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# Dried pears — Specification and test methods

*Poires séchées — Spécifications et méthodes d'essai*



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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 7702 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*, Subcommittee SC 13, *Dry and dried fruits and vegetables*.

This second edition cancels and replaces the first edition (ISO 7702:1986), which has been technically revised.

Annexes A, B and C form an integral part of this International Standard.





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# Dried pears — Specification and test methods

## 1 Scope

This International Standard specifies requirements and test methods for dried pears obtained from the fruits of the pear tree *Pyrus communis* (L.) destined for human consumption.

## 2 Definitions

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

**2.1 whole pear:** An entire pear.

**2.2 halved pear:** A pear that has been cut longitudinally into approximately equal halves.

**2.3 sliced pear:** A pear that has been cut longitudinally into several slices.

**2.4 diced pear:** A pear that has been cut into approximately equal-sized cubes.

**2.5 pest-infested dried pear:** Dried pear damaged by insect infestation and/or mite infestation.

**2.6 spoiled dried pear:** Dried pear damaged by bruises, or darkened in colour, or showing the presence of mushy tissue, visible decomposition caused by bacteria, fungi, visible mould hyphae or any other indications of disease.

**2.7 immature dried pear:** Dried pear obtained from an unripe green pear, having poor flavour, hard tissue and undesirable appearance.

**2.8 grittiness:** The presence of distinct particles in the fruit flesh.

**2.9 stem or seeds:** A piece of dried pear with stem and/or seeds attached.

**2.10 core carpel:** A piece of dried pear with attached core carpel which together have an area exceeding that of a circle 12 mm in diameter.

**2.11 fermentation:** A piece of dried pear damaged by fermentation to the extent that the characteristic appearance and/or flavour is substantially affected.

**2.12 residual sulfur dioxide** ($SO_2$) **content:** The quantity of sulfur dioxide determined in accordance with the method specified in annex B.

It is expressed in milligrams per kilogram.

**2.13 moisture content:** Conventionally, the loss in mass determined under the operating conditions specified in annex C.

## 3 Requirements

### 3.1 Description

Dried pears are the sun-dried or artificially dried ripe fruits of *Pyrus communis* (L.). Dried pears are prepared from sufficiently ripe fruits that have been cut into halves lengthwise, sliced or diced. The stems shall be pulled or cut off and the calyx ends removed. The fruits shall be sound and clean.

NOTE 1 It is not customary to peel pears, nor to remove the cores unless damaged. Only damaged areas should be trimmed.

### 3.2 Classification

Dried pears shall be classified on the basis of colour and the presence of defects, extraneous matter and broken pieces, as specified in table 1. They may also be separated into sizes.

### 3.3 Odour and taste

Dried pears shall have an odour and taste characteristic of the variety. They shall be free from foreign odour and odour traces coming from abnormal fermented pears.

### 3.4 Freedom from insects, moulds, etc.

Dried pears shall be free from living insects, mites or other parasites and moulds, and shall be practically free from dead insects, insect fragments and rodent contamination visible to the naked eye (corrected, if necessary, for abnormal vision) or with such magnification as may be necessary in any particular case. If the magnification exceeds × 10, this fact shall be stated in the test report.

### 3.5 Extraneous matter

The proportion of extraneous matter such as dirt, pieces of skin, calyx, leaf, peduncle, twigs, bits of wood, soil or any other foreign matter among or on the dried pears shall not exceed the values given in table 1 according to the class.

### 3.6 Pest-infested and spoiled dried pears

The proportion of pest-infested and spoiled dried pears shall not exceed the values given in table 1 according to the class.

### 3.7 Immature dried pears

The proportion of immature dried pears shall not exceed the values given in table 1 according to the class.

### 3.8 Colour

The colour of dried pears shall be light and cream (yellowish white) with slight browning of the cut edges, or light brown.

### 3.9 Moisture content

The moisture content of dried pears shall not exceed 25 % (*m/m*).

### 3.10 Sulfur dioxide content

The content of residual sulfur dioxide shall not exceed the values given in table 1, according to the class.

### 3.11 Mineral impurities

The acid-insoluble ash yield shall not exceed 1 g/kg.

## 4 Classification

### 4.1 Classes

Dried pears are classified into three classes defined in 4.1.1 to 4.1.3.

#### 4.1.1 Extra class

Dried pears in this class shall be of superior quality. They shall be characteristic of the variety and/or commercial type. They shall be practically free from defects, provided that these do not affect the general appearance of the product, the quality, or its presentation in the package. Pears in this class shall not exceed the allowable percentages for the various defects given in table 1.

#### 4.1.2 Class I

Dried pears in this class shall be of good quality. They shall be characteristic of the variety and/or commercial type.

