NSAI Standards

Irish Standard Recommendation
S.R. CEN/TS 17768:2022

Organic and organo-mineral fertilizers - Digestion by aqua regia for subsequent determination of elements

S.R. CEN/TS 17768:2022

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National Foreword

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TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

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CEN/TS 17768

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English Version

Organic and organo-mineral fertilizers - Digestion by aqua regia for subsequent determination of elements

Engrais organiques et organo-minéraux - Digestion à l'eau régale pour le dosage ultérieur des éléments

Organische und organisch-mineralische Düngemittel - Aufschluss durch Königswasser zur anschließenden Bestimmung der Elemente

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

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European foreword

This document (CEN/TS 17768:2022) 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

Aqua regia is applied to digest different matrices for the subsequent determination of many elements. For example, a multi-matrix standard for aqua regia extraction of soils, sludges and biowaste was prepared by CEN/TC 444 “Environmental characterization”. A similar procedure was applied for determination of aqua regia extractable elements according to CEN/TS 17769 and CEN/TS 17770. CEN/TC 223 “Soil improvers and growing media” published a standard for a similar procedure for soil improvers and growing media. Wide use of the aqua regia digestion, availability of the instruments and the possibility to merge the standards for different matrices in the future, were the main reasons for also applying this method of digestion for organic and organo-mineral fertilizers.

1 Scope

This document specifies the procedure for the digestion of different organic fertilizers and organo-mineral fertilizers with aqua regia to enable a subsequent determination of elements.

The extracts are suitable for analysis using CEN/TS 17770 and CEN/TS 17769.

NOTE Alternatively, inductively coupled plasma mass spectrometry (ICP-MS) can be used for the measurement if the user proves that the method gives the same results.

2 Normative references

There are no normative references in this document.

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:

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

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

4 Principle

The samples are digested by boiling in aqua regia.

5 Sampling and sample preparation

Sampling 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.

6 Reagents

All reagents should be of recognized analytical grade. The reagents and water used shall have negligible concentrations of the elements to be determined if compared to the lowest concentrations of these elements in the sample solution.

6.1 Hydrochloric acid 37 % HCl, $c(HCl) \approx 12$ mol/l, $\rho \approx 1{,}18$ g/ml.

6.2 Nitric acid 65 %, $c(HNO_3) \approx 14{,}3$ mol/l, $\rho \approx 1{,}4$ g/ml.

6.3 Antifoaming agent, e.g. n-dodecane ($C_{12}H_{26}$) or octanol ($C_8H_{18}O$) are suitable.

7 Apparatus

7.1 Common laboratory glassware

All glassware and plastic ware shall be adequately cleaned and stored to avoid any contamination.

7.2 Apparatus for thermal heating digestion

Temperature is controlled with reaction vessel and reflux condenser. The capacity of the reaction vessel should be at least 5 times of the volume of the aqua regia used.