

English Version

Organic and organo-mineral fertilizers - Determination of the inorganic arsenic content

Engrais organiques et organo-minéraux -
Détermination de la teneur en arsenic inorganique

Organische und organisch-mineralische Düngemittel -
Bestimmung des Gehalts an anorganischem Arsen

This Technical Specification (CEN/TS) was approved by CEN on 13 March 2022 for provisional application.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (CEN/TS 17775:2022) 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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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.

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Introduction

This document describes a procedure of extraction and measurement for the determination of inorganic arsenic in organic or organo-mineral fertilizers. This Technical Specification is based on a mild acid oxidative extraction of the arsenic species followed by liquid chromatography (High Performance Liquid Chromatography [HPLC] or ion chromatography [IC]) coupled to the element-specific detector ICP-MS (Inductively Coupled Plasma Mass Spectrometer) for the determination of the mass fraction of inorganic arsenic (iAs).

1 Scope

This document specifies a method for extraction, separation, and determination of inorganic arsenic (iAs) in organic or organo-mineral fertilizers using anion-exchange HPLC or IC coupled to ICP-MS.

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

3 Terms and definitions

No terms and definitions are listed in this document.

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/>

4 Principle

This document describes a method for the determination of inorganic arsenic in organic or organo-mineral fertilizers. Inorganic arsenic consists of arsenite As(III) and arsenate, As(V). A representative test portion of the sample is treated with a diluted nitric acid and hydrogen peroxide solution in a heated water bath. By this means the sample is solubilised, arsenic species are extracted into solution and As(III) is oxidised to As(V). The inorganic arsenic is selectively separated from other arsenic compounds using anion exchange HPLC (High Performance Liquid Chromatography) coupled on-line to the element-specific detector ICP-MS (Inductively Coupled Plasma Mass Spectrometer) for the determination of the mass fraction of the inorganic arsenic. External calibration with solvent matrix-matched standards is used for the quantification of the amount of the inorganic arsenic. Alternatively, IC (ion chromatography) coupled to ICP-MS can be used.

A preliminary determination of the total arsenic in aqua regia extracts by inductively coupled plasma atomic emission spectrometry [ICP-AES] (CEN/TS 17770) could reduce the number of the samples where the determination of iAs is necessary because if the content of aqua regia (total) extractable arsenic is lower than the legislative limit for iAs then the determination of iAs is not necessary.

5 Sampling

Sampling should be performed carefully, following principle described in EN 1482 (all parts) with appropriate adaptations required account for specificities of organic and organo-mineral fertilizers.