The following slight defects are allowed, provided that the dried pears retain their essential characteristic as regards general appearance, quality and presentation:

— skin defects;

— coloration defects.

#### 4.1.3 Class II

This class includes dried pears which do not qualify for inclusion in the higher classes but which satisfy the requirements specified in table 1.

The following defects are allowed, provided that the dried pears retain their essential characteristics as regards general appearance, quality and presentation:

— skin defects;

— coloration defects.

Pieces of pear are acceptable only in Class II.

### 4.2 Sizing

Sizing is determined by the diameter of the widest part. The following minimum diameter is required for each class:

| Class | Not peeled | Peeled |
|---|---|---|
| Extra | 35 mm | 30 mm |
| Class I | 25 mm | 22 mm |
| Class II | 20 mm | 18 mm |

The difference between the longest and smallest fruit in any package shall not be greater than 20 mm.

Sizing is therefore compulsory for the Extra class and Class I, but is not required for diced or sliced dried pears.

### 4.3 Tolerances

Subject to agreement between the interested parties, tolerances with respect to characteristics and size may be allowed in each package (or in each lot for product transported in bulk) for product not satisfying the requirements of the class indicated.

## 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.

Methods of sampling dry and dried fruits and vegetable products will form the subject of a future International Standard.

## 6 Test methods

Samples of dried pears shall be tested for conformity of the product to the requirements of table 1 by the test method specified in annex A.

The residual sulfur dioxide content (3.10) shall be tested in accordance with annex B, and the moisture content (3.9) in accordance with annex C.

NOTE 2 An example of the method for the determination of acid-insoluble ash is given in ISO 930[1].

## 7 Packing and marking

### 7.1 Packing

Dried pears shall be packed in clean, sound and dry containers made of materials which do not affect the product. If wooden boxes are used, they shall be lined with a suitable paper.

For direct consumption, small consumer packages may be used. The quantities packed in such packages are usually 0,5 kg, 1,0 kg or 2,5 kg net mass but, if required, other quantities may be used. A suitable number of such small packages shall be placed in large wooden or cardboard cases.

The size of the packages and the number of small packages packed in a case shall be subject to agreement between the purchaser and vendor. However, the mass of the large containers or cases shall not be more than 25 kg.

### 7.2 Marking

The container and case shall be marked or labelled with the following particulars:

a) name of the product or variety, and the trademark or brand name, if any;

b) name and address of the producer or packer;

c) code or batch number;

d) net mass, or gross mass (according to the request of the importing country);

e) class of product;

f) producing country;

g) expiry date;

h) any other marking required by the purchaser, such as year of harvest and date of packing (if known);

i) reference to this International Standard (optional).



1) ISO 930:1980, *Spices and condiments — Determination of acid-insoluble ash.*

**Table 1 — Requirements by class**

| Class | Pest-infested | Spoiled | Immature | Extraneous matter | Colour | Deviations from the main colour | Gritty | Presence of pieces among whole and halved pears | Residual $SO_2$ | Stem or seeds | Fermentation | Core carpel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % (*m/m*) max. | % (*m/m*) max. | % (*m/m*) max. | % (*m/m*) max. | | % (*m/m*) max. | % (*m/m*) max. | % max. (by number) | % (*m/m*) max. | % max. (by number) | % (*m/m*) max. | % max. (by number) |
| **Extra** | 1 | 2 | 1 | 0,5 | Light and cream with slight browning of cut edges | 2 | 1 | 0 | 0,10 | 2 | 0,5 | 5 |
| **Class I** | 2 | 3 | 2 | 1,0 | Light and cream with slight browning of cut edges | 5 | 2 | 5 | 0,15 | 5 | 1,0 | 10 |
| **Class II** | 3 | 4 | 4 | 1,5 | Light brown | 10 | 3 | 10 | 0,20 | 7 | 2,0 | 15 |

# Annex A
(normative)

# Determination of the content of pest-infested and spoiled dried pears, immature fruits, extraneous matter and deviations from main colour



## A.1 Principle

Visual inspection of a test portion of dried pears. Physical separation of pest-infested and spoiled dried pears, immature fruits, extraneous matter and dried pears which show deviations from the main colour.

## A.2 Procedure

Weigh, to the nearest 0,02 g, a test portion of about 500 g. Separate carefully, by hand or using tweezers, the pest-infested and spoiled dried pears, immature fruits, extraneous matter and the dried pears which show deviations from the main colour.

Weigh, to the nearest 0,02 g, each of the categories separately.

## A.3 Expression of results

The proportion, expressed as a percentage by mass, of each category separately is equal to

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

where

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

$m_1$ is the mass, in grams, of the relevant category (see A.2).

## A.4 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 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 test result.

