

INTERNATIONAL
STANDARD

ISO
11466

First edition
1995-03-01

**Soil quality — Extraction of trace elements
soluble in *aqua regia***

*Qualité du sol — Extraction des éléments en traces solubles dans l'eau
régale*



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.

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.

International Standard ISO 11466 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical methods and soil characteristics*.

Annex A of this International Standard is for information only.

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Soil quality — Extraction of trace elements soluble in *aqua regia*

WARNING — Digestions with hydrochloric and nitric acid are potentially hazardous and safety glasses or goggles must be used.

The digestion should be carried out in a well-ventilated fume cupboard with the reflux digestion on a temperature-controlled heating apparatus. It is essential to add antibumping granules (or roughened glass beads) both to the blank and the samples to prevent bumping and loss of solution. It is important to maintain gentle reflux, both of the blank and the test samples, to avoid temperature fluctuations which could cause local superheating.

1 Scope

This International Standard specifies a method for the extraction, with *aqua regia*, of trace elements from soils and similar materials, prepared according to ISO 11464, and containing less than about 20 % (*m/m*) organic carbon according to ISO 10694. Materials containing more than about 20 % (*m/m*) organic carbon will require treatment with additional nitric acid (see note 8). The resulting solution is suitable for the determination of trace elements using appropriate atomic spectrometric techniques. With high solute concentrations in extract solutions, spectral interferences and background enhancement should be expected.

NOTE 1 *Aqua regia* will not totally dissolve most soils and similar materials, and the efficiency of extraction for particular elements differs from element to element. Such efficiency might also differ for the same element in different matrices. Users of this International Standard should carry out a programme of analysis using reference materials to assure themselves that the method given here is appropriate for their needs. Elements extractable in *aqua regia* cannot, therefore, be described as "totals"; conversely they cannot be regarded as the "bio-available" fraction, as the extraction procedure is too vigorous to represent any biological process.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

ISO 10694:1995, *Soil quality — Determination of organic and total carbon after dry combustion (elementary analysis)*.

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*.