SLOVENSKI STANDARD
SIST-TS CEN/TS 17785:2023

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Organsko-mineralna gnojila - Določevanje sredstev za kelatiranje in kompleksiranje

Organo-mineral fertilizers - Determination of chelating and complexing agents

Organisch-mineralische Düngemittel - Bestimmung von Chelat- und Komplexbildnern

Engrais organo-minéraux - Détermination des agents chélatants et complexants

Ta slovenski standard je istoveten z: CEN/TS 17785:2022

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65.080	Gnojila	Fertilizers

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TECHNICAL SPECIFICATION

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Organo-mineral fertilizers - Determination of chelating and complexing agents

Engrais organo-minéraux - Détermination des agents chélatants et complexants

Organisch-mineralische Düngemittel - Bestimmung von Chelat- und Komplexbildnern

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (CEN/TS 17785:2022) 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

Regulation (EU) 2019/1009 [1] lays down the rules on the making available on the market of EU fertilizing products and the specific safety and quality requirements for the defined product function categories (PFCs).

Organo-mineral fertilizers have been classified into PFC 1 (B), which has been divided into two groups PFC 1 (B) (I) [solid organo-mineral fertilizers] and PFC (B) (II) [liquid organo-mineral fertilizers].

An organo-mineral fertilizer is a co-formulation of:

a) one or more inorganic fertilizers, as specified in PFC 1 (C), and;

b) one or more materials containing: organic carbon (Corg); and nutrients of solely biological origin.

Inorganic Fertilizers have been classified into PFC 1 (C), which has been divided into two groups PFC 1 (C) (I) [inorganic macronutrient fertilizers] and PFC 1 (C) (II) [inorganic micronutrient fertilizers].

Micronutrients are considered to be, in plant nutrition, a number of elements known to be needed in small amounts for proper plant growth and development. The most common are Iron (Fe), Manganese (Mn), Molybdenum (Mo), Copper (Cu), Zinc (Zn) and Boron (B).

If an inorganic micronutrient fertilizer contains a substance, or one of the substances in the mixture, which is intended to enhance the long term availability to plants of micronutrients in the EU fertilizing product, that substance is either a chelating agent or a complexing agent.

The specific safety and quality requirements in relation to the determination of chelating and complexing agents in organo-mineral fertilizers (PFC 1 (B)) are defined in this document as well as normative references of the test methods to be used in order to measure the compliance with the related requirement in the Regulation (EU) 2019/1009 [1].

1 Scope

This document specifies references to the methods for the determination of chelating and complexing agents in organo-mineral fertilizers. The document specifies references to the methods and requirements for organo-mineral fertilizers in accordance with PFC 1 (B) as specified in the Regulation (EU) 2019/1009 [1].

Organo-mineral materials for this purpose are organic fertilizers containing micronutrient chelates or complexes and/or mixtures of them, in powder or granular form, aqueous or suspension preparations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1482-1:2007, *Fertilizers and liming materials — Sampling and sample preparation — Part 1: Sampling*

EN 1482-2:2007, *Fertilizers and liming materials — Sampling and sample preparation — Part 2: Sample preparation*

EN 12944-1:1999[1], *Fertilizers and liming materials — Vocabulary — Part 1: General terms*

EN 12944-2:1999[2], *Fertilizers and liming materials — Vocabulary — Part 2: Terms relating to fertilizers*

CEN/TS 17784-2:2022, *Organo-mineral fertilizers — Identification of complexing agents — Part 2: Method using high-performance liquid chromatography (HPLC)*

CEN/TS 17784-1:2022, *Organo-mineral fertilizers — Identification of complexing agents — Part 1: Method using UV-Vis spectrophotometry and gravimetry*

CEN/TS 17788:2022, *Organo-mineral fertilizers — Determination of the fraction of complexed micronutrients*

CEN/TS 17789-1:2022, *Organo-mineral fertilizers — Identification of chelating agents — Part 1: Determination of EDTA, HEEDTA and DTPA by ion chromatography*

CEN/TS 17789-2:2022, *Organo-mineral fertilizers — Identification of chelating agents — Part 2: Determination of Fe chelated by [o,o] EDDHA, [o,o] EDDHMA and HBED, or the amount of chelating agents by ion pair chromatography*

CEN/TS 17790:2022, *Organo-mineral fertilizers — Determination of the chelated micronutrient content and the chelated fraction of micronutrients by treatment with a cation exchange resin*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12944-1:1999 and EN 12944-2:1999 apply.

