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Soil quality — Extraction of trace elements by buffered DTPA solution

Qualité du sol — Extraction des éléments en traces par une solution tamponnée de DTPA

Reference number
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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14870 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical methods and soil characteristics*.

Soil quality — Extraction of trace elements by buffered DTPA solution

1 Scope

This International Standard specifies a method for the extraction of trace elements in soil samples using a buffered diethylenetriaminepentaacetic acid (DTPA) solution. This method mainly applies to the estimation of the availability of copper, iron, manganese and zinc to plants which grow in the soils. It is preferably applicable to soils having a pH greater than 6. Potentially toxic elements such as cadmium, chromium, nickel and lead can also be determined in the extracts. In soils containing large amounts of one or more of these elements, the efficiency of the extraction of any of these elements can be lessened by exceeding the complexation capacity of DTPA.

This International Standard does not specify the methods of measurement of the trace elements in the extracts.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

ISO 11464:1994, *Soil quality — Pretreatment of samples for physico-chemical analyses*

ISO 11465:1993, *Soil quality — Determination of dry matter and water content on a mass basis — Gravimetric method*

3 Principle

The soil sample is extracted at a temperature of 20 °C, under precise shaking conditions and with a soil:solution extraction ratio of 1:2 (m/V), of the soluble species of trace elements in a mixed buffered solution (pH = 7,3) of triethanolamine (0,1 $\text{mol}\cdot\text{l}^{-1}$) with calcium chloride (0,01 $\text{mol}\cdot\text{l}^{-1}$) and diethylenetriaminepentaacetic acid (DTPA, 0,005 $\text{mol}\cdot\text{l}^{-1}$).

NOTE 1 The determination of the trace elements in the extracts can be performed using flame or electrothermal atomic absorption spectrometry, inductively coupled plasma atomic emission spectrometry or any other relevant technique.

NOTE 2 Due to the relatively high extraction ratio, it may be difficult to obtain a sufficient amount of extract solution in case of soils with high absorbing capacities.