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Microbiology of food, animal feed and water — Preparation, production, storage and performance testing of culture media

Microbiologie des aliments, des aliments pour animaux et de l'eau — Préparation, production, stockage et essais de performance des milieux de culture

Reference number
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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. www.iso.org/directives

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 34, *Food products*, Subcommittee SC 9, *Microbiology*, in collaboration with Technical Committee ISO/TC 147 *Water quality*, Subcommittee SC 4, *Microbiological methods*.

This first edition of ISO 11133 replaces the second edition of ISO/TS 11133-1 (ISO/TS 11133-1:2009) and the first edition of ISO/TS 11133-2:2003, which have been technically revised. It also incorporates the Amendment ISO/TS 11133-2:2003/Amd.1:2011. In particular, it also includes requirements for microbiology media for water testing. It supersedes ISO 9998:1991.

This corrected version of ISO 11133:2014 incorporates the following corrections:

— In Annex E

Selective media for enumeration of microorganisms

— DG18 column Incubation: d was replaced with days;

— EC column control strain: £ was deleted after Pseudomonas;

— mCCDA: [d] was deleted after both species of *Campylobacter*; [b] was added after 000156;

— mCCDA: the criteria "Total or partial inhibition (0-1)" was added to the control stain *E. coli* and "Total inhibition (0)" was added to *S. aureus*;

— TSC: the row with *Pseudomonas aeruginosa* and the WDCM number 00025 was deleted.

Selective enrichment media

— Bolton productivity: the cocktails of control strains were split into 2 separate cells;

— EE: [d] was added before [i], after both stains of *Salmonella;*

— ITC: a new cocktail of strains was introduced for Productivity;

— PBS selectivity: [b] was added after 00025;

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— RVS Productivity: added [d] to *E. coli*.

Non-selective liquid media

— mCCDA: [d] was deleted after both species of *Campylobacter*; [b] was added after 000156;

— mCCDA column Characteristic reactions: “colonies” was added after “moist”;

— PEMBA lane productivity: [i] was deleted after “good growth (2)”;

— Media TCBS was added after TBX;

— VRBG: one *Salmonella* Typhimurium was replaced by *Salmonella* Enteritidis WDCM 00030 and [d,i] was added to both *Salmonella*;

Non-selective isolation media

— Nutrient agar: the WDCM numbers were inverted between *S.* Typhimurium and *S.* Enteritidis;

— TSYEA: name and WDCM were corrected to *Listeria monocytogenes* 4b WDCM 00021[b];

Multipurpose media

— Pre-enrichment for Enterobacteriaceae: added [d] to both *Salmonella* and deleted “or” between the 2 WDCM numbers.

Reference media for enumeration of microorganisms

— TSA: deleted “*Escherichia coli* O157:H7 WDCM 00014 (non-toxigenic)”;

— SDA: added WDCM number 00053[b] to *Aspergillus*;

— In Annex F

Selective media for enumeration of microorganisms by comparing with a non-selective reference medium

— Colilert was replaced by Colilert-18 and the WDCM number 00207 was replaced by 00024.

Selective media for enumeration of microorganisms by comparing with a previously accepted batch (for use in special cases)

— Colilert was replaced by Colilert-18 and the WDCM number 00207 was replaced by 00024;

— Lactose TTC: a line was added between *Enterococcus faecalis* and *Pseudomonas aeruginosa* and the WDCM number corresponding.

Selective enrichment media

— Bolton/Preston Productivity: cocktails of control strains were split in 2 separate cells;

Non-selective liquid media

— “Saline salt” was replaced by “Saline solution”, and a [b] was added after 00034;

— mCCDA: [d] was deleted after both species of *Campylobacter*; [b] was added after 000156.

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Introduction

In laboratories carrying out microbiological examinations, the main objectives are to maintain, resuscitate, grow, detect and/or enumerate a wide variety of microorganisms. Culture media are used in all traditional microbiological culture techniques and also for many alternative techniques. Many formulae of culture media are commercially available and many more, designed for specific growth purposes, are described in the literature.

Many tests and procedures depend upon culture media being capable of providing consistent and reproducible results. The requirements for media may be specific to both the sample and the organisms to be detected. Culture media meeting established performance criteria are therefore a pre-requisite for any reliable microbiological work. Sufficient testing should be carried out to demonstrate

a) the acceptability of each batch of medium,

b) that the medium is "fit for purpose", and

c) that the medium can produce consistent results.

