
**Soil quality — Determination of trace
elements in extracts of soil by inductively
coupled plasma - atomic emission
spectrometry (ICP-AES)**

*Qualité du sol — Dosage des éléments traces dans des extraits de sol
par spectrométrie d'émission atomique avec plasma induit par haute
fréquence (ICP-AES)*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22036 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical methods and soil characteristics*.

Soil quality — Determination of trace elements in extracts of soil by inductively coupled plasma - atomic emission spectrometry (ICP-AES)

WARNING — The procedures in this International Standard should be carried out by competent, trained persons. Some of the techniques and reagents, including the use of equipment, are potentially very dangerous. Users of this International Standard who are not thoroughly familiar with the potential dangers and related safe practices should take professional advice before commencing any operation.

1 Scope

This International Standard describes the determination of trace elements in digests or extraction solutions from soil by inductively coupled plasma - atomic emission spectrometry (ICP-AES) for 34 elements (see Table 1).

This multi-element determination method is applicable to soil extracts obtained with aqua regia in accordance with ISO 11466, with DTPA in accordance with ISO 14870 or other weak extractants, or soil extracts for the determination of total element contents using the acid digestion method of ISO 14869-1 or the fusion method of ISO 14869-2.

The choice of calibration method depends on the extractant and can be adapted to the extractant concentration.

2 Normative references

The following referenced documents are indispensable for the application 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 Guide 32, *Calibration in analytical chemistry and use of certified reference materials*

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

ISO 5725-1, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

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

ISO 11466, *Soil quality — Extraction of trace elements soluble in aqua regia*

ISO 14869-1, *Soil quality — Dissolution for the determination of total element content — Part 1: Dissolution with hydrofluoric and perchloric acids*

ISO 14869-2, *Soil quality — Dissolution for the determination of total element content — Part 2: Dissolution by alkaline fusion*

ISO 14870, *Soil quality — Extraction of trace elements by buffered DTPA solution*