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Water quality — Practices for evaluating and controlling microbiological colony count media used in water quality tests

*Qualité de l'eau — Techniques d'évaluation et de contrôle des milieux
microbiologiques servant au comptage des colonies pour les essais
d'évaluation de la qualité de l'eau*



Reference number
ISO 9998:1991(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9998 was prepared by Technical Committee ISO/TC 147, *Water quality*.

Annexes A and B form an integral part of this International Standard. Annex C is for information only.

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Introduction

The development of micro-organisms upon culture media is dependent upon a number of very important factors.

- a) The proper nutrients must be available.
- b) Oxygen or other gases must be available.
- c) A certain degree of moisture is necessary.
- d) The medium must be of the proper pH reaction.
- e) Proper temperatures must be maintained.
- f) The medium must be sterile and maintained free of contamination after inoculation.
- g) Media must be able to be reproduced consistently with minimum variations.
- h) Care should be taken to avoid plates which are too crowded.

To ensure the reproducibility of microbiological results and to enable inter-laboratory comparison studies to be made, the preparation of microbiological media must be strictly regulated. Guidelines for ensuring the proper preparation of media which can be used with similar growth expectations from laboratory to laboratory are presented below.

Water quality — Practices for evaluating and controlling microbiological colony count media used in water quality tests

1 Scope

This International Standard covers the comparison and evaluation of the same medium prepared from different lots of materials.

It also covers the comparison and evaluation of different media which are used for the same purpose.

It only deals with the finished product ready to be tested, and not media formulation or preparation.

This method applies to the evaluation of any solid media intended for bacteriological isolation and enumeration procedures.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8199:1988, *Water quality — General guide to the enumeration of micro-organisms by culture*.

3 Productivity/selectivity testing

3.1 The general procedure is to inoculate appropriate organisms onto the media under evaluation and to compare their performance, when trying

- a) to choose between various manufacturer's media;
- b) to select the most appropriate medium; or
- c) to assess batch-to-batch variation.

Inoculation can be either a quantitative method or simple plate-spreading by wire loop and seeding of liquid media by pipette. Alternatively, a series of natural aquatic samples with high bacterial populations may be used. This type of screening is closer to reality, but has the disadvantage that the most demanding organisms may not be present in the water sample used.

3.2 Examples of statistical analyses are given in annex A.

4 Media preparation and tests

4.1 Application

The following tests and procedures can be applied to each lot of medium prepared from either a commercial source or in a laboratory using primary ingredients (see also ISO 8199).

4.2 Measurement of pH-value

Prepare the medium, sterilize as directed and measure the pH using an electronic pH-meter. The pH of most media should be within ± 0.2 of a unit of the target value at 25 °C. Check the pH of the sterilized media, in the case of solid media after solidification.

The pH or reaction of the culture medium, expressing its hydrogen ion concentration, is very important for the growth of micro-organisms. Most micro-organisms prefer media which are approximately neutral, although some may require media which are distinctly acid.

Drift in pH or other pH problems may be caused by

- superheating;
- incomplete mixing;
- excessive sterilization;