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ILNAS-EN 14735:2021

Characterization of waste - Preparation of waste samples for ecotoxicity tests

Charakterisierung von Abfällen -
Herstellung von Abfallproben für
ökotoxikologische Untersuchungen

Caractérisation des déchets - Préparation
des échantillons de déchets en vue
d'essais écotoxicologiques



National Foreword

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**Characterization of waste - Preparation of waste samples
for ecotoxicity tests**

Caractérisation des déchets - Préparation des
échantillons de déchets en vue d'essais
écotoxicologiques

Charakterisierung von Abfällen - Herstellung von
Abfallproben für ökotoxikologische Untersuchungen

This European Standard was approved by CEN on 3 October 2021.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 14735:2021) has been prepared by Technical Committee CEN/TC 444 “Environmental characterization of solid matrices”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by May 2022, and conflicting national standards shall be withdrawn at the latest by May 2022.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.

This document supersedes EN 14735:2005.

The main changes with respect to the previous edition are:

- the modification of Clause 12 “Test report” to specify whether ecotoxicity tests have been repeated with pH adjustment of the test portion, allowing to clearly distinguish these results from those obtained without pH adjustment;
- the clarification of the notes of 10.5 and 11.2.3 and associated notes regarding the repetition of the tests with pH adjustment;
- the update of Annex B, describing the ecotoxicity tests considered to establish this document.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Ecotoxicity can be estimated using two approaches: a chemical-specific approach and a toxicity-based approach. Chemical analyses are compared, in the first case, to quality criteria or threshold values to estimate ecotoxicity. In the second one, ecotoxicity is measured directly using biological tests. These two approaches complement each other; indeed, determination of pollutants in complex mixtures of unknown composition, that is a characteristic of many wastes, does not allow a relevant estimation of ecotoxicity. For such samples, the toxicity-based approach is usually recognized to be appropriate to assess potential toxicity. Bioassays integrate, indeed, the effects of all contaminants including additive, synergistic and antagonistic effects. They are sensitive to the bioavailable fraction of the contaminants only. Finally, bioassays integrate the effects of all contaminants, including those, not considered or detected by chemical analyses.

Ecotoxicity tests can be applied to wastes to identify their potential hazardous properties with respect to the environment for classification purposes or to assess the risk related to a site-specific exposure scenario.

Identification of properties potentially hazardous to the environment for classification purposes

A classification system, based on the assessment of intrinsic properties, should be independent of an exposure scenario. The main requirement, in order to establish a relevant system for classifying wastes and for assessment of hazard properties, is to obtain comparable test results. This can only be obtained if the ecotoxicity tests on wastes are carried out according to a unique procedure describing more or less conventional test conditions (an exclusive dilution medium for terrestrial tests, a unique L/S ratio for preparation of water extracts, a unique liquid / solid separation step, etc.). This procedure should be applicable to a very wide range of waste materials whatever their physical properties are.

Any strategy for the assessment of properties potentially hazardous to the environment used in a classification system should include test organisms representing the terrestrial and the aquatic compartment. Both types of tests should be considered because they expand the range of effect expression due to differences in species sensitivity and exposure.

For this specific purpose, the water extracts preparations for toxicity testing do not simulate leaching from wastes under environmental conditions but measure the water available fraction of the toxic components of the wastes.

Site-specific exposure scenario

The second application of ecotoxicity tests to wastes refers to a risk assessment approach. In this particular case, the test strategy should model site specific exposure conditions and should take into account the transfer of contaminants via the food chain and to surface and ground water by run-off or leaching. This application concerns firstly the definition of generic scenarios frequently encountered (e.g. wastes deposit in stockpiles, re-use of wastes) and focus on the relevant way of exposure to terrestrial and aquatic organisms.

This document describes the necessary steps to be performed before carrying out ecotoxicity tests on wastes within the context of assessment of ecotoxic properties for classification purposes.

It should be kept in mind that the use of this standard is currently not mandatory for assessing the hazardous property HP14.

1 Scope

This document describes the necessary steps to be performed before carrying out ecotoxicity tests on wastes. The purpose of this document is to provide guidance on the taking of the sample, transport, storage of wastes and to define preparation, for the determination of ecotoxicological properties of wastes under the conditions specified in this document by biological testing either as raw wastes or water extracts from wastes. Sample preparation for other applications (e.g. assessment of waste effects on aquatic and terrestrial organisms in a disposal scenario) is not considered.

Specifying a test battery to characterize ecotoxicological properties of wastes is not in the scope of this document.

This document is applicable to solid and liquid wastes.

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.

EN 12457-2:2002, *Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 2: One stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 4 mm (without or with size reduction)*

EN 14899, *Characterization of waste - Sampling of waste materials - Framework for the preparation and application of a Sampling Plan)*

EN 16720-1, *Characterization of sludges - Physical consistency - Part 1: Determination of flowability - Method by extrusion tube apparatus)*

EN ISO 5667-3, *Water quality - Sampling - Part 3: Preservation and handling of water samples (ISO 5667-3)*

EN ISO 14238:2012, *Soil quality - Biological methods - Determination of nitrogen mineralization and nitrification in soils and the influence of chemicals on these processes (ISO 14238: 2012)*

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

EN ISO 10390, *Soil, sludge and treated biowaste - Determination of pH (ISO/FDIS 10390)*

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 <https://www.electropedia.org/>

3.1

dilution medium

liquid or solid used for the preparation of control vessels and the preparation of test mixtures

3.2

ecotoxicological properties

potential adverse effects to biological systems which a waste has an inherent capacity to cause

3.3

eluate

solution recovered from a leaching test

[SOURCE: EN 12457-2:2002, 3.3]

3.4

granular waste

waste not being monolithic, nor a liquid, a gas or a sludge

[SOURCE: adapted from EN 12457-2:2002, 3.10]

3.5

laboratory sample

sample or subsample(s) sent to or received by the laboratory (IUPAC definition)

Note 1 to entry: When the laboratory sample is further prepared (reduced) by subdividing, mixing, grinding or by combinations of these operations, the result is the test sample. When no preparation of the laboratory sample is required, the laboratory sample is the test sample. A test portion is removed from the test sample for the performance of the test or for analysis. The laboratory sample is the final sample from the point of view of sample collection, but it is the initial sample from the point of view of the laboratory.

Note 2 to entry: Several laboratory samples can be prepared and sent to different laboratories or to the same laboratory for different purposes. When sent to the same laboratory, the set is generally considered as a single laboratory sample and is documented as a single sample.

3.6

leachant

liquid used in a leaching test

Note 1 to entry: For the purpose of this document the leachant is water as specified in Clause 4.

3.7

leaching test

test during which a material is put into contact with a leachant and some constituents of the material are extracted