International Standard

ISO 13536

Soil quality — Determination of the potential cation exchange capacity and exchangeable cations using barium chloride solution buffered at pH = 8,1

Qualité du sol — Détermination de la capacité d'échange cationique potentielle et des teneurs en cations échangeables en utilisant une solution tampon de chlorure de baryum à pH = 8,1

Second edition
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Contents

Page

Foreword ... **iv**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Principle ... **1**
5 Procedures ... **2**
5.1 Leaching ... 2
5.1.1 Reagents ... 2
5.1.2 Procedure ... 2
5.2 Determination of the CEC ... 3
5.2.1 Principle ... 3
5.2.2 Reagents ... 3
5.2.3 Calibration series ... 3
5.2.4 Procedure ... 3
5.2.5 Calculation ... 4
5.3 Determination of exchangeable sodium and potassium ... 4
5.3.1 Principle ... 4
5.3.2 Reagents ... 5
5.3.3 Calibration series ... 5
5.3.4 Procedure ... 5
5.3.5 Calculations ... 5
5.4 Determination of exchangeable calcium and magnesium ... 6
5.4.1 Principle ... 6
5.4.2 Reagents ... 6
5.4.3 Calibration series ... 6
5.4.4 Procedure ... 7
5.4.5 Calculations ... 7
6 Test report ... **7**
Bibliography ... **8**

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Foreword

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This document was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical and physical characterization*.

This second edition cancels and replaces the first edition (ISO 13536:1995), which has been technically revised.

The main changes are as follows:

— revision of the Formula (2) for the calculation of the cation exchange capacity (CEC) of the soil;

— addition of a note on possible misleading of the correction procedure in the analysis of calcareous soils;

— update of bibliography.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Soil quality — Determination of the potential cation exchange capacity and exchangeable cations using barium chloride solution buffered at pH = 8,1

WARNING — Barium is a very toxic element if ingested. The barium ion has health risks for laboratory personnel working with this chemical; it is also harmful for the environment.

1 Scope

This document specifies a method for the determination of the potential cation exchange capacity (CEC) of soil buffered at pH = 8,1 and for the determination of the content of exchangeable sodium, potassium, calcium and magnesium in soil.

This document is applicable to all types of air-dried soil samples.

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 11464, *Soil quality — Pretreatment of samples for physico-chemical analysis*

ISO 11465, *Sludge, treated biowaste, soil and waste — Determination of dry residue or water content and calculation of the dry matter fraction on a mass basis*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology 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

The determination of cation exchange capacity (CEC) as specified in this document is a modification of the method proposed by Mehlich[1],[2] and modified by Bascomb[3]. The CEC of soil samples is determined in barium chloride solution buffered at pH = 8,1 using triethanolamine.

The soil is first saturated with respect to barium by treating the soil three times with buffered barium chloride solution. Subsequently, a known excess of 0,02 mol/l magnesium sulfate solution is added. All the barium present, in solution as well as adsorbed, is precipitated in the form of highly insoluble barium sulfate and the sites with exchangeable ions are then readily occupied by magnesium. The excess magnesium is determined by either flame atomic absorption spectrometry (FAAS) or inductively coupled plasma atomic emission spectrometry (ICP-AES).

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