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# International Standard 662

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## Animal and vegetable fats and oils — Determination of moisture and volatile matter content

*Corps gras d'origines animale et végétale — Détermination de la teneur en eau et en matières volatiles*

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**Descriptors** : fats, animal fats, vegetable fats, chemical analysis, determination of content, water, volatile matters.

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 662 was developed by Technical Committee ISO/TC 34, *Agricultural food products*, and was circulated to the member bodies in January 1979.

It has been approved by the member bodies of the following countries :

| | | |
|---|---|---|
| Australia | India | Romania |
| Bulgaria | Kenya | South Africa, Rep. of |
| Canada | Korea, Rep. of | Spain |
| Cyprus | Malaysia | Thailand |
| Czechoslovakia | Mexico | Turkey |
| Ethiopia | Netherlands | United Kingdom |
| France | New Zealand | Yugoslavia |
| Germany, F.R. | Poland | |
| Hungary | Portugal | |

The member body of the following country expressed disapproval of the document on technical grounds :

Peru

This International Standard has also been approved by the International Union of Pure and Applied Chemistry (IUPAC).

It cancels and replaces ISO Recommandations ISO/R 661-1968 and ISO/R 933-1969, of which it constitutes a technical revision.

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# Animal and vegetable fats and oils — Determination of moisture and volatile matter content

## 1 Scope and field of application

This International Standard specifies two methods for the determination, by drying, of the moisture and volatile matter content of animal or vegetable fats or oils :

— method A, using a sand bath or hot-plate;

— method B, using a drying oven.

Method A is applicable to all fats and oils.

Method B is applicable only to non-drying fats and oils with an acid value less than 4. In no circumstances should lauric oils be analysed by this method

## 2 Reference

ISO 661, *Animal and vegetable fats and oils — Preparation of test sample.*

## 3 Definition

**moisture and volatile matter content :** The loss in mass undergone by the product on heating at 103 ± 2°C, under the conditions specified in this International Standard, and expressed as a percentage by mass.

## 4 Principle

Heating a test portion at 103 ± 2 °C until moisture and volatile substance are completely eliminated, and determination of the loss in mass.

## 5 Method A

### 5.1 Apparatus

Usual laboratory apparatus and in particular :

**5.1.1 Analytical balance.**

**5.1.2 Dish,** of porcelain or glass, 80 to 90 mm in diameter, about 30 mm deep, with a flat bottom.

**5.1.3 Thermometer,** graduated from about 80 °C to at least 110 °C, about 100 mm long, with a reinforced mercury bulb and with an expansion chamber at its upper end.

**5.1.4 Sand bath** or **electric hot-plate.**

**5.1.5 Desiccator,** containing an efficient desiccant.

### 5.2 Procedure

#### 5.2.1 Preparation of the test sample

Prepare the test sample in accordance with ISO 661.

#### 5.2.2 Test portion

Weigh, to the nearest 0,001 g, approximately 20 g of the test sample (5.2.1) into the dish (5.1.2) which has been previously dried and then weighed together with the thermometer (5.1.3).

#### 5.2.3 Determination

Heat the dish containing the test portion (5.2.2) on the sand bath or electric hot-plate (5.1.4), allowing the temperature to rise at a rate of about 10 °C/min up to 90 °C, and stirring constantly with the thermometer.

Reduce the rate of heating, observing the rate at which bubbles rise from the bottom of the dish, and allow the temperature to rise to 103 ± 2 °C. Do not heat above 105 °C. Continue to stir, scraping the bottom of the dish until all evolution of bubbles has ceased.

To ensure the removal of all moisture, repeat the heating to 103 ± 2 °C several times, cooling to 95 °C between the heating periods. Then allow the dish and thermometer to cool in the desiccator (5.1.5) to room temperature and weigh to the nearest 0,001 g. Repeat this operation until the difference between the results of two successive weighings does not exceed 2 mg.

#### 5.2.4 Number of determinations

Carry out two determinations on test portions taken from the same test sample (5.2.1).

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## 6 Method B

### 6.1 Apparatus

Usual laboratory apparatus, and in particular:

**6.1.1 Analytical balance.**

**6.1.2 Glass vessel,** approximately 50 mm in diameter and 30 mm tall, with a flat bottom.

**6.1.3 Electric drying oven,** capable of being controlled at 103 ± 2 °C.

**6.1.4 Desiccator,** containing an efficient desiccant.

### 6.2 Procedure

**6.2.1 Preparation of the test sample**

Prepare the test sample in accordance with ISO 661.

**6.2.2 Test portion**

Weigh to the nearest 0,001 g, approximately 5 or 10 g of the test sample (6.2.1), according to the expected moisture and volatile matter content, into the vessel (6.1.2), which has been previously dried and then weighed.

**6.2.3 Determination**

Keep the vessel containing the test portion (6.2.2) for 1 h in the drying oven (6.1.3), controlled at 103 ± 2 °C. Allow to cool in the desiccator (6.1.4) to room temperature and weigh to the nearest 0,001 g. Repeat the operations of heating, cooling and weighing, but using successive periods in the oven of 30 min each, until the loss in mass between two successive weighings does not exceed 2 or 4 mg, according to the mass of the test portion.

NOTE — An increase of mass of the test portion after repeated heating indicates that autoxidation of the fat or oil has occurred. In this case, take for calculation of the result the smallest mass recorded, or preferably use method A.

**6.2.4 Number of determinations**

Carry out two determinations on test portions taken from the same test sample (6.2.1).

## 7 Expression of results

### 7.1 Method of calculation and formula

The moisture and volatile matter content, expressed as a percentage by mass, is equal to

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

where

$m_0$ is the mass, in grams, of the dish and the thermometer (see 5.2.2), or of the glass vessel (see 6.2.2);

$m_1$ is the mass, in grams, of the dish, thermometer and test portion (see 5.2.2), or of the vessel and test portion (see 6.2.2), before heating;

$m_2$ is the mass, in grams, of the dish, thermometer and residue (see 5.2.3), or of the vessel and residue (see 6.2.3), after heating.

Take as the result the arithmetic mean of the two determinations, provided that the requirement for repeatability (see 7.2) is satisfied.

Report the result to the second decimal place.

### 7.2 Repeatability

The difference between the results of two determinations, carried out simultaneously or in rapid succession by the same analyst, shall not exceed 0,05 g of moisture and volatile matter per 100 g of sample.

## 8 Test report

The test report shall show the method used and the result obtained. It shall also mention any operating conditions not specified in this International Standard, or regarded as optional, as well as any circumstances that may have influenced the result.

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

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