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Yogurt — Determination of total solids content (Reference method)

Yaourt — Détermination de la teneur totale en matières solides (Méthode de référence)

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Contents

Page

Foreword

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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 13580 | IDF 151 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, and the International Dairy Federation (IDF), in collaboration with AOAC International. It is being published jointly by ISO and IDF and separately by AOAC International.

Foreword

IDF (the International Dairy Federation) is a worldwide federation of the dairy sector with a National Committee in every member country. Every National Committee has the right to be represented on the IDF Standing Committees carrying out the technical work. IDF collaborates with ISO and AOAC International in the development of standard methods of analysis and sampling for milk and milk products.

Draft International Standards adopted by the Action Teams and Standing Committees are circulated to the National Committees for voting. Publication as an International Standard requires approval by at least 50 % of the National Committees casting a vote.

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All work was carried out by the Joint ISO/IDF/AOAC Action Team on *Water*, of the Standing Committee *Main components of milk*, under the aegis of its project leader, Mrs M. Nicolas (FR).

This edition of ISO 13580 | IDF 151 cancels and replaces the first edition of IDF 151:1991.

Yogurt — Determination of total solids content (Reference method)

1 Scope

This International Standard specifies a reference method for the determination of the total solids content of plain, flavoured, sweetened and fruit yogurts.

2 Normative references

The following referenced document is 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 11869, *Yogurt — Determination of titratable acidity — Potentiometric method* [1)]

3 Terms and definitions

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

3.1
total solids content
mass fraction of substances remaining after completion of the heating process specified in this International Standard

NOTE The total solids content is expressed as a percentage by mass.

4 Principle

Water from a test portion is evaporated in the presence of zinc oxide in a drying oven at 102 °C ± 2 °C. The lactic acid content is determined in order to compensate for the loss of water produced by neutralization.

5 Reagents

Use only reagents of recognized analytical grade, unless otherwise specified, and distilled water or demineralized water or water of equivalent purity.

5.1 **Zinc oxide**, at least 99 % pure.

1) Equivalent to IDF 150.

6 Apparatus

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 Desiccator, containing an effective desiccant (e.g. freshly dried silica gel with hygrometric indicator).

6.3 Drying oven, well ventilated, capable of being maintained at 102 °C ± 2 °C throughout the working space.

6.4 Flat-bottom dishes, of height 20 mm to 25 mm, of diameter 50 mm to 75 mm, made of appropriate material (e.g. stainless steel, nickel or aluminium), provided with well-fitting, readily removable lids.

6.5 Boiling water bath or **steam bath**.

6.6 Short stirring rods, made of glass, flattened at one end and of suitable size to fit into the dish (6.4).

6.7 Homogenizer, for homogenizing fruit yogurt (see 8.2).

6.8 Spoon or **spatula**.

7 Sampling

A representative sample should have been sent to the laboratory. It should not have been damaged or changed during transport or storage.

Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in ISO 707 | IDF 50.

Store the sample in such a way that deterioration and change in composition are prevented.

8 Preparation of test sample

8.1 Natural yogurt and flavoured, sweetened yogurt

Bring the sample to a temperature of between 20 °C and 25 °C. Mix the sample carefully by means of a spoon or spatula, using a rotary motion which passes from the lower layers to the surface layers of the sample so as to displace and mix them well.

8.2 Fruit yogurt

Bring the sample to a temperature of between 20 °C and 25 °C. Homogenize it using an appropriate device, in order to facilitate the grinding and dispersion of the fruit.

Transfer the test sample to an airtight container until the analysis, which should be carried out as soon as possible after homogenization.

If delay cannot be avoided, take all necessary precautions to prevent deterioration of the sample and to avoid condensation of moisture on the internal surface of the sample container.

9 Procedure

9.1 Preparation of the dish

Heat an open dish (6.4) containing approximately 2 g of zinc oxide (5.1), together with its lid and a stirring rod (6.6) placed on top of the lid, in the drying oven (6.3) set at 102 °C for at least 1 h.