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

# Annex B
(normative)

# Determination of residual sulfur dioxide content: Spectrometric method using tetrachloromercurate(II) *p*-rosaniline

## B.1 Principle

Colour development by the addition of *p*-rosaniline solution to a test solution prepared from dried pear which has been treated with sodium tetrachloromercurate(II) solution. Measurement using a spectrometer of the absorbance of the test solution at a wavelength of 550 nm against a blank.

## B.2 Reagents

Use only reagents of recognized analytical grade and distilled or demineralized water or water of equivalent purity.

**B.2.1 Sulfuric acid solution**, $c(H_2SO_4)$ = 0,25 mol/l.

**B.2.2 Sodium hydroxide solution**, $c$(NaOH) = 0,5 mol/l.

**B.2.3 Formaldehyde solution**, $c$(HCHO) = 0,015 % (*m/m*), prepared from 40 % (*m/m*) formaldehyde by diluting in two steps: 10 to 1 000 then 75 to 2 000.

**B.2.4 Sodium tetrachloromercurate(II) solution**

**WARNING — Mercury(II) salts are very toxic, particularly in aqueous solution. Use skin and respiratory protection when handling dry mercury(II) salts. Use skin protection when handling concentrated solutions of mercury(II) salts.**

Place 23,4 g of sodium chloride (NaCl) and 54,3 g of mercury(II) chloride ($HgCl_2$) in a 2 000 ml one-mark volumetric flask (B.3.3). Dissolve it in about 1 900 ml of water, dilute to the mark with water and mix.

**B.2.5 Hydrochloric-acid-bleached *p*-rosaniline hydrochloride [bis(4-aminophenyl)-4-amino-3-tolylhydroxymethane] solution** ($C_{20}H_{21}N_3O{\cdot}HCl$).

Place 100 mg of *p*-rosaniline hydrochloride and 200 ml of water in a 1 000 ml one-mark volumetric flask. Add 160 ml of hydrochloric acid (concentrated acid diluted 1:1 with water) and dilute to the mark with water. Allow to stand for 12 h before use.

**B.2.6 Sulfur dioxide standard solution** ($SO_2$), corresponding to about 100 mg of $SO_2$ per litre.

Dissolve about 170 mg of sodium hydrogensulfite ($NaHSO_3$) in water in a 1 000 ml one-mark volumetric flask, dilute to the mark with water and mix. Standardize with an iodine standard reference solution [$c$(I) = 0,01 mol/l] before use.

1 ml of this standard solution contains about 100 µg of $SO_2$.

## B.3 Apparatus

Usual laboratory equipment and, in particular, the following.

**B.3.1 Spectrometer**, with selectors for continuous or discontinuous variation, suitable for measurement of absorbance at a wavelength of 550 nm.

**B.3.2 Fruit chopper**, made of a material which does not absorb moisture.

**B.3.3 One-mark volumetric flasks**, short-necked, of capacity 100 ml, 1 000 ml and 2 000 ml.

**B.3.4 Blender**, of capacity at least 300 ml.

**B.3.5 Pipette**, free-running, of capacity 10 ml, calibrated.

**B.3.6 Water bath**, capable of being maintained at 22 °C ± 1 °C.

## B.4 Preparation of test sample

Take approximately 50 g of dried pear and pass it through the fruit chopper (B.3.2) three times, mixing thoroughly after each grinding.

## B.5 Procedure

### B.5.1 Test portion and preparation of test solution

Weigh, to the nearest 0,02 g, about 10 g of the test sample (B.4) and transfer it to a blender (B.3.4). Add 290 ml of water. Cover and blend for 2 min. Withdraw a 10 ml aliquot from the bottom of the blender with the pipette (B.3.5) and transfer it to a 100 ml one-mark volumetric flask (B.3.3) containing 2 ml of sodium hydroxide solution (B.2.2). Swirl and mix for 15 s to 30 s. Add 2 ml of sulfuric acid (B.2.1) and 20 ml of sodium tetrachloromercurate(II) solution (B.2.4). Dilute to the mark with water. Mix thoroughly by inverting the stoppered flask several times.

### B.5.2 Blank test

Carry out a blank test in parallel with the determination, by the same procedure, using the same quantities of all reagents as in the determination, but replacing the aliquot (B.5.1) with 10 ml of water.

### B.5.3 Calibration

#### B.5.3.1 Preparation of calibration solutions

Add 5 ml of sodium tetrachloromercurate(II) solution (B.2.4) to each of a series of six 100 ml one-mark volumetric flasks (B.3.3). Then add, respectively, 0 ml (zero control), 1,0 ml, 2,0 ml, 3,0 ml, 4,0 ml or 5,0 ml of sulfur dioxide standard solution (B.2.6). Dilute to the mark with water and mix.

