



**SLOVENSKI STANDARD**  
**SIST EN ISO 659:1998**  
**01-december-1998**

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Oilseeds - Determination of oil content (Reference method) (ISO 659:1998)

Ölsamen - Bestimmung des Ölgehaltes (Referenzverfahren) (ISO 659:1998)

Graines oléagineuses - Détermination de la teneur en huile (Méthode de référence) (ISO 659:1998)

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**Ta slovenski standard je istoveten z: EN ISO 659:1998**

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**ICS:**

67.200.20      Oljnice      Oilseeds

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN ISO 659

June 1998

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Descriptors: see ISO document

English version

Oilseeds - Determination of oil content (Reference method) (ISO  
659:1998)

Graines oléagineuses - Détermination de la teneur en huile  
(Méthode de référence) (ISO 659:1998)

Ölsamen - Bestimmung des Ölgehaltes  
(Referenzverfahren) (ISO 659:1998)

This European Standard was approved by CEN on 9 April 1998.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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## Foreword

The text of the International Standard ISO 659:1998 has been prepared by Technical Committee ISO/TC 34 "Agricultural food products" in collaboration with Technical Committee CEN/TC 307 "Oilseeds, vegetable and animal fats and oils and their by-products - Methods of sampling and analysis", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 1998, and conflicting national standards shall be withdrawn at the latest by December 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

**NOTE FROM CEN/CS:** The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

## Endorsement notice

The text of the International Standard ISO 659:1998 was approved by CEN as a European Standard without any modification.

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# INTERNATIONAL STANDARD

**ISO  
659**

Second edition  
1998-06-01

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## **Oilseeds — Determination of oil content (Reference method)**

*Graines oléagineuses — Détermination de la teneur en huile (Méthode de référence)*

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Reference number  
ISO 659:1998(E)

**ISO 659:1998(E)****Foreword**

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 659 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*, Subcommittee SC 2, *Oleaginous seeds and fruits*.

This second edition cancels and replaces the first edition (ISO 659:1988), which has been technically revised.

Annexes A and B of this International Standard are for information only.

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International Organization for Standardization  
Case postale 56 • CH-1211 Genève 20 • Switzerland  
Internet iso@iso.ch

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# Oilseeds — Determination of oil content (Reference method)

## 1 Scope

This International Standard specifies a reference method for the determination of the hexane extract (or light petroleum extract), called “oil content”, of oil seeds used as industrial raw materials.

NOTE If required, the following may be analysed separately:

- the pure seeds and the impurities (see 9.3);
- in the case of groundnuts, the pure seeds, the total fines, the non-oleaginous impurities and the oleaginous impurities.

The method has been tested on rapeseed, soya beans and sunflower seeds. This does not, however, preclude its applicability to other commercial seeds. ([standards.iteh.ai](https://standards.iteh.ai))

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## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of the publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on the International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 658:1988, *Oilseeds — Determination of impurities*.

ISO 664:1990, *Oilseeds — Reduction of laboratory sample to test sample*.

ISO 665:1977, *Oilseeds — Determination of moisture and volatile matter content*.

## 3 Definition

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

### 3.1 hexane extract, called “oil content”

all the substances extracted under the operating conditions specified in this International Standard, expressed as a percentage by mass of the product as received [*tale quale*] or on the cleaned seed.

NOTE On request, it may be expressed relative to the dry matter.

## 4 Principle

Extraction of a test portion, in a suitable apparatus, with technical hexane or light petroleum. Elimination of the solvent and weighing of the extract obtained.

## 5 Reagent

**5.1 Technical hexane, *n*-hexane or light petroleum**, essentially composed of hydrocarbons with 6 carbon atoms, of which less than 5 % distils below 40 °C and more than 95 % distils between 40 °C and 60 °C or between 50 °C and 70 °C. The residue on complete evaporation shall not exceed 2 mg per 100 ml.

## 6 Apparatus

Usual laboratory apparatus and, in particular, the following.

### 6.1 Analytical balance.

**6.2 Mechanical mill**, easy to clean, appropriate for the nature of the oilseeds, and allowing the oilseeds to be ground to a uniform particle size without heating or appreciable change in moisture, volatile matter or oil content.

NOTE The following mills have been found to give satisfactory results:

- the Christy Norris 8" Laboratory Mill<sup>1)</sup> with perforated plate of bar-type screens depending on seed type (e.g. 0,8 mm perforated plate, 3 mm and 6 mm bar screens; see 8.3.2, 8.3.3 and 8.3.4);
- the Ultra Centrifugal Mill (UCM) (Glen Creston)<sup>1)</sup> with 1 mm screen for sunflower seeds and other screens according to seed type.

Other mills may be satisfactory, provided they conform to the criteria given above.

**6.3 Mechanical micro-grinder**, capable of producing a fineness of grinding of the oilseeds of less than 160 µm, with the exception of the "shell", particles of which may reach 400 µm.

NOTE A "Dangoumau" type analytical grinder<sup>2)</sup> with a 150 ml cylinder and 1 cm, 2 cm and 3 cm diameter steel balls (approximately 7 g, 30 g and 130 g) according to the sample being ground, has been found to be suitable.

The following microgrinders have also been found to be suitable:

- Retsch<sup>2)</sup>, IE Retsch<sup>2)</sup>, Planetary Ball Mill<sup>2)</sup>, S1 and S2 Centrifugal Ball Mill<sup>2)</sup>, Batam Mikro Pulverizer Hammer Mill<sup>2)</sup>, IKA Mill<sup>2)</sup>, Fritch Pulverisette 5 Planetary Ball Mill<sup>2)</sup> and Steam Mill<sup>2)</sup>.

**6.4 Extraction thimble and cotton wool**, free from matter soluble in hexane or light petroleum.

**6.5 Suitable extraction apparatus**, fitted with a flask of capacity 200 ml to 250 ml.

1) The Christy Norris 8" Laboratory Mill and the Ultra Centrifugal Mill (UCM) (Glen Creston) are examples of suitable products available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of these products.

2) The above-mentioned microgrinders are examples of suitable products available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of these products.



NOTE Straight-through extractors, for example the Butt, Smalley or Bolton-Williams type<sup>3)</sup>, are suitable.

The use of other extractors is conditional upon the results of a test on a standard material of known oil content to confirm the suitability of the apparatus.

**6.6 Pumice stone**, in small particles, or other anti-bumping granules, previously dried in an oven at  $(130 \pm 2) ^\circ\text{C}$  and cooled in a desiccator.

**6.7 Apparatus for safely removing solvent from extraction thimble** (for example in a current of warm air).

**6.8 Electric heating bath** (sand bath, water bath, heating mantel, etc.) or **hot-plate**.

**6.9 Electrically heated oven**, with thermostatic control, capable of being maintained at  $(103 \pm 2) ^\circ\text{C}$ . The oven should be capable of being used at either atmospheric or reduced pressure (see 9.2.3).

**6.10 Desiccator**, containing an efficient desiccant (e.g. silica gel with blue indicator, or  $\text{P}_2\text{O}_5$ ).

**6.11 Electrically heated oven**, capable of being maintained at  $(130 \pm 2) ^\circ\text{C}$  (for cottonseed, see 8.3.5).

**6.12 Metal dish**, flat-bottomed, of diameter 100 mm and height approx. 40 mm.

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## 7 Sampling

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Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in ISO 542.

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It is important that the laboratory receive a sample which is truly representative and has not been damaged or changed during transport and storage.

## 8 Preparation of test sample

### 8.1 Reduction of laboratory sample

Prepare the test sample in accordance with ISO 664. If large non-oleaginous foreign bodies have been separated before reduction of the laboratory sample, make allowance for this in the calculation (see 10.1.3). According to the requirements of the contract, take a sample as received or after separation of the impurities.

### 8.2 Predrying

**8.2.1** The moisture content of the test portion (9.1) shall be less than 10 % (*m/m*) when extraction of the oil (9.2) is commenced.

NOTE Failure to observe this may result in an incorrect result and invalidate the analysis.

3) The Butt, Smalley or Bolton-Williams straight-through extractors are examples of suitable products available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of these products.