
**Cosmetics — Microbiology — Detection
of *Candida albicans***

Cosmétiques — Microbiologie — Détection de Candida albicans

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 18416 was prepared by Technical Committee ISO/TC 217, *Cosmetics*.

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Introduction

Microbiological examinations of cosmetic products are carried out according to an appropriate microbiological risk analysis in order to ensure their quality and safety for consumers.

Microbiological risk analysis depends on several parameters such as:

- potential alteration of cosmetic products;
- pathogenicity of microorganisms;
- site of application of the cosmetic product (hair, skin, eyes, mucous membranes);
- type of user (adults, children, including under 3 years).

For cosmetics and other topical products, the detection of *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Candida albicans* may be relevant because they can cause skin or eye infections. The detection of other kinds of microorganism might be of interest since those microorganisms (including indicators of faecal contamination, e.g. *Escherichia coli*) suggest hygienic failure during the manufacturing process.

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Cosmetics — Microbiology — Detection of *Candida albicans*

1 Scope

This International Standard gives general guidelines for the detection and identification of the specified microorganism *Candida albicans* in cosmetic products. Microorganisms considered as specified in this International Standard might differ from country to country according to national practices or regulations.

In order to ensure product quality and safety for consumers, it is advisable to perform an appropriate microbiological risk analysis so as to determine the types of cosmetic product to which this International Standard is applicable. Products considered to present a low microbiological risk include those with low water activity, hydro-alcoholic products, those with extreme pH values, etc.

The method described in this International Standard is based on the detection of *Candida albicans* in a non-selective liquid medium (enrichment broth), followed by isolation on a selective agar medium. Other methods may be appropriate dependent on the level of detection required.

NOTE For the detection of *Candida albicans*, subcultures can be performed on non-selective culture media followed by suitable identification steps (e.g. using identification kits).

Because of the large variety of cosmetic products within this field of application, this method might not be suited in every detail to some products (e.g. certain water-immiscible products). Other International Standards (e.g. ISO 18415) might be appropriate. Other methods (e.g. automated) can be substituted for the test presented here provided that their equivalence has been demonstrated or the method has been otherwise validated.

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.

ISO 21148:2005, *Cosmetics — Microbiology — General instructions for microbiological examination*

EN 12353, *Chemical disinfectants and antiseptics — Preservation of test organisms used for the determination of bactericidal, mycobactericidal, sporicidal and fungicidal activity*

3 Terms and definitions

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

3.1

product

portion of an identified cosmetic product received in the laboratory for testing

3.2

sample

portion of the product (at least 1 g or 1 ml) that is used in the test to prepare the initial suspension

**3.3
initial suspension**

suspension (or solution) of the sample in a defined volume of an appropriate enrichment broth

**3.4
sample dilution**

dilution of the initial suspension

**3.5
specified microorganisms**

aerobic mesophilic bacteria or yeast that is undesirable in a cosmetic product because it can cause skin or eye infections or is an indication of hygienic failure

**3.6
*Candida albicans***

yeast that form white to beige, creamy and convex colonies on the surface of a selective medium

NOTE The main characteristic for identification is the production of germ tube and/or pseudomycelium and chlamydospore when the test is performed following the method specified in this International Standard.

**3.7
enrichment broth**

non-selective liquid medium containing suitable neutralizers and/or dispersing agents and validated for the product under test

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4 Principle

The first step of the procedure is to perform an enrichment by using a non-selective broth medium to increase the number of microorganisms without the risk of inhibition by the selective ingredients that are present in selective/differential growth media.

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The second step (isolation) of the test is performed on a selective medium followed by identification tests.

To prevent the possible inhibition of microbial growth by the sample it shall be neutralized to allow the detection of viable microorganisms [1]. In all cases and whatever the methodology, the neutralization of the antimicrobial properties of the product shall be checked and validated [2], [3], [4].

5 Diluents and culture media

5.1 General

General instructions are given in ISO 21148. When water is mentioned in this International Standard, use distilled water or purified water as specified in ISO 21148.

The enrichment broth is used to disperse the sample and to increase the initial microbial population. It may contain neutralizers if the specimen to be tested has antimicrobial properties. The efficacy of the neutralization shall be demonstrated (see Clause 11). Information relative to suitable neutralizers is given in Annex B.

The enrichment broth (5.3.3.1), or any of the ones listed in Annex A, is suitable for checking the presence of *Candida albicans* in accordance with this International Standard provided that it is validated in accordance with Clause 11.

Other diluents and culture media may be used if it has been demonstrated that they are suitable for use.

5.2 Diluent for the yeast suspension (tryptone sodium chloride solution)

5.2.1 General

The diluent is used for the preparation of yeast suspension used for the validation procedure (see Clause 11).

