



SLOVENSKI STANDARD

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Sir in topljeni sir, kazeini in kazeinatti - Določevanje maščob - Gravimetrijska metoda (ISO/DIS 23319:2020)

Cheese and processed cheese products, caseins and caseinates - Determination of fat content - Gravimetric method (ISO/DIS 23319:2020)

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Fromages et fromages fondus, caséines et caséinates - Détermination de la teneur en matière grasse - Méthode gravimétrique (ISO/DIS 23319:2020)

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Cheese and processed cheese products, caseins and caseinates — Determination of fat content — Gravimetric method

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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Reagents	2
6 Apparatus	2
7 Sampling	4
8 Preparation of test sample	4
8.1 Cheese.....	4
8.2 Caseins and caseinates.....	4
9 Procedure	5
9.1 Test portion.....	5
9.2 Blank test.....	5
9.3 Preparation of a fat-collecting vessel.....	5
9.4 Determination.....	5
10 Calculation and expression of results	9
11 Precision	9
11.1 Interlaboratory test.....	9
11.2 Repeatability.....	9
11.3 Reproducibility.....	10
11.4 Test report.....	10
Annex A (normative) Additional procedures	11
Annex B (normative) Fat extraction tube model with siphon or wash-bottle fittings	13
Annex C (normative) Interlaboratory test for cheeses	14
Annex D (normative) Interlaboratory test for caseins and caseinates	15
Bibliography	16

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

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, and the International Dairy Federation (IDF). It is being published jointly by ISO and IDF.

This first edition of ISO 23319 merges, cancels and replaces the following standards for the determination of the fat content of milk and milk products using the SBR principle:

- ISO 1735:2004 | IDF 5:2004, *Cheese and processed cheese products — Determination of fat content — Gravimetric method (Reference method)*;
- ISO 5543:2004 | IDF 127:2004 *Caseins and caseinates — Determination of fat content — Gravimetric method (Reference method)*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

IDF (the International Dairy Federation) is a non-profit private sector organization representing the interests of various stakeholders in dairying at the global level. IDF members are organized in National Committees, which are national associations composed of representatives of dairy-related national interest groups including dairy farmers, dairy processing industry, dairy suppliers, academics and governments/food control authorities.

ISO and IDF collaborate closely on all matters of standardization relating to methods of analysis and sampling for milk and milk products. Since 2001, ISO and IDF jointly publish their International Standards using the logos and reference numbers of both organizations.

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This document was prepared by the IDF *Standing Committee on Analytical Methods for Composition* and ISO Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*. It is being published jointly by ISO and IDF.

The work was carried out by the IDF/ISO Action Team (C34) of the *Standing Committee on Analytical Methods for Composition* under the aegis of its project leader, Mr Philippe Trossat (FR).

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Cheese and processed cheese products, caseins and caseinates — Determination of fat content — Gravimetric method

WARNING — The use of this document may involve hazardous materials, operations and equipment. This standard does not purport to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish safety and health practices and to determine the applicability of regulatory limitations prior to use.

1 Scope

This document specifies a method for the determination of the fat content of all types of cheese and processed cheese products containing lactose of below 5 % (mass fraction) of non-fat solids, and all types of caseins and caseinates.

The method is not applicable to fresh cheese type containing e.g. fruits, syrup or muesli. For such products the Schmid–Bondzynski–Ratzlaff (SBR) principle is not applicable due to high concentrations of sugars. For these products, the method using the Weibull–Berntrop principle (ISO 8262-3) is appropriate.

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2 Normative references (standards.iteh.ai)

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3889, *Milk and milk products — Specification of Mojonnier-type fat extraction flasks*

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

3 Terms and definitions

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

3.1

fat content

mass fraction of substances determined by the procedure specified in this document

Note 1 to entry: The fat content is expressed as a percentage by mass.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Principle

A test portion is digested with hydrochloric acid, then ethanol is added. The acid-ethanolic solution is subsequently extracted with diethyl ether and light petroleum. The solvents are removed by

ISO/DIS 23319:2020(E)
IDF 250:2020(E)

distillation or evaporation. The mass of the substances extracted, which are soluble in light petroleum, is determined.

NOTE This is usually known as the Schmid-Bondzynski-Ratzlaff principle.

5 Reagents

Use only reagents of recognized analytical grade, unless otherwise specified, and distilled or demineralized water or water of equivalent purity. The reagents shall leave no appreciable residue when the determination is carried out by the method specified (see [Annex A](#)).