#### B.5.3.2 Colour development

Transfer 5,0 ml volumes of the calibration solutions (B.5.3.1) to 200 ml test tubes containing 5 ml of *p*-rosaniline hydrochloride solution (B.2.5). Add 10 ml of formaldehyde solution (B.2.3), mix and leave for 30 min at 22 °C.

#### B.5.3.3 Spectrometric measurements

Measure the absorbance of each calibration solution at a wavelength of 550 nm against the zero control solution.

#### B.5.3.4 Plotting the calibration graph

Plot a graph of absorbance against mass of sulfur dioxide.

### B.5.4 Determination

NOTE 3 If it is required to check whether the repeatability requirement is met, carry out two single determinations in accordance with B.5.4.1 and B.5.4.2 under repeatability conditions.

#### B.5.4.1 Colour development

Proceed in accordance with B.5.3.2, but use 2,0 ml of the test solution (B.5.1) instead of the calibration solutions.

#### B.5.4.2 Spectrometric measurements

Measure the absorbance of the test solution at a wavelength of 550 nm against the blank (B.5.2).

NOTE 4 If the same spectrometer cell is used for successive samples, it should be cleaned between runs with hydrochloric acid (concentrated acid diluted 1:1 with water).

## B.6 Calculation

Convert the absorbance measurements (B.5.4.2) to mass of sulfur dioxide by means of the calibration graph (B.5.3.4). Convert the results to milligrams per kilogram of sample.

## B.7 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 5 % of the arithmetic mean of the two results.

## B.8 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 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 test result.

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

# Annex C
(normative)

# Determination of moisture content

## C.1 Principle

Heating and drying of a test portion of dried pear at a temperature of 70 °C ± 1 °C under a pressure not exceeding 13 kPa (100 mmHg).

## C.2 Apparatus

Usual laboratory equipment and, in particular, the following.

**C.2.1 Electric oven**, capable of being maintained at 70 °C ± 1 °C at a pressure of 13 kPa (100 mmHg).

**C.2.2 Dish**, of corrosion-resistant metal, of diameter about 8,5 cm, with **tight-fitting lid.**

**C.2.3 Fruit chopper**, made of a material which does not absorb moisture.

**C.2.4 Desiccator**, containing an effective desiccant.

**C.2.5 Steam bath**

**C.2.6 Sand**

**C.2.7 Analytical balance**, capable of an accuracy of ± 0,01 g.

## C.3 Preparation of test sample

Take approximately 50 g of dried pear and pass it through the fruit chopper (C.2.3) three times, mixing thoroughly after each grinding. Keep it in a completely filled, airtight, closed container to prevent absorption of water.

## C.4 Procedure

NOTE 5 If it is required to check whether the repeatability requirement is met, carry out two single determinations in accordance with C.4.1 to C.4.3 under repeatability conditions.

### C.4.1 Preparation of dish and lid

Add about 2 g of the sand (C.2.6) to the dish (C.2.2) and dry, with the lid, for 2 h in the oven (C.2.1) set at 70 °C. Leave to cool to room temperature in the desiccator (C.2.4) and weigh to the nearest 0,01 g. Repeat the same drying procedure until a constant weight is achieved.

### C.4.2 Test portion

Weigh, to the nearest 0,02 g, about 5 g of the test sample (C.3) and spread this test portion as evenly as possible over the bottom of the dish containing the sand (C.4.1).

### C.4.3 Determination

Moisten the test portion and the sand thoroughly with a few millilitres of hot water. Mix the test portion and sand with a spatula. Wash the sample residue on the spatula into the dish with the minimum volume of hot water. Heat the open dish on the steam bath (C.2.5) to evaporate the water to dryness. Then put the dish, with the lid alongside, in the oven (C.2.1) set at 70 °C and continue drying for 6 h under a pressure not exceeding 13 kPa (100 mmHg). Do not open the oven during this period. During drying, admit to the oven a slow current of air (about 2 bubbles per second) dried by passing through sulfuric acid. The metal dish shall be placed in direct contact with the metal shelf of the oven. After drying, remove the dish, cover it immediately with its lid and place it in the desiccator (C.2.4). After cooling to room temperature, weigh it, still covered, to the nearest 0,02 g.

## C.5 Calculation

The moisture content, expressed as a percentage by mass, of the test portion 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 with its lid and the sand;

$m_1$ is the mass, in grams, of the dish with its lid and the sand with the test portion before moistening and oven-drying;

$m_2$ is the mass, in grams, of the dish with its lid and the sand with the test portion after oven-drying.

Give the result to one decimal place.

## C.6 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 0,2 g of water per 100 g of sample.

## C.7 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 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 test result.

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