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

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

[1] As impacted by EN 12944-1:1999/AC:2000.
[2] As impacted by EN 12944-2:1999/AC:2000.

4 Sampling and sample preparation

4.1 Sampling

Samples taken for quality control purposes shall be representative, as described in EN 1482-1:2007.

4.2 Sample preparation

Sample preparation for quality control purposes shall be in accordance with EN 1482-2:2007.

5 Requirements

5.1 General

The requirements for the determination of chelating and complexing agents in organo-mineral fertilizers according to PFC 1(B), PFC 1(C) and component material category (CMC) 1 of Regulation (EU) 2019/1009 [1] shall be evaluated by using the analytical methods referred to in 5.2 to 5.5 (see Table 1).

5.2 Determination of the fraction of chelated micronutrients

Relevant analytical methods for the determination of the fraction of chelated micronutrients in organo-mineral fertilizers are specified as follows:

The determination of the fraction of the chelated iron in organo-mineral fertilizers containing UVCB (Unknown or Variable composition, Complex reaction products and Biological materials) iron chelates shall be determined according to CEN/TS 17790:2022.

5.3 Identification of chelating agents

5.3.1 General

Relevant analytical methods for the identification of chelating agents in organo-mineral fertilizers are specified in 5.3.2 and 5.3.3.

5.3.2 Identification of UVCB iron chelates

The identification of the chelating agents in a UVCB iron chelate in organo-mineral fertilizers shall be determined according to CEN/TS 17789-2:2022.

5.3.3 Identification of micronutrient chelate fertilizers

The identification of the chelating agents in organo-mineral fertilizers shall be determined according CEN/TS 17789-1:2022.

5.4 Determination of the fraction of complexed micronutrients

The determination of the complexing agents in organo-mineral fertilizers shall be determined according to CEN/TS 17788:2022.

5.5 Identification of complexing agents

The identification of the complexing agents in an organo-mineral fertilizer shall be determined according to CEN/TS 17784-1:2022 or CEN/TS 17784-2:2022 depending on the complexing agent declared.

Table 1 — References to methods for the determination of the chelated/complexed fraction and the identification of the different chelating/complexing agents in organo-mineral fertilizers

Parameter	Reference
Determination of the fraction of chelated iron in UVCB iron chelates	CEN/TS 17790:2022
Identification of chelating agents	
Determination of EDTA[a], HEEDTA[b] and DTPA[c] by ion chromatography	CEN/TS 17789-1:2022
Determination of Fe chelated by [o,o] EDDHA[d], [o,o] EDDHMA[e] and HBED[f], or the amount of chelating agents by ion pair chromatography	CEN/TS 17789-2:2022
Determination of the fraction of complexed micronutrients	CEN/TS 17788:2022
Identification of complexing agents	
Identification of lignosulfonates	CEN/TS 17784-1:2022
Identification of heptagluconic acid by chromatography	CEN/TS 17784-2:2022

[a] Ethylenediaminetetraacetic acid, $C_{10}H_{16}O_8N_2$

[b] 2-Hydroxyethylethylenediaminetriacetic acid, $C_{10}H_{18}O_7N_2$

[c] Diethylenetriaminepentaacetic acid, $C_{14}H_{23}O_{10}N_3$

[d] Ethylenediamine-N,N'-di[(ortho-hydroxyphenyl)acetic acid], $C_{18}H_{20}O_6N_2$

[e] Ethylenediamine-N,N'-di[(*ortho*-hydroxymethylphenyl) acetic acid], $C_{20}H_{24}O_6N_2$

[f] N,N'-bis(2-hydroxybenzyl)-ethylenediamine-N,N'-diacetic acid, $C_{20}H_{24}O_6N_2$

Bibliography

[1] Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003