SLOVENSKI STANDARD
SIST-TS CEN/TS 17773:2023

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Organska in organsko-mineralna gnojila - Določevanje suhe snovi

Organic and organo-mineral fertilizers - Determination of the dry matter content

Organische und organisch-mineralische Düngemittel - Bestimmung des Trockensubstanzgehalts

Engrais organiques et organo-minéraux - Détermination de la teneur en matière sèche

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65.080	Gnojila	Fertilizers

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TECHNICAL SPECIFICATION

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English Version

Organic and organo-mineral fertilizers - Determination of the dry matter content

Engrais organiques et organo-minéraux - Détermination de la teneur en matière sèche

Organische und organisch-mineralische Düngemittel - Bestimmung des Trockenrückstands

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (CEN/TS 17773:2022) has been prepared by Technical Committee CEN/TC 260 “Fertilizers and liming materials”, the secretariat of which is held by DIN.

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Introduction

In case of the analysis of organic and organo-mineral fertilizers, water is usually not considered a part of the sample and results are generally related to dry matter, which can be calculated by determining the dry residue (dry matter content).

1 Scope

This document is applicable to fertilizing products, which are classified as PFC 1(A) and PFC 1(B) or the PFC 1(A) and PFC 1(B) component in PFC 7 of Regulation (EU) 2019/1009 [1]. However, the present method was not validated for blends.

This document specifies the procedure for the determination and calculation of the dry matter fraction of organic and organo-mineral fertilizers for which the results of the performed analysis are calculated to the dry matter basis.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at https://www.iso.org/obp
- IEC Electropedia: available at https://www.electropedia.org/

3.1
dry residue
remaining mass fraction of a sample after a drying process at 105 °C under specified conditions

3.2
dry matter content
mass fraction of a sample excluding water calculated by the determination of dry residue

4 Principle

The samples are dried to a constant mass in an oven at 105 °C. The difference in mass before and after the drying process is used to determine dry matter content. This method applies to solid samples and samples which become solid during the drying process. Volatile compounds volatilizing at temperatures up to and including (105 ± 2)°C are expressed as water using this procedure.

5 Sampling and sample preparation

Sampling and sample preparation should be performed carefully, following the principles described in EN 1482 (all parts) with appropriate adaptations, required to account for specificities of organic and organo-mineral fertilizers. Details about the sampling shall be given in the test report.

6 Interferences

The samples can change during the drying process, e.g. by absorption of carbon dioxide in the case of alkaline samples, or of oxygen by reducing substances.

7 Reagents

7.1 Sand, CAS 14808-60-7, e.g. AnalaR NORMAPUR® purified by acid and calcinated from VWR™, or equivalent[1].

8 Apparatus

8.1 Drying system, thermostatically controlled and capable of maintaining temperature of (105 ± 2) °C.

8.2 Desiccator, with an active drying agent such as silica gel.

8.3 Analytical balance, capable of weighing to the nearest 1 mg or better.

8.4 Evaporating dish or crucible, temperature tolerant laboratory vessel withstanding at least 110 °C, suitable materials are metallic, ceramic, borosilicate glass or quartz, porcelain, etc.

9 Procedure

WARNING Flammable or explosive gases can be released from some samples during the drying process.

9.1 Procedure A

This procedure is suitable for solid or liquid organic and organo-mineral fertilizers.

Place an evaporating dish or crucible (8.4) in the drying system (8.1) set at (105 ± 2) °C for a minimum of 30 min. After cooling in the desiccator (8.2) to ambient temperature, weigh the dish or crucible (8.4) to the nearest 1 mg (m_a).

Weigh into the evaporating dish or crucible (8.4) 5 g to 10 g of solid sample or 10 g to 30 g of liquid sample. The mass should be adjusted to assure that at least 0,3 g of dry residue will remain after the drying process. Weigh the loaded dish or crucible (8.4) to the nearest 1 mg (*m*b). Place the evaporating dish or crucible (8.4) containing the sample into the drying system (8.1) set at (105 ± 2) °C until the residue appears dry, typically overnight. Then follow the procedure described in 9.3.

9.2 Procedure B

This procedure is suitable for liquid organic and organo-mineral fertilizers where there is a risk of a cake surface formation which hinders an even drying.

Weigh approximately 10 g of sand (7.1) into an evaporating dish (8.4), distribute the sand evenly and place the dish (8.4) into the drying system (8.1) set at (105 ± 2) °C for a minimum of 120 min. After cooling in the desiccator (8.2) to ambient temperature, weigh the evaporating dish (8.4) to the nearest 1 mg (m_a).

Depending on the expected dry residue, weigh into the evaporating dish (8.4) 10 g to 30 g of sample and weigh the loaded dish (8.4) to the nearest 1 mg (m_b). The mass should be adjusted to assure that at least 0,3 g of dry residue will remain after the drying process. Place the evaporating dish (8.4) containing the sample into the drying system (8.1) set at (105 ± 2) °C until the residue appears dry, typically overnight. Then follow the procedure described in 9.3.

[1] AnalaR NORMAPUR® from VWR™ is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of this product.

The addition of sand prevents a surface crust from forming and disperses the sample. The amount of sand depends on the sample size and sample properties and may be changed accordingly. Other heat-stable inert materials such as diatomaceous earth can be used.

The analyst shall ascertain that the inert matrix used does not give erroneous results for the assay because of decomposition or entrapped moisture loss.

9.3 Procedure A and B

The following applies for both procedures (9.1 and 9.2).

After cooling in the desiccator (8.2) weigh the evaporating dish or crucible (8.4) for the first time. The dry residue shall be regarded as constant if the mass obtained after further 1 h of drying does not differ by more than 0,5 % or 2 mg of the previous value, whichever is the greater (m_c). If the difference is greater, repeat the drying process.

In the case of mass inconstancy after three cycles, the drying process may be stopped (after at least 16 h). The result of the last weighing shall be recorded in the test report.

Other techniques than oven drying, e.g. infrared or halogen lamp drying are allowed, provided they are proven to give comparable results. The technique of choice shall be recorded in the test report.

Ensure that the dry matter is determined using samples identical to those used for determination of parameters that relate to dry matter, by weighing at the same time and from the same sub-sample.

NOTE 20 h of drying and omission of re-drying as well as re-weighing can be applied for sample types with documented evidence that the necessary drying time is less than 20 h.

10 Quality control

Where uncertainty exists about the homogeneity or behaviour of the sample it is recommended that the analysis is carried out in duplicate. At least one duplicate analysis should be carried out in each batch of analyses.

11 Calculation and expression of results

The dry residue w_{dr} expressed as mass fraction in percent (%) or in grams per kilogram (g/kg) is calculated according to Formula (1):

$$w_{dr} = \frac{m_c - m_a}{m_b - m_a} \cdot f \qquad (1)$$

where

m_a is the mass of the empty dish or crucible, in g;

m_b is the mass of the dish or crucible containing the sample, in g;

m_c is the mass of the dish or crucible containing the dried sample, in g;

f is the conversion factor f = 100 for expression of results as mass fraction in % or 1 000 for expression of results in g/kg.

12 Test report

The test report shall contain at least the following information:

a) all information necessary for the complete identification of the sample;

b) test method used with reference to this document (CEN/TS 17773:2022);

c) date of sampling and sampling procedure (if known);

d) date when the determination was finished;

e) all operating details not specified in this document, or regarded as optional, together with details of any incidents that occurred when performing the method, which might have influenced the test result(s).