Place the lid with the stirring rod on top on the dish and immediately transfer it to the desiccator (6.2). Allow it to cool to room temperature for at least 45 min.

Weigh the dish, with the lid and rod, to the nearest 1 mg.

9.2 Test portion

Move the zinc oxide to one side of the prepared dish (9.1) by tilting. Place on the clear space approximately 1 g of the prepared sample (Clause 8). Replace the lid on the dish with the stirring rod on top.

Weigh the dish, with the stirring rod on top, to the nearest 1 mg.

9.3 Determination of total solids content

9.3.1 Add 5 ml of water to the test portion in the dish (9.2). Using the stirring rod, thoroughly mix the diluted test portion and the zinc oxide. Spread the mixture evenly over the bottom of the dish. Leave the stirring rod with the flattened end used for mixing resting in the mixture and the other end resting on the rim of the dish.

9.3.2 Heat the dish on the boiling water bath or steam bath (6.5), ensuring that the maximum possible area of the dish is exposed to the steam. Continue the heating process for approximately 30 min, with frequent mixing of the contents of the dish during the early drying stage, so as to obtain maximum liquid evaporation.

9.3.3 Remove the dish from the water bath or steam bath and wipe its base to remove any water. Leave the stirring rod in the dish and then place it, together with the lid by its side, in the drying oven (6.3) set at 102 °C for 3 h. Then cover the dish with its lid and immediately transfer to the desiccator (6.2).

9.3.4 Allow the dish and contents to cool in the desiccator to the temperature of the weighing room for at least 45 min. Weigh the dish and contents to the nearest 1 mg.

9.3.5 Again, heat the dish and its contents, together with its lid, for a further 1 h, as described in 9.3.3.

Cover the dish with its lid and immediately transfer it to the desiccator (6.2). Allow to cool as in 9.3.4. Weigh the dish and its lid, to the nearest 1 mg.

9.3.6 Repeat this heating and weighing procedure (9.3.5) until the mass of the dish with its lid decreases by 1,0 mg or less, or increases between two successive weighings.

Take the lowest mass recorded for the calculation.

9.4 Determination of lactic acid content

In order to compensate for the water loss as a result of neutralizing the yogurt by means of zinc oxide, determine, in accordance with ISO 11869, the titratable acidity of the test sample (expressed as grams of lactic acid per 100 g of product).

10 Calculation and expression of results

10.1 Calculation

Calculate the total solids content of the test sample, w, expressed as a percentage by mass, by using the following equation:

$$w = \frac{(m_2 - m_0)}{(m_1 - m_0)} \times 100 + (0{,}1\,a)$$

where

m_0 is the mass of the dish (including zinc oxide), lid and stirring rod (9.1), in grams;

m_1 is the mass of the dish (including zinc oxide), lid, stirring rod and test portion (9.2), in grams;

m_2 is the mass of the dish, lid, stirring rod and dried test portion (including zinc oxide) (9.3.6), in grams;

a is the titratable acidity obtained in 9.4, expressed as grams of lactic acid per 100 g of product;

0,1 is the correction value to compensate for the loss of water as a result of neutralizing the acidity of yogurt with zinc oxide (9.3.1).

10.2 Expression of results

Report the test result to two decimal places.

11 Precision

11.1 Interlaboratory test

Details of an interlaboratory test on the precision of the method are summarized in Annex A. The values derived from this interlaboratory test may not be applicable to concentration ranges and matrices other than those given.

11.2 Repeatability

The absolute difference between two independent single test results, obtained with the same method on identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, will in not more than 5 % of cases be greater than 0,28 %.

11.3 Reproducibility

The absolute difference between two single test results, obtained with the same method on identical test material in different laboratories by different operators using different equipment, will in not more than 5 % of cases be greater than 0,45 %.

12 Test report

The test report shall specify:

a) all information necessary for the complete identification of the sample;

b) the sampling method used, if known;

c) the test method used with reference to this International Standard;

d) all operating details not specified in this International Standard, or regarded as optional, together with details of any incidents which may have influenced the test results;

e) the test results obtained and, if the repeatability has been checked, the final quoted result obtained.