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Characterization of waste - Guidance on the use of ecotoxicity tests applied to waste

S.R. CEN/TR 16110:2010

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TECHNICAL REPORT

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CEN/TR 16110

December 2010

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English Version

Characterization of waste - Guidance on the use of ecotoxicity tests applied to waste

Caractérisation des déchets - Lignes directrices pour l'utilisation des essais d'écotoxicité appliqués aux déchets

Charakterisierung von Abfällen - Anleitung zur Anwendung von Ökotoxizitätsprüfungen auf Abfälle

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Foreword

This document (CEN/TR 16110:2010) has been prepared by Technical Committee CEN/TC 292 “Characterization of waste”, the secretariat of which is held by NEN.

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This document is a Technical Report.

Introduction

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

Ecotoxicity tests may be applied to wastes to identify their potential hazardous intrinsic properties with respect to the environment for basic characterization or to assess the risk related to a site-specific exposure scenario.

The majority of existing ecotoxicity tests being internationally harmonized were developed to describe the ecotoxic potential of a test substance when added to water or to soil/soil material, of waste water or of eluates. These methods can be applied with some modifications for the ecotoxicological characterization of wastes. In this situation, users of these methods should be aware that the validation of the methods is not complete. Several studies as well as an International ring test have been conducted to validate some test methods for waste samples and the results have been used as background information.

1 Scope

Ecotoxicity tests can be applied to wastes to identify their potential hazardous properties with respect to the environment or to assess the risk related to a site-specific exposure scenario. This document provides guidance for the selection and use of ecotoxicity tests for both applications.

This document focuses on the following selected field of applications:

a) Basic ecotoxicological characterization;

b) Site-specific exposure scenario;

c) Landfill management:

   1) monitoring of leachates;

   2) mineral waste going to non-controlled landfill sites.

d) Re-use of waste:

   1) use of sludge in agriculture;

   2) use of mineral waste in road construction.

The user should be aware that other fields of application can also be covered by ecotoxicological testing not being in the scope of the document. The ecotoxicological assessment of waste within other scenarios might need the development of other test strategies.

Depending on the waste type and the assessment goal, relevant criteria are described for the selection of a test strategy and the suitable ecotoxicity test(s).

This document also provides guidance for individual ecotoxicity test protocols to meet the specific demands of waste testing (e.g. limitations, test design, confounding factors).The tests recommended represent a minimum test battery that may be accomplished by additional tests or even be replaced by others according to the waste, the intended use or protection goal envisaged.

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.

EN 12457-1:2002, *Characterisation of waste — Leaching — Compliance test for leaching of granular waste materials and sludges — Part 1:One stage batch test at a liquid to solid ratio of 2 l/kg for materials with high solid content and with particle size below 4 mm (without or with size reduction)*

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