SLOVENSKI STANDARD
SIST-TS CEN/TS 17704:2023

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Rastlinski biostimulanti - Določevanje suhe snovi

Plant biostimulants - Determination of dry matter

Pflanzen-Biostimulanzien - Bestimmung der Trockenmasse

Biostimulants des végétaux - Détermination de la matière sèche

Ta slovenski standard je istoveten z: **CEN/TS 17704:2022**

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65.080 Gnojila Fertilizers

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TECHNICAL SPECIFICATION

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CEN/TS 17704

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English Version

Plant biostimulants - Determination of dry matter

Biostimulants des végétaux - Détermination de la matière sèche

Biostimulanzien für die pflanzliche Anwendung - Bestimmung der Trockenmasse

This Technical Specification (CEN/TS) was approved by CEN on 3 January 2022 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (CEN/TS 17704:2022) has been prepared by the Technical Committee CEN/TC 455 “Plant biostimulants”, the secretariat of which is held by AFNOR.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document was prepared by the experts of CEN/TC 455 "Plant Biostimulants". The European Committee for Standardization (CEN) was requested by the European Commission (EC) to draft European standards or European standardization deliverables to support the implementation of Regulation (EU) 2019/1009 of 5 June 2019 laying down rules on the making available on the market of EU fertilizing products ("FPR" or "Fertilising Products Regulation").

This standardization request, presented as M/564, also contributes to the Communication on "Innovating for Sustainable Growth: A Bio economy for Europe". The Working Group 4 "Other safety parameters", was created to develop a work program as part of this request. The technical committee CEN/TC 455 "Plant Biostimulants" was established to carry out the work program that will prepare a series of standards. The interest in biostimulants has increased significantly in Europe as a valuable tool to use in agriculture. Standardization was identified as having an important role in order to promote the use of biostimulants. The work of CEN/TC 455 seeks to improve the reliability of the supply chain, thereby improving the confidence of farmers, industry, and consumers in biostimulants, and will promote and support commercialisation of the European biostimulant industry. The preparation of this document is based on a standardization request to CEN by the European Commission and the European Free Trade Association (Mandate M/564) concerning the modernization of methods of analysis of fertilizers within the framework of Regulation (EU) 2019/1009 of the European Parliament and of the Council.

In case of the analysis of plant biostimulants, 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 fraction).

WARNING – Persons using this Technical Specification should be familiar with usual laboratory practice. This document does not purport to address all of the safety issues, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to ensure compliance with any national regulatory conditions.

IMPORTANT – It is absolutely essential that tests conducted according to this document are carried out by suitably trained staff.

1 Scope

This document specifies the procedure for the determination and calculation of the dry matter fraction of plant biostimulants for which the results of performed analysis are to be calculated to the dry matter basis.

This document is also applicable to the blends of fertilizing products where plant biostimulants are the main part of the blend. Otherwise, the Technical Specification for the main part of the blend applies.

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.

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

3.2
dry matter fraction
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 ± 2) °C. The difference in mass before and after the drying process is used to determine dry matter. This method applies to solid samples and samples which become solid during the drying process.

5 Sampling and sample preparation

Sampling and sample preparation are not part of this Technical Specification. A recommended sampling method is given in CEN/TS 17702-1 and a sample preparation method is given in CEN/TS 17702-2.

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. Volatile compounds evaporating at 105 °C are expressed as water using this procedure.

7 Reagents

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

[1] AnalaR NORMAPUR® 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 products.

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 an accuracy of 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

CAUTION – Flammable or explosive gases may be released from some samples in the drying process.

9.1 Procedure A

This procedure is suitable for solid or liquid biostimulants.

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 to 10) g of solid sample or (10 to 30) g of liquid sample. The weight should be adjusted to ensure that at least 0,3 g of dry residue will remain after the drying process. Spread the sample to an even depth not exceeding 2 cm. 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 but not for more than 20 h. Then follow procedure 9.3.

9.2 Procedure B

This procedure is suitable for liquid biostimulants 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), spread the sand to an even depth not exceeding 2 cm. 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 to 30) g of sample and weigh the loaded dish (8.4) to the nearest 1 mg (m_b). The weight should be adjusted to ensure 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 but not for more than 20 h. Then follow the procedure in 9.3.

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 e.g. pumice stone, diatomaceous earth etc. are also suitable.

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 weight 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 on the samples identical to those used for determination of parameters that relates 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/re-weighing can be applied for sample types with a 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 be 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 is calculated according to Formula (1):

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

where

w_{dr} is the dry residue of the sample, expressed as mass fraction in percent (%) or in grams per kilogram (g/kg);

m_{a} is the mass of the empty dish or crucible, expressed in grams (g);

m_{b} is the mass of the dish or crucible containing the sample, expressed in grams (g);

m_{c} is the mass of the dish or crucible containing the dried sample, expressed in grams (g);

f is the conversion factor f = 100 for expression of results as mass fraction in percent (%) and f = 1 000 for expression of results in grams per kilogram (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;

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).