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STANDARD

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**Roasted ground coffee — Determination  
of moisture content — Method by  
determination of loss in mass at 103 °C  
(Routine method)**

*Café torréfié moulu — Détermination de la teneur en eau — Méthode par  
détermination de la perte de masse à 103 °C (Méthode de routine)*



Reference number  
ISO 11294:1994(E)

## 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 11294 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*, Subcommittee SC 15, *Coffee*.

Annex A of this International Standard is for information only.

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# Roasted ground coffee — Determination of moisture content — Method by determination of loss in mass at 103 °C (Routine method)

## 1 Scope

This International Standard specifies a routine method for the determination of loss in mass at 103 °C of roasted ground coffee.

NOTE 1 This method has been shown to give very similar results on average to those obtained by the method given in ISO 11817:—, *Roasted ground coffee — Determination of moisture content — Karl Fischer method (Reference method)*.

This method is most suited to degassed roasted ground coffee, because of the presence of volatile matter, especially carbon dioxide, in variable quantities in roasted coffee.

## 2 Definition

For the purposes of this International Standard, the following definition applies.

**2.1 loss in mass at 103 °C:** Loss in mass caused principally by water and volatile matter (carbon dioxide, volatile acids, etc.) which are vaporized under the conditions specified in this International Standard.

Loss in mass is expressed as a percentage by mass.

## 3 Principle

Heating a test portion at 103 °C  $\pm$  1 °C for 2 h at atmospheric pressure.

## 4 Apparatus

Usual laboratory apparatus and, in particular, the following.

**4.1 Oven**, electrically heated, capable of being operated at 103 °C  $\pm$  1 °C.

**4.2 Dish**, made of corrosion-resistant metal or of glass, with lid and an effective surface area of at least 18 cm<sup>2</sup> (for example, 50 mm minimum diameter and 25 mm to 30 mm deep).

**4.3 Desiccator**, containing an effective desiccant.

**4.4 Analytical balance**, capable of weighing to 0,1 mg.

## 5 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.

## 6 Preparation of test sample

Mix thoroughly the laboratory sample.

## 7 Procedure

### 7.1 Preparation of the dish

Dry the dish (4.2) and its lid for 1 h in the oven (4.1) set at 103 °C.

Remove the dish and its lid from the oven and allow them to cool to room temperature in the desiccator (4.3).

Weigh the dish and its lid to the nearest 0,1 mg.

## 7.2 Test portion

Place approximately 5 g of the test sample (clause 6) in the prepared dish (7.1).

Cover the dish with its lid and weigh the dish, lid and contents to the nearest 0,1 mg.

## 7.3 Determination

Place the dish containing the test portion, with the lid removed but alongside or beneath the dish, in the oven (4.1) set at 103 °C, and dry for 2 h ± 0,1 h.

Remove the dish, fit the lid and place them in the desiccator (4.3). Allow the dish, lid and contents to cool to room temperature and then weigh them to the nearest 0,1 mg.

## 8 Expression of test results

The loss in mass at 103 °C, expressed as percentage by mass of the sample, is calculated according to the following formula:

$$\frac{(m_1 - m_2) \times 100}{m_1 - m_0}$$

where

- $m_0$  is the mass, in grams, of the dish and lid (see 7.1);
- $m_1$  is the mass, in grams, of the dish, test portion and lid before drying (see 7.2);
- $m_2$  is the mass, in grams, of the dish, test portion and lid after drying (see 7.3).

## 9 Precision

Results of an interlaboratory test are given in annex A.

## 9.1 Repeatability

The absolute difference between two independent 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 0,1 %.

## 9.2 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 0,5 %.

NOTE 2 The reproducibility of the test method is such that the method is less suitable for roasted ground coffees with low moisture contents (below approx. 2 % moisture).

## 10 Test report

The test report shall specify

- the method used,
- the test result obtained, and
- if the repeatability has been checked, the final quoted result obtained.

It shall also mention any operating details not specified in this International Standard, or regarded as optional, as well as any circumstances that may have influenced the result.

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

## Annex A (informative)

### Results of interlaboratory test

An interlaboratory test carried out in 1989, in which 15 laboratories participated, each of which carried out three determinations on each sample, gave the statistical results (evaluated in accordance with ISO 5725<sup>1)</sup>) shown in table A.1.

In the same interlaboratory test, the same laboratories determined the true moisture content by the Karl Fischer method of ISO 11817. Table A.2 shows the comparison of mean values obtained for each sample by the two methods.

**Table A.1 — Determination of loss in mass for roasted ground coffee**

Sample	A	B	C	D	E
Number of laboratories retained after eliminating outliers	15	15	14	15	15
Mean loss in mass, % ( <i>m/m</i> )	4,98	4,54	3,20	1,56	1,50
Standard deviation of repeatability, <i>s<sub>r</sub></i>	0,031	0,011	0,027	0,027	0,021
Coefficient of variation of repeatability, %	0,6	0,9	0,8	1,7	1,4
Repeatability 2,83 <i>s<sub>r</sub></i>	0,09	0,12	0,08	0,08	0,06
Standard deviation of reproducibility, <i>s<sub>R</sub></i>	0,187	0,168	0,281	0,187	0,154
Coefficient of variation of reproducibility, %	3,7	3,7	8,8	12,0	10,3
Reproducibility 2,83 <i>s<sub>R</sub></i>	0,5	0,5	0,8	0,5	0,4

**Table A.2 — Comparison of loss in mass values with moisture content values determined by the Karl Fischer method**

Sample	A	B	C	D	E
Mean loss in mass, % ( <i>m/m</i> )	4,98	4,54	3,20	1,56	1,50
Mean moisture content, % ( <i>m/m</i> )	5,07	4,64	3,32	1,51	1,44

1) ISO 5725:1986, *Precision of test methods — Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests.*

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