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Fertilizers and soil conditioners — Determination of microamounts of inorganic anions in fertilizers by ion chromatography

Engrais et amendements — Détermination des microquantités d'anions inorganiques dans les fertilisants par chromatographie d'échange d'ions

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 134, *Fertilizers and soil conditioners.*

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Introduction

Microamounts of inorganic anions such as fluoride, chloride, bromide, iodide, nitrite and thiocyanate are usually contained in fertilizers. Excessive amounts of such inorganic anions can not only impede the growth of crops, but can also cause harmful effects on the arable land and the environment. Current standards around the world mostly focus on a few specific anions. This method, which uses ion chromatography, provides a high-throughput screening and rapid determination pathway targeting microamounts of six anions as an alternative to traditional chemical analysis.

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Fertilizers and soil conditioners — Determination of microamounts of inorganic anions in fertilizers by ion chromatography

1 Scope

This document specifies the ion chromatography method for the determination of microamounts of water soluble inorganic anions, such as fluoride (F^-), chloride (Cl^-), bromide (Br^-), iodide (I^-), nitrite (NO_2^-) and thiocyanate (SCN^-), in fertilizers.

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.

ISO 8157, *Fertilizers and soil conditioners — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8157 apply.

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

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

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

4 Principle

Water soluble inorganic anions are extracted by sonication, centrifugation and purification using a C18 column and a Ba-ion column (where applicable). During pre-treatment, the anions are filtered by a 0,22 µm aqueous filter. They are determined by ion chromatography. Anions are separated based on their affinity for the exchange sites on the analytical column. The suppressor device reduces the background conductivity of the eluent to a low level by replacing the cations with the hydrogen ions, thereby converting the anions in the fertilizer sample to their corresponding acids with higher conductivity. The separated anions (in their acid forms) are measured by an electrical-conductivity detector. Anions are identified based on their retention times compared to known standards. Quantitation is accomplished by measuring the peak height or area compared to a calibration curve generated from known standards.

5 Reagents

WARNING — Acetone and methanol are flammable and toxic. Refer to the applicable safety data sheet (SDS). The related operations shall be performed in the fume hood. This document does not point out all possible safety problems; therefore, the user shall bear the responsibility to take proper safety and health measures.

Analytical grade reagent (A.R.) chemicals shall be used in all tests, unless otherwise indicated. The purity of water used throughout shall be understood to mean reagent water with electrical resistivity ≥18,2 MΩ·cm. In the list below, G.R. refers to guarantee reagent.

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