INTERNATIONAL STANDARD

ISO 658

Third edition
2002-04-01

Oilseeds — Determination of content of impurities

Graines oléagineuses — Détermination de la teneur en impuretés

Reference number
ISO 658:2002(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 658 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 2, *Oleaginous seeds and fruits*.

This third edition cancels and replaces the second edition (ISO 658:1988), which has been technically revised.

Annex A of this International Standard is for information only.

Oilseeds — Determination of content of impurities

1 Scope

This International Standard specifies a method for the determination of the impurities content in oilseeds used as primary industrial materials. It also defines the various categories of what are usually understood to be impurities.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 659, *Oilseeds — Determination of oil content (Reference method)*

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

3 Terms and definitions

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

3.1
impurities in oilseeds
all foreign matter, organic and inorganic, other than seeds of the species under consideration

3.2
fines in oilseeds
particles passing through the sieves of aperture sizes given in Table 1, according to the species being analysed

NOTE In the case of groundnuts, meal from the seeds contained in the fines is not regarded as an impurity.

3.3
non-oleaginous impurities
non-oleaginous foreign bodies, fragments of stalks, leaves and all other non-oleaginous parts belonging to the oleaginous seed analysed, retained by the sieves of aperture sizes given in Table 1

EXAMPLES Bits of wood, pieces of metal, stones, seeds of non-oleaginous plants, and bits of shell, loose or adhering to palm kernels.

NOTE In the case of seeds sold in their shells, for example sunflower seeds (*Helianthus annuus* L.) or pumpkin seeds (*Cucurbita pepo* L.), the loose shells are regarded as impurities only if their proportion is larger than that of the corresponding kernels present in the same sample.

3.4
oleaginous impurities
oilseeds other than those of the species under consideration

4 Principle

The impurities are separated, by sieving and sorting, into three categories as follows:

— fines;

— non-oleaginous impurities;

— oleaginous impurities.

The mass of total impurities is determined or, on request, the mass of each category of impurity.

5 Apparatus

5.1 Sieves, having round holes with diameters as given in Table 1.

5.2 Tweezers, or other suitable instruments.

5.3 Analytical balance, capable of being read to the nearest 0,005 g.

5.4 Sample dividers, capable of taking 10 g sample aliquots of small seeds and 100 g sample aliquots of sunflower seeds and soyabeans.

Table 1 — Aperture sizes of sieves

Nature of product	Aperture diameter mm
Copra	2,0
Medium and larger sized seeds (see ISO 664)	1,0
Small seeds (see ISO 664)	0,5

6 Sampling

Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in ISO 542 [1].

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

7 Preparation of test sample

Prepare the test sample in accordance with ISO 664.

8 Procedure

NOTE If it is required to check whether the repeatability limits (10.2) are met, carry out two single determinations in accordance with 8.2.2 to 8.2.3.

8.1 Test portion

Take as the test portion a complete test sample (see clause 7). For a complete analysis, two or four test samples are necessary (see 10.2).

Weigh the test portion to the nearest 0,1 g.

8.2 Determination

8.2.1 General

The determination of impurities content shall be carried out sufficiently quickly to avoid any appreciable change in the moisture content of the seed.

8.2.2 Separation of fines

Separate the fines quantitatively by sieving the test portion on the sieve (see 5.1) and collecting them.

In the case of groundnuts, collect the total fines thus obtained, which include non-oleaginous fines and fines from the seed. Weigh them to the nearest 0,01 g and determine their oil content by the method specified in ISO 659. Determine also the oil content of the pure seeds by the method specified in ISO 659 in order to calculate the content of non-oleaginous fines.

8.2.3 Separation of oleaginous and non-oleaginous impurities

8.2.3.1 Copra and medium and larger sized seeds, apart from sunflower seeds and soya beans

In the material retained by the sieve (see 5.1), separate, by means of tweezers or any other suitable instrument (see 5.2), the non-oleaginous impurities (see 3.3), if necessary detaching bits of shell adhering to the seeds (as is the case with palm kernels) from the oleaginous impurities (see 3.4).

Weigh together, to the nearest 0,01 g, the non-oleaginous and oleaginous impurities and the fines (see 8.2.2), except in the case of groundnuts.

On request, weigh separately, to the nearest 0,01 g, each category of impurity.

If stipulated in the contract, note the nature of the oleaginous impurities in order that this can be recorded in the test report.

8.2.3.2 Sunflower seeds and soya beans

In the material retained by the sieve (see 5.1), separate, by means of tweezers or any other appropriate instrument (see 5.2), the impurities whose dimensions differ clearly from those of the sunflower seeds or soya beans being examined (large impurities). Class these impurities into two categories (oleaginous and non-oleaginous) and weigh each of them to within 0,01 g.