These three criteria are an essential part of internal quality control procedures and, with appropriate documentation, will permit effective monitoring of culture media and contribute to the production of both accurate and reliable data. For reliable microbiological analysis it is essential to use culture media of proven quality. For all media described in standard methods it is essential to define the minimum acceptance criteria required to ensure their reliability. It is recommended that in the determination of the performance characteristics of a culture medium tests are carried out that conform with this International Standard.

The establishment of widely accepted minimum performance criteria for media should lead to products with more consistent quality and thus reduce the extent of testing necessary in the user's laboratory.

In addition the acceptance criteria measured by the methods defined in this International Standard can be used by all microbiological laboratories to evaluate the productive, selective and/or elective properties of a culture medium.

In the microbiological analysis of food, animal feed and water, the requirements of this International Standard have precedence in the assessment of culture media quality.

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Microbiology of food, animal feed and water — Preparation, production, storage and performance testing of culture media

1 Scope

This International Standard defines terms related to quality assurance of culture media and specifies the requirements for the preparation of culture media intended for the microbiological analysis of food, animal feed, and samples from the food or feed production environment as well as all kinds of water intended for consumption or used in food production.

These requirements are applicable to all categories of culture media prepared for use in laboratories performing microbiological analyses.

This International Standard also sets criteria and describes methods for the performance testing of culture media. This International Standard applies to producers such as:

— commercial bodies producing and/or distributing ready-to-use or semi-finished reconstituted or dehydrated media;

— non-commercial bodies supplying media to third parties;

— microbiological laboratories preparing culture media for their own use.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6887-1, *Microbiology of food and animal feed — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 1: General rules for the preparation of the initial suspension and decimal dilutions*

ISO 6887-2, *Microbiology of food and animal feed — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 2: Specific rules for the preparation of meat and meat products*

ISO 6887-3, *Microbiology of food and animal feed — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 3: Specific rules for the preparation of fish and fishery products*

ISO 6887-4, *Microbiology of food and animal feed — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 4: Specific rules for the preparation of miscellaneous products*

ISO 6887-5, *Microbiology of food and animal feeding stuffs — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 5: Specific rules for the preparation of milk and milk products*

ISO 6887-6, *Microbiology of food and animal feed — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 6: Specific rules for the preparation of samples taken at the primary production stage*

ISO 7704, *Water quality — Evaluation of membrane filters used for microbiological analyses*

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ISO 7218, *Microbiology of food and animal feeding stuffs — General requirements and guidance for microbiological examinations*

ISO 8199, *Water quality — General guidance on the enumeration of micro-organisms by culture*

3 Terms and definitions

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

NOTE 1 This clause gives the general definitions relating to quality assurance of culture media and provides terminology relating to performance testing, culture media and test microorganisms.

NOTE 2 Tables E.2 and F.2 give explanations of media name abbreviated terms.

3.1 General terms and definitions

3.1.1
quality control
part of quality management focused on fulfilling quality requirements

Note 1 to entry: See Reference [1].

3.1.2
batch of culture medium
lot of culture medium
homogeneous and fully traceable unit of a medium referring to a defined amount of bulk, semi-finished product or end product, which is consistent in type and quality and which has been produced within one defined production period, having been assigned the same batch (or lot) number

3.1.3
chromogenic substrate
fluorogenic substrate
substrate containing a chromophore/fluorophore group and a substrate utilizable by bacteria or fungi

Note 1 to entry: After splitting the chromogenic/fluorogenic substrate, the chromophore/fluorophore is released and a coloured/fluorescent end product becomes visible/can be detected using an ultraviolet (UV) lamp.

3.2 Terminology of performance testing

3.2.1
performance of culture medium
response of a culture medium to challenge by test organisms under defined conditions

3.2.2
target microorganism
microorganism or group of microorganisms to be detected or enumerated

3.2.3
non-target microorganism
microorganism that is suppressed by the medium and/or conditions of incubation or does not show expected characteristics of the target microorganism

3.2.4
productivity of culture medium
level of recovery of a target microorganism from the culture medium under defined conditions

3.2.5
selectivity of culture medium
degree of inhibition of a non-target microorganism on or in a selective culture medium under defined conditions

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