

INTERNATIONAL STANDARD

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Meat and meat products — Determination of moisture content (Reference method)

*Viande et produits à base de viande — Détermination de l'humidité
(Méthode de référence)*

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Reference number
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Foreword

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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.

International Standard ISO 1442 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*, Subcommittee SC 6, *Meat and meat products*.

This second edition cancels and replaces the first edition (ISO 1442:1973), which has been technically revised.

Annex A of this International Standard is for information only.

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Meat and meat products – Determination of moisture content (Reference method)

1 Scope

This International Standard specifies a reference method for the determination of the moisture content of meat and meat products.

2 Definitions

For the purposes of this International Standard, the following definitions apply.

2.1 moisture content of meat and meat products: Loss in mass obtained under the operating conditions specified in this International Standard, divided by the mass of the test portion.

Moisture content is expressed as a percentage by mass.

2.2 test result: The value of a characteristic obtained by carrying out a specified test method. [ISO 5725-1]

3 Principle

Thorough mixing of the test portion with sand and drying to constant mass at $103\text{ °C} \pm 2\text{ °C}$.

4 Material

4.1 Sand, clean, acid-washed, of a size such that it passes through a sieve of aperture size 1,4 mm and stays on a sieve of aperture size 250 μm .

Dry the sand before use at 150 °C to 160 °C and store in an airtight closed bottle.

NOTE — If clean (acid-washed) sand is not available, the sand may be cleaned by the following procedure.

Wash the sand with running water. Boil the sand with dilute hydrochloric acid, $\rho_{20} = 1,19\text{ g/ml}$, diluted (1 + 1), for 30 min while stirring continuously. Repeat the boiling operation with another portion of the acid until the acid no longer turns yellow after boiling. Wash the sand with distilled water until the test for chloride is negative. For storage, dry the sand at 150 °C to 160 °C .

5 Apparatus

Usual laboratory apparatus and, in particular, the following.

5.1 Mechanical or electrical equipment capable of homogenizing the laboratory sample. This includes a high-speed rotational cutter, or a mincer fitted with a plate with holes not exceeding 4,0 mm in diameter.

5.2 Flat dish, made of porcelain or metal (e.g. nickel, aluminium, stainless steel), of diameter at least 60 mm and height about 25 mm.

5.3 Thin glass rod, flattened at one end, slightly longer than the diameter of the dish (5.2).

5.4 Drying oven, electrically heated, capable of operating at $103\text{ °C} \pm 2\text{ °C}$.

5.5 Desiccator, containing an efficient desiccant, such as silica gel.

5.6 Analytical balance, capable of weighing to the nearest 0,001 g.

6 Sampling

It is important that the laboratory receive a sample which is truly representative and has not 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 3100-1.

Proceed from a representative sample of at least 200 g.

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

7 Preparation of test sample

Homogenize the laboratory sample with the appropriate equipment (5.1). Take care that the temperature of the sample material does not rise above 25 °C. If a mincer is used, pass the sample at least twice through the equipment. Fill a suitable airtight container with the prepared test sample, close the container and store in such a way that deterioration and change in composition are prevented. Analyse the test sample as soon as practicable, but always within 24 h after homogenization.

8 Procedure

NOTE — If it is required to check whether the repeatability limit (10.2) is met, carry out two single determinations in accordance with 8.3 under repeatability conditions.

8.1 Preparation of the dish and sand

Transfer to the dish (5.2) a quantity of sand (4.1) equal to three to four times the mass of the test portion (see 8.2) and dry the dish, sand and glass rod (5.3) for 30 min in the oven (5.4) set at 103 °C.

Allow the dish with its contents and the glass rod to cool in the desiccator (5.5) to room temperature and weigh to the nearest 0,001 g (m_0).

8.2 Test portion

Transfer between 5 g to 8 g of the prepared test sample (clause 7) to the prepared dish (8.1) and weigh the dish with its contents and the glass rod to the nearest 0,001 g (m_1).

8.3 Determination

8.3.1 Mix the contents of the dish by means of the glass rod (5.3).

NOTE — In cases of difficulty in mixing the test portion with sand, ethanol may be added as necessary. In this case, the ethanol should be evaporated gently before drying the sample in the oven.

Heat the dish with its contents and the glass rod for 2 h in the oven (5.4) set at 103 °C. Remove the dish with its contents and the glass rod from the oven and place them in the desiccator (5.5).

Allow the dish, its contents and the glass rod to cool to room temperature, then weigh to the nearest 0,001 g.

8.3.2 Repeat the heating, cooling and weighing operations specified in 8.3.1 until the results of two successive weighings (m_2), separated by 1 h of heating, do not differ by more than 0,1 % of the mass of the test portion.

9 Expression of results

Calculate the moisture content, w , as a percentage by mass, using the following equation:

$$w = \frac{m_1 - m_2}{m_1 - m_0} \times 100 \%$$

where

m_0 is the mass, in grams, of the dish, rod and sand (8.1);

m_1 is the mass, in grams, of the dish containing the test portion, rod and sand, before drying (8.2);

m_2 is the mass, in grams, of the dish containing the test portion, rod and sand, after drying (8.3.2).

Report the result rounded to one decimal place.

10 Precision

10.1 Interlaboratory test

Details of an interlaboratory test on the precision of the method are given in ref. [3]. The values derived from this interlaboratory test may not be applicable to concentration ranges and matrices other than those given.

10.2 Repeatability

The absolute difference between two independent single test results, obtained using 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, should not be greater than the value of r given by the formula

$$r = 0,593 \% + 0,0017 \bar{w}$$

where $\bar{w}$ is the mean moisture content of both results, expressed as a percentage by mass.

10.3 Reproducibility

The absolute difference between two single test results obtained using the same method on identical test material in different laboratories with different operators using different equipment, should not be greater than the value of R given by the formula.

$$R = 0,797 \% + 0,00471 \bar{w}$$

where $\bar{w}$ is the mean moisture content of both results, expressed as a percentage by mass.

11 Test report

The test report shall specify

- the method in accordance with which sampling was carried out (if known);
- the method used;
- the test result(s) obtained; and
- if the repeatability has been checked, the final quoted result obtained.

It shall also mention all operating details not specified in this International Standard, or regarded as optional, together with details of any incidents which may have influenced the result.

The test report shall include all information necessary for the complete identification of the sample.

Annex A (informative)

Bibliography

- [1] ISO 3100-1:1991, *Meat and meat products — Sampling and preparation of test samples — Part 1: Sampling*.
- [2] ISO 5725-1:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*.
- [3] Nordic Committee on Food Analysis (NMKL), No. 23, 3rd edn., 1991. Available from NMKL, Statens Tekniska Forskningscentral, Livmedelslaboratoriet, SF-02150 Esbo, Finland.

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