

Soil quality — Pretreatment of samples for determination of organic contaminants

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National foreword

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The UK participation in its preparation was entrusted by Technical Committee EH/4, Soil quality, to Subcommittee EH/4/3, Chemical methods and soil characteristics, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Soil quality — Pretreatment of samples for determination of organic contaminants

*Qualité du sol — Prétraitement des échantillons pour la détermination
des contaminants organiques*



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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.

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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.

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ISO 14507 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical methods and soil characteristics*.

Introduction

The properties of organic micropollutants can differ greatly according to chemical species:

- they can range from non-volatile to very volatile compounds (low to high vapour pressure);
- they can be labile or reactive at ambient or elevated temperatures;
- they can be biodegradable or UV-degradable;
- they can have considerably different solubilities in water;
- they require different analytical procedures.

Because of these differences, a general pretreatment procedure cannot be proposed. The goal of a pretreatment procedure is to prepare a test sample in which the concentration of the contaminant is equal to the concentration in the original soil, provided, however, that this procedure does not alter the chemical species to be analysed. For instance, if the sample contains only small particles and the contaminant is homogeneously distributed, it is not necessary to grind the sample. In this International Standard, the size 2 mm is used to distinguish between small and large soil particles.

Consistency among the following aspects is important:

- soil diversity;
- the aim of the analysis (including its accuracy);
- the nature of the chemical species to be analysed.

The particle size distribution of the sample in relation to the mass of sample taken for analysis is also important to pretreatment. For the analysis of organic contaminants, the sample mass taken in most cases is about 20 g.

With such a sample mass, and provided that the contaminant is homogeneously distributed and the particles in the sample are smaller than about 2 mm, further grinding of the sample is not necessary. If the sample contains large particles or if the contaminant is heterogeneously distributed (as occurs for instance with tar particles), it is not possible to take a representative test sample of about 20 g without grinding the sample. To improve the homogeneity, samples are ground to a size smaller than 1 mm. Prior to analysis, very often no information about the distribution of the contaminant in the soil is known.

Some analytical procedures start with a field-moist sample. Drying of the sample gives lower extraction results. If the sample is not dried, grinding is not possible.

In a situation in which accurate results are needed, the best available pretreatment procedure should be used. If it is necessary to establish whether the concentration is above a certain limit and it is already known that the soil is heavily polluted, the simplest pretreatment procedure may meet the need. In this case however, the result may not be presented as a representative value for the whole sample.

The choice depends above all on the volatility of the organic compounds under analysis. It also depends on the soil particle size distribution, the heterogeneity of the sample and the analytical procedure.

