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Determination of the dry matter content of coffee extracts — Sea sand method of liquid or pasty coffee extracts

PROOF/ÉPREUVE

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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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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 15, *Coffee*.

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.

Determination of the dry matter content of coffee extracts — Sea sand method of liquid or pasty coffee extracts

1 Scope

This document specifies requirements for the determination of the dry matter content of liquid or pasty coffee extracts by means of the sea sand method.

It is applicable to liquid or pasty coffee extracts. The method is intended as a routine method.

2 Normative references

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 3696, *Water for analytical laboratory use — Specification and test methods*

3 Terms and definitions

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

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/

3.1
liquid or pasty coffee extracts
liquid and pasty coffee extract forms only differ in the concentration of the soluble solids and the effect of this difference on the viscosity of the product.

3.2
dry matter content of liquid or pasty coffee extracts
dry residue remaining after vaporization of the volatile substances using the method described in this document

4 Principle

The sample is mixed with sea sand and dried in a vacuum oven at 70 °C for 16 h. The mass loss is determined by weighing.

5 Reagents

Use only reagents of recognised analytical grade, unless otherwise specified.

5.1 Water, grade 1 in accordance with ISO 3696.

5.2 Sea sand, analytical grade, acid cleaned and annealed.

6 Apparatus

Usual laboratory apparatus and, in particular, the following.

6.1 Analytical balance, capable of weighing to an accuracy of 0,1 mg.

6.2 Vacuum oven.

6.3 Weighing vessel, low type, with a lid, approximated 80 mm in diameter, or suitable metal trays.

NOTE While grinded lids are normally used for weighing vessels, a tightly attached watch glass or equivalent is sufficient for metal vessels.

6.4 Dessicator, capable of taking up an appropriate number of weighing vessels (6.3).

6.5 Stirring rod.

7 Sample preparation

A representative thoroughly homogenized, undamaged and unchanged by transport or storage shall be used.

Liquid or pasty coffee extract is usually distributed in a frozen state (below –18 °C).

After defrosting and heating to room temperature, suitable measures (shaking, stirring, etc.) are used to prepare a laboratory sample which also contains those dry matter components still insoluble at room temperature.

8 Procedure

Place 25 g to 30 g of sea sand (5.2) in the weighing vessel or metal tray (6.3), respectively, together with a stirring rod fits into the weighing vessel. After drying to constant weight in a vacuum oven (6.2), during which the lid also remains in the vacuum oven, place the lid on the weighing vessel and cool in a desiccator (6.4). Then weigh the weighing vessel including lid (6.3), stirring rod (6.5) and sea sand (5.2).

For analysis, weigh a sample of liquid or pasty coffee extract that corresponds to a dry matter content of 0,1 g to 1,0 g. Mix sea sand (5.2) and coffee extract thoroughly. If proper mixing is not possible, some water (5.1) may be added. Then heat the mixture over a bath of hot water or steam while stirring occasionally until a completely homogenous sandy powder is obtained. The formation of lumps or crusts shall be avoided by constant stirring or crushing. Then dry the mixture in the vacuum oven for (6.2) for 16 h at (70 ± 2) °C. The pressure is approximately 131 mbar. The lid of the weighing vessel also remains in the vacuum oven - the lid of weighing vessel remains open in the vacuum oven during drying-. After completion of the drying process, close the weighing vessel, place it in a desiccator to cool and weigh it after cooling.

9 Calculation

The dry matter content of the sample (mass fraction) w_t, in g/100 g, is calculated by using Formula (1):

$$w_t = \frac{(m_A - m_L)\cdot 100}{m_E} \quad (1)$$

where

m_A is the final weight (weighing vessel including lid + stirring rod + sea sand + dry residue), in g;

m_L is the tare weight (weighing vessel including lid + stirring rod + sea sand after reaching constant weight), in g;

m_E is the test portion of the sample, in g.

The result of each single determination is indicated to two decimals (mass fraction 0,01 %). The indication of the mean value calculated from multiple determinations should be shortened by one digit (mass fraction 0,1 %).

10 Repeatability

During the analyses, two samples with a dry matter content between 10 % and 60 % and a difference in dry matter content of 0,5 % should be differentiated with a statistical certainty P = 95 %.

This corresponds to the difference between two samples, both with P = 95 % and a variation range of the final results of ±0,25 %, the variation ranges of which have just ceased to overlap.

This repeatability is a minimum requirement; in special cases, more stringent requirements regarding the probability range and the variation range may be agreed.

Appropriate measures shall be taken to ensure compliance with the required variation and probability ranges. This can be achieved by means of statistical control charts or similar during on-going operational or control inspections. Where determinations are carried out only once or in larger time intervals, the required number of multiple determinations N shall be previously determined by calculation from

a) the required or agreed level of probability;

b) the required or agreed variation range (corresponding to the “differentiation level”);

c) the determination, the knowledge of the repeatability variation range within a laboratory and/or the reproducibility variation range between different laboratories.

11 Test report

The test report should contain the data in accordance with ISO/IEC 17025. It shall contain at least the following information:

d) any information necessary for the identification of the sample (type, origin and designation of the sample);

e) the specific reference method used, with reference to this document;

f) the date and type of sampling procedure (if known);

g) the date of sample receipt;

h) the date of test;

i) the test results and the units in which they have been expressed as well as statistical information on the accuracy of these results, if required;

j) any special observations made during testing;

k) any operations of the procedure not specified in the method or regarded as optional, which might have affected the results.

Bibliography

[1] ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

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