5.1 Hydrochloric acid, containing a mass fraction of HCl of approximately 36 % ($\rho_{20} = 1,18$ g/ml)

5.2 Dilute hydrochloric acid, containing a mass fraction of approximately 25 % ($\rho_{20} = 1,125$ g/ml)

Dilute 675 ml of concentrated hydrochloric acid ([5.2](#)) to 1 000 ml with water and mix.

5.3 Ethanol, (C_2H_5OH), at least 94 % (volume fraction)

Ethanol denatured otherwise than by methanol may be used provided that the denaturant does not affect the result of the determination (see A5).

5.4 Diethyl ether ($C_2H_5OC_2H_5$), free from peroxides (see A3) and containing none or not more than 7 mg/kg of antioxidants (see A4)

5.5 Light petroleum, with any boiling range between 30 °C and 60 °C or, as equivalent, pentane [$CH_3(CH_2)_3CH_3$], with a boiling point of 36 °C.

5.6 Mixed solvent, prepared shortly before use by mixing equal volumes of diethyl ether ([5.4](#)) and light petroleum ([5.5](#)).

6 Apparatus

WARNING — Since the determination involves the use of volatile flammable solvents, all electrical apparatus employed shall comply with legislation relating to the hazards in using such solvents.

Usual laboratory equipment and, in particular, the following.

6.1 Analytical balance, capable of weighing to the nearest 1 mg, with a readability of 0,1 mg.

6.2 Centrifuge, capable of holding the fat-extraction flasks or tubes ([6.6](#)) and capable of spinning at a rotational frequency of 500 min^{-1} to 600 min^{-1} to produce a radial acceleration of around 80 g to 90 g at the outer end of the flasks or tubes.

NOTE The use of the centrifuge is optional but recommended (see [9.4.7](#)).

6.3 Distillation or evaporation apparatus to enable the solvents and ethanol to be distilled from the fat-collecting flasks or to be evaporated from beakers and dishes at a temperature not exceeding 100 °C.

6.4 Drying oven, electrically heated, with ventilation port(s) fully open, capable of being maintained at a temperature of $102^\circ\text{C} \pm 2^\circ\text{C}$ throughout the working space, alternatively, a vacuum drying oven, capable of being maintained at $72,5 \pm 2,5^\circ\text{C}$, and a pressure less than 600 mbar (50 mmHg) may be used. The oven shall be fitted with a suitable thermometer.

6.5 Boiling water bath or hot plate**6.6 Fat-extraction flasks****6.6.1 Mojonnier-type fat-extraction flasks, as specified in ISO 3889 | IDF 219****6.6.2 Extraction tubes-type fat extraction flask**

It is also possible to use fat extraction tubes with siphon or wash-bottle fittings. For an example, see model in [Annex B](#).

6.6.3 Stoppers

The flasks or tubes shall be provided with stoppers of different material, such as bark cork, silicone rubber, polytetrafluoroethylene (PTFE) or glass, unaffected by the reagents used. Bark corks shall be washed with the diethyl ether ([5.4](#)), kept in water at 60 °C or more for at least 15 min, and shall then be allowed to cool in the water so that they are saturated when used

6.7 Rack, to hold the fat-extraction flasks or tubes.**6.8 Wash bottle**, suitable for use with the mixed solvent ([5.6](#)). A plastic wash bottle shall not be used.**6.9 Fat-collecting vessels**

For example:

- boiling flasks, flat-bottomed, of capacity 125 ml to 250 ml;
- conical flasks, of capacity 250 ml;
- metal dishes.

If metal dishes are used, they shall preferably be of stainless steel, and shall be flat-bottomed, preferably with a spout, and shall have a diameter of 80 mm to 100 mm and a height of approximately 50 mm. Do not use aluminium dishes.

6.10 Boiling aids, fat-free, of non-porous porcelain or silicon carbide, or glass beads. The use of glass beads is optional in the case of metal dishes.**6.11 Measuring cylinders** of capacities 5 ml and 25 ml.**6.12 Pipettes**, graduated, to deliver 10 ml.**6.13 Tongs**, made of metal, capable of holding flasks, beakers or dishes.**6.14 Sheets of cellulose film**, unlacquered, soluble in hydrochloric acid, of thickness of thickness 0,03 mm to 0,05 mm, of dimensions 50 mm × 75 mm approximately. The sheets shall be inert under the test conditions.**6.15 Grinding or grating device**, for grinding or grating the laboratory sample if necessary. This device should be such that no undue heat will be developed and no loss of moisture occurs. A hammer mill shall not be used.**6.16 Test sieve**, of woven wire cloth, diameter 200 mm, nominal size of opening 500 µm, with receiver, complying with the requirements of ISO 565.