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Soil quality — Effects of pollutants on earthworms —

Part 3: Guidance on the determination of effects in field situations

Qualité du sol — Effets des polluants vis-à-vis des vers de terre —

Partie 3: Lignes directrices relatives à la détermination des effets sur site

Reference number
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 190, *Soil quality*, Subcommittee SC 4, *Biological methods*.

This second edition cancels and replaces the first edition (ISO 11268-3:1999), which has been technically revised.

ISO 11268 consists of the following parts, under the general title *Soil quality — Effects of pollutants on earthworms*:

— *Part 1: Determination of acute toxicity to Eisenia fetida/Eisenia andrei*

— *Part 2: Determination of effects on reproduction to Eisenia fetida/Eisenia andrei*

— *Part 3: Guidance on the determination of effects in field situations*

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Introduction

The earthworm field test is based on a method being developed by the German Federal Biological Research Centre for Agriculture and Forestry for the testing of pesticides.[6] Later, it was internationally standardized by the International Organization for Standardization (ISO), taking into account results and recommendations of an international workshop in 1991 in Sheffield, United Kingdom, [7] "Ecotoxicology of Earthworms", as a tool for characterizing soil quality. Growing experience has shown that the practical performance of the test can be improved. In two meetings organized by the Federal Biological Research Centre for Agriculture and Forestry (Braunschweig, 2002) and by the German Federal Agency for Consumer Protection and Food Safety (Lille, 2005), an ad-hoc working group of experts from various countries and institutions proposed recommendations that should be taken into account if revision has been approved by voting in the periodical review. A report of the discussions, comments, and recommendations has been published.[8]

In cases where earthworms and other organisms are used as bioindicators to assess the soil quality of a site as a habitat for soil organisms, guidance for extraction procedures and advice for planning a survey is given in ISO 23611-1 to ISO 23611-6.

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Soil quality — Effects of pollutants on earthworms —

Part 3:
Guidance on the determination of effects in field situations

1 Scope

This part of ISO 11268 specifies techniques for determining the effects of substances on earthworms in the field and provides a basis for determining the effects of chemicals applied to or incorporated into soil, including soil injections or drilled pelleted formulations.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10390, *Soil quality — Determination of pH*

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

ISO 11274, *Soil quality — Determination of the water-retention characteristic — Laboratory methods*

ISO 11277, *Soil quality — Determination of particle size distribution in mineral soil material — Method by sieving and sedimentation*

ISO 23611-1, *Soil quality — Sampling of soil invertebrates — Part 1: Hand-sorting and formalin extraction of earthworms*

3 Units

Rates of application of test substances are expressed in kilograms per hectare (kg/ha) or litres per hectare (l/ha) of the substance applied. When this is a formulated material, the application rate is expressed in terms of the amount of active ingredient applied.

The concentrations of test substances incorporated in the soil are given in mg active ingredient (a.i.)/kg soil dry mass, d_m. The same units are used when comparing the results of this field test with those gained in laboratory studies.

4 Principle

Species, numbers, and biomass of earthworms collected by sampling plots treated with a test substance are compared with those collected from treated control and reference plots. Sampling is performed as specified in ISO 23611-1. The duration of the study depends on the characteristics of the test substance but is usually of one year's duration. Sampling dates are chosen to lie within the periods of activity of the earthworms.

The test is of a randomized complete block design with four replicates per treatment. Statistical analysis of numbers of each species collected at each sampling occasion is used to determine the effects of treatments by comparing abundance, biomass, and diversity between control and treated plots.

NOTE The test also generates samples of earthworms from treated plots for residue analysis where such information is appropriate.

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