
**Pomegranate fruit — Specification and
test methods**

Grenade — Spécifications et méthodes d'essai

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Published in Switzerland

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Foreword

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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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 23393 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 14, *Fresh, dry and dried fruits and vegetables*.

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Pomegranate fruit — Specification and test methods

1 Scope

This International Standard specifies requirements and test methods for pomegranate fruit of the tree *Punica granatum* (L.) destined for human consumption.

2 Terms and definitions

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

2.1

pomegranate

fruit of the tree *Punica granatum* (L.)

2.2

pest-infested pomegranate

pomegranate damaged by insect and/or mite infestation

2.3

spoiled pomegranate

pomegranate damaged by bruises, or darkened in colour, frozen, sun-burnt or showing the presence of visible decomposition caused by bacteria, fungi, visible mould hyphae or any other indications of disease

2.4

immature pomegranate

pomegranate obtained from an unripe pomegranate having poor flavour, hard tissues and undesirable appearance

2.5

fermented pomegranate

pomegranate damaged by fermentation to the extent that the characteristic appearance and/or flavour is substantially affected

2.6

extraneous matter

dirt, pