

Water and soil quality - Determination of the toxic effect of sediment and soil samples on growth, fertility and reproduction of *Caenorhabditis elegans* (Nematoda) (ISO 10872:2020)

EESTI STANDARDI EESSÕNA

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Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 04.08.2021.	Date of Availability of the European standard is 04.08.2021.
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ICS 13.060.70

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English Version

Water and soil quality - Determination of the toxic effect of
sediment and soil samples on growth, fertility and
reproduction of *Caenorhabditis elegans* (Nematoda) (ISO
10872:2020)

Qualité de l'eau et du sol - Détermination de l'effet
toxique d'échantillons de sédiment et de sol sur la
croissance, la fertilité et la reproduction de
Caenorhabditis elegans (Nematodes) (ISO
10872:2020)

Wasserbeschaffenheit und Bodenbeschaffenheit -
Bestimmung der toxischen Wirkung von Sediment-
und Bodenproben auf Wachstum, Fertilität und
Reproduktion von *Caenorhabditis elegans* (Nematoda)
(ISO 10872:2020)

This European Standard was approved by CEN on 18 July 2021.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of ISO 10872:2020 has been prepared by Technical Committee ISO/TC 147 "Water quality" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 10872:2021 by Technical Committee CEN/TC 230 "Water analysis" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2022, and conflicting national standards shall be withdrawn at the latest by February 2022.

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

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Endorsement notice

The text of ISO 10872:2020 has been approved by CEN as EN ISO 10872:2021 without any modification.

Contents

	Page
Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Principle.....	2
5 Reagents and media.....	3
6 Apparatus.....	5
7 Reference substance.....	6
8 Organisms.....	7
8.1 Test organism.....	7
8.2 Food organism.....	7
9 Stock- and pre-cultures.....	7
9.1 Stock cultures.....	7
9.1.1 <i>Caenorhabditis elegans</i>	7
9.1.2 <i>Escherichia coli</i>	7
9.2 Pre-culture.....	8
10 Procedure.....	8
10.1 Preparation of food medium.....	8
10.2 Preparation of test material and controls.....	8
10.2.1 Soil.....	8
10.2.2 Sediment.....	9
10.2.3 Pore water, elutriate, extract.....	9
10.2.4 Solution of reference substance.....	9
10.3 Test.....	10
10.4 Nematode separation.....	10
10.5 Measurements and calculations.....	10
10.5.1 Recovery.....	10
10.5.2 Males.....	10
10.5.3 Growth and fertility.....	11
10.5.4 Reproduction.....	11
10.6 Timetable of the test.....	12
11 Validity criteria.....	13
12 Expression of results.....	13
13 Test report.....	14
Annex A (informative) Determination of maximal water holding capacity (WHC _{max}).....	15
Annex B (informative) Figures and photos of adult worms <i>C. elegans</i>	16
Annex C (informative) Micropipette method (10.3).....	18
Annex D (informative) Performance data.....	19
Bibliography.....	22

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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 5, *Biological method*.

This second edition cancels and replaces the first edition (ISO 10872:2010), which has been technically revised. The main changes compared to the previous edition are as follows:

- the title has been changed to achieve a better perception in the field soil toxicity testing;
- for soil testing, the method has been modified in terms of a reduced water content of the test material;
- cited references and standards have been refreshed;
- information on the control soil and restrictions for tested soils has been added;
- the document has been editorially revised.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Nematodes are one of the most abundant and species-rich metazoans in sediments^[1] and soils^[2] and possess key positions in benthic and soil food webs due to the evolution of various feeding types (bacterial, algal, fungal and plant feeders, omnivores, predators see References ^[3] and ^[4]). Moreover, they are well acknowledged as environmental indicators for assessing the toxicity of chemicals and the quality of sediments and soils (see References ^[5], ^[6], ^[7], ^[8] and ^[9]).

The test organism *Caenorhabditis elegans* (Maupas, N2 var. Bristol) is a bacterivorous nematode that is found primarily in microbe-rich, decaying plant material (see Reference ^[10]) and belongs to the family of Rhabditidae, frequently found in terrestrial soils and aquatic sediments (see References ^[11] and ^[12]). Moreover, individuals of *C. elegans* were already found in sediments of polysaprobial fresh-water systems (see References ^[13] and ^[14]). Due to its easy cultivation and short life cycle^[15], *C. elegans* has become a well-studied model organism in biomedical and ecotoxicological research (see References ^[16], ^[17] and ^[18]).

The test is designed for measurement of the response to dissolved and particle-bound substances^[19]. It applies to the testing of sediments, soils, waste, pore water, elutriates and aqueous extracts (see e.g. References ^[20], ^[21], ^[22] and ^[23]).

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WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

IMPORTANT — It is absolutely essential that tests conducted according to this document be carried out by suitably trained staff.

1 Scope

This document specifies a method for determining the toxicity of environmental samples on growth, fertility and reproduction of *Caenorhabditis elegans*. The method applies to contaminated whole freshwater sediment (maximum salinity 5 g/l), soil and waste, as well as to pore water, elutriates and aqueous extracts that were obtained from contaminated sediment, soil and waste.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 5667-16, *Water quality — Sampling — Part 16: Guidance on biotesting of samples*

ISO 7027-2, *Water quality — Determination of turbidity — Part 2: Semi-quantitative methods for the assessment of transparency of waters*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

agar plate

Petri dish filled with Nematode Growth Medium (NGM) agar

3.2

aqueous control

water that serves as negative control for tests in aqueous samples

3.3

artificial control sediment

defined artificial sediment

3.4

bacterial stock culture

stock culture of food bacteria