5.2.2 Composition

— tryptone, pancreatic digest of casein	1,0 g
— sodium chloride	8,5 g
— water	1 000 ml

5.2.3 Preparation

Dissolve the components in water by mixing whilst heating. Dispense into suitable containers. Sterilize in the autoclave at 121 °C for 15 min.

After sterilization and cooling of the solution, the pH shall be equivalent to $7,0 \pm 0,2$ when measured at room temperature.

5.3 Culture media

5.3.1 General

Culture media may be prepared using the descriptions provided below or from dehydrated culture media in accordance with the manufacturer's instructions. The instructions provided by the supplier of the media should be followed.

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NOTE Ready-to-use media may be used when their composition and/or growth yields are comparable to those of the formulae given herein.

5.3.2 Agar medium for validation

5.3.2.1 Sabouraud dextrose agar (SDA)

5.3.2.1.1 Composition

— dextrose	40,0 g
— peptic digest of animal tissue	5,0 g
— pancreatic digest of casein	5,0 g
— agar	15,0 g
— water	1 000 ml

5.3.2.1.2 Preparation

Dissolve the components or the dehydrated complete medium in the water by heating. Dispense the medium into suitable containers. Sterilize in an autoclave at 121 °C for 15 min. After sterilization the pH shall be equivalent to $5,6 \pm 0,2$ when measured at room temperature.

5.3.2.2 Other agar media for validation

Other agar media for validation may be used as appropriate (see Annex A).

5.3.3 Enrichment broth

5.3.3.1 Eugon LT 100 broth

5.3.3.1.1 General

This medium contains ingredients which neutralize inhibitory substances present in the sample: lecithin and polysorbate 80, and dispersing agent octoxynol 9.

5.3.3.1.2 Composition

— pancreatic digest of casein	15,0 g
— papaic digest of soybean meal	5,0 g
— L-cystine	0,7 g
— sodium chloride	4,0 g
— sodium sulfite	0,2 g
— glucose	5,5 g
— egg lecithin	1,0 g
— polysorbate 80	5,0 g
— octoxynol 9	1,0 g
— water	1 000 ml

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5.3.3.1.3 Preparation

Dissolve the components polysorbate 80, octoxynol 9 and egg lecithin one after another in boiling water to complete dissolution. Dissolve the other components by mixing whilst heating. Dispense the medium into suitable containers. Sterilize in the autoclave at 121 °C for 15 min.

After sterilization and cooling of the solution, the pH shall be equivalent to $7,0 \pm 0,2$ when measured at room temperature.

5.3.3.2 Other enrichment broths

Other enrichment broths may be used as appropriate (see Annex A).

5.3.4 Selective agar medium for isolation of *Candida albicans*

5.3.4.1 Sabouraud dextrose chloramphenicol agar

5.3.4.1.1 Composition

— dextrose	40,0 g
— peptic digest of animal tissue	5,0 g
— pancreatic digest of casein	5,0 g

— chloramphenicol	0,050 g
— agar	15,0 g
— water	1 000 ml

5.3.4.1.2 Preparation

Dissolve the components (including the chloramphenicol) or the dehydrated complete medium in the water by mixing while heating. Dispense the medium into suitable containers. Sterilize in an autoclave at 121 °C for 15 min. After sterilization the pH shall be equivalent to $5,6 \pm 0,2$ when measured at room temperature.

5.3.4.2 Other selective agar media

Other selective agar media may be used as appropriate (see Annex A).

5.3.5 Corn meal agar with 1 % polysorbate 80

5.3.5.1 Composition

— infusion from corn meal	50,0 g
— agar	15,0 g
— polysorbate 80	10,0 g
— water	1 000 ml

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5.3.5.2 Preparation

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Dissolve the components or the dehydrated complete medium in the water by mixing while heating. Dispense the medium into suitable containers. Sterilize in an autoclave at 121 °C for 15 min. After sterilization the pH shall be equivalent to $6,0 \pm 0,2$ when measured at room temperature.

6 Apparatus and glassware

The laboratory equipment, apparatus and glassware shall be as described in ISO 21148.

7 Strains of microorganisms

For the validation of the test conditions, the following representative strain is used:

Candida albicans ATCC¹⁾ 10231 or equivalent strain: IP²⁾ 48.72 or NCPF³⁾ 3179 or NBRC⁴⁾ 1594 or KCTC⁵⁾ 17205, or other equivalent national collection strain.

The culture should be reconstituted according to the procedures provided by the supplier of the reference strain.

-
- 1) American Type Culture Collection.
 - 2) Institute Pasteur.
 - 3) National Collection of Pathogenic Fungi.
 - 4) National Biological Resource Center.
 - 5) Korean Collection for Type Culture.