is essential when the containers contain hydrophilic materials (such as porcelain).
- Note the exact mass « **A** » of the sample **in g**.
- **Place** the sample for at least 24 hours **in the oven at 105°C**.
- **Remove** the sample, **cool** it in a desiccator, **weigh** the crucible again. Note its mass « **C** », **in g**.
- If necessary, store this oven dried sample in the desiccator for loss on ignition measurement.

NB: The results of physico-chemical analyses carried out on fresh or air-dried soil must always be corrected by the dry matter content.

Calculations

Test sample (m) corrected by residual humidity (RH):

$$m_{105} = m - (m * RH)$$

The calculation to obtain the residual humidity in % is as follow:

$$RH \% = (A - C) / (A - B) * 100$$

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References

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