INTERNATIONAL STANDARD

ISO 16778

First edition
2015-06-15

Water quality — Calanoid copepod early-life stage test with *Acartia tonsa*

Qualité de l'eau — Essai aux premiers stades de la vie de copépodes calanoïdes avec Acartia tonsia

Reference number
ISO 16778:2015(E)

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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).

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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 147, *Water quality*, Subcommittee SC 5, *Biological methods*.

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Water quality — Calanoid copepod early-life stage test with *Acartia tonsa*

WARNING — Persons using this document should be familiar with normal laboratory practice. This International Standard 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 and to ensure compliance with any national regulatory conditions.

IMPORTANT — It is absolutely essential that tests conducted in accordance with this document be carried out by suitably qualified staff.

1 Scope

This International Standard specifies an early-life stage test procedure for determination of the toxic effects of a chemical substance, effluent, or water sample on a cold-water marine and brackish water copepod species under semi-static conditions. The biological endpoints include survival and development of the early-life stages. The exposure starts with eggs and is continued until emergence of juvenile stages.

Copepods occur widely in marine, brackish, and fresh water ecosystems. They represent important prey items for the larvae of many fish and larger invertebrates and are increasingly used as a live food source in aquaculture. They feed on phytoplankton and, thus, are an ecologically important energy-transfer link between primary producers and higher trophic levels.

2 Normative references

There are no normative references cited in this document.

3 Terms and definitions

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

3.1
EC
effect concentration

3.2
EC_x
calculated concentration from which an effect of x % is expected

3.3
larval development ratio
LDR
fraction of animals that have turned into a copepodite stage compared to the total number of surviving nauplii and copepodites within a given period of time (5 d to 6 d)

3.4
lowest observed effect concentration
LOEC
lowest concentration within the experimental range at which a significant effect is observed

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3.5
no observed effect concentration
NOEC
tested concentration just below the LOEC

[SOURCE: ISO/TS 20281:2006, 3.18]

3.6
***x* % confidence intervals**
interval of values within which the measured or calculated value is likely to be present with a probability of *x* %

3.7
dilution water
water with defined properties (e.g. salinity) or natural seawater used for stepwise dilution of the test sample or used as control

4 Principle

The test is an early-life stage test, where the organisms are exposed to various concentrations of a chemical substance, effluent, or water sample, from the egg stage to the juvenile stages. Survival and development of early-life stages [larval development ratio (LDR)] are dependent on the investigated parameters. The total test duration is about 5 d to 6 d, which is sufficient time to investigate the development from nauplii to copepodites.

The naupliar (larval) and copepodite (juvenile) stages are morphologically distinct, and therefore, the transition from the last naupliar to the first copepodite stage is easily observed. Larval development ratio (LDR) is recorded after 5 d to 6 d, when about 60 % of the control animals have reached a copepodite stage, and is expressed as the ratio of copepodites to the total number of surviving early-life stages (nauplii + copepodites) at the end of the LDR test. Hatching success and mortality of the early stages should be presented along with the LDR.

The outcome of the test is either the no observed effect concentration and the lowest observed effect concentration (NOEC-LOEC) values or the effect concentrations with a certain degree (*x* %) of inhibition (EC_x) (e.g. EC_{50} and EC_{10}).

5 Apparatus

Test vessels and other apparatus, which will come into contact with the dilution water and test solutions, should be made entirely of glass or other materials chemically inert to the test chemical.

5.1 Standard laboratory apparatus, e.g. measurements of pH, dissolved oxygen concentration, salinity, and temperature.

5.2 Glass flasks, volume 1 l, 2 l, and 5 l.

5.3 Air pumps.

5.4 Air filters, pore size 0,2 µm.

5.5 Peristaltic pump for food supply.

5.6 Temperature-controlled cabinet or room.

5.7 Low-magnifying stereomicroscope, preferably with dark field illumination.

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