Using an aliquot portion (minimum 100 g, weighed to the nearest 0,1 g) of partially sorted sunflower seeds or soya beans, separate, by manual sorting, the oleaginous impurities and the non-oleaginous impurities (small impurities). Weigh each of these two fractions to the nearest 0,01 g.

8.2.3.3 Small seeds

Transfer the residue from the sieve (see 5.1) to a second sieve so as to retain impurities larger than the seeds, or separate these impurities by means of tweezers or any other suitable instrument (see 5.2). To assist the removal of large impurities, a 3,15 mm mesh may be used.

On request, sort this fraction into non-oleaginous impurities (see 3.3) and oleaginous impurities (see 3.4).

Weigh separately, to the nearest 0,01 g, the fines (see 8.2.2) and the impurities (non-oleaginous and oleaginous) larger than the seeds, and also the partially sorted seeds.

Using an aliquot portion of the latter fraction of seeds (at least 10 g, weighed to the nearest 0,01 g), separate, by sorting, the small non-oleaginous impurities from the small foreign oleaginous seeds. Weigh these two fractions of impurities, to the nearest 0,005 g, together or, on request, separately.

NOTE Specific methods for the determination of the content of *Sinapis arvensis* (wild mustard) seeds in rapeseeds (*Brassica napus*) and of turnip rape (*Brassica rapa*) have been published (see reference [3]).

8.2.4 Grouping of foreign oilseeds

If required, the foreign oilseeds may be grouped and weighed according to species, in order to show in the test report the mass fraction, in percent, of each species.

9 Expression of results

9.1 Method of calculation

9.1.1 Express the results as a mass fraction, in percent, of total impurities. On request, the percentage of each category of impurity may be indicated.

9.1.2 When the determination of impurities content has been carried out on the whole test portion (see 8.2.3.1), the calculation shall be as follows:

a) total impurities, I_t, expressed as a mass fraction in percent

$$I_t = \frac{m_4}{m_0} \times 100\ \% \qquad (1)$$

or

$$I_t = P + I_n + I_0 \qquad (1) = (2) + (3) + (4)$$

b) fines, P, expressed as a mass fraction in percent

$$P = \frac{m_1}{m_0} \times 100\ \% \qquad (2)$$

c) non-oleaginous impurities, I_n, expressed as a mass fraction in percent

$$I_n = \frac{m_2}{m_0} \times 100\ \% \qquad (3)$$

d) oleaginous impurities, I_0, expressed as a mass fraction in percent

$$I_0 = \frac{m_3}{m_0} \times 100\ \% \qquad (4)$$

where

m_0 is the mass, in grams, of the test portion;

m_1, m_2, m_3 are the respective masses, in grams, of each category of impurity;

m_4 is the mass, in grams, of all the impurities, including the fines.

9.1.3 When only a part of the impurities has been separated from the whole of the test portion and the other from an aliquot portion of the remainder (see 8.2.3.2 and 8.2.3.3), the calculation shall be as follows:

a) total impurities, I_t, expressed as a mass fraction in percent

$$I_t = \left[\frac{m_4}{m_0} + \frac{(m_0 - m_4)m_5}{m_0 \times m_b} \right] \times 100\ \% \qquad (5)$$

or

$$I_t = P + I_n + I_0 \qquad (5) = (6) + (7) + (8)$$

b) fines, P, expressed as a mass fraction in percent

$$P = \frac{m_1}{m_0} \times 100\ \% \qquad (6)$$

c) non-oleaginous impurities, I_n, expressed as a mass fraction in percent

$$I_n = \left[m_{2a} + \left(m_{2b} \times \frac{m_a}{m_b} \right) \right] \times \frac{100\ \%}{m_0} \qquad (7)$$

d) oleaginous impurities, I_0, expressed as a mass fraction in percent

$$I_0 = \left[m_{3a} + \left(m_{3b} \times \frac{m_a}{m_b} \right) \right] \times \frac{100\ \%}{m_0} \qquad (8)$$

where

m_0 is the mass, in grams, of the initial test portion;

m_1 is the mass, in grams, of the fines;

m_{2a} is the mass, in grams, of the fraction of non-oleaginous impurities larger than seeds of the basic species and separated from the whole test portion;

m_{2b} is the mass, in grams, of the fraction of small non-oleaginous impurities separated from the aliquot portion of the residue obtained after elimination, from the test portion, of fines and impurities larger than seeds of the basic species;

m_{3a} is the mass, in grams, of the fraction of oleaginous impurities larger than seeds of the basic species and separated from the whole test portion;

m_{3b} is the mass, in grams, of the fraction of small oleaginous impurities separated from the aliquot portion of the residue obtained after elimination, from the test portion, of fines and impurities larger than seeds of the basic species;

m_a is the mass, in grams, of the residue obtained after elimination, from the initial test portion, of fines and impurities larger than seeds of the basic species:

$$m_a = m_0 - m_1 - m_{2a} - m_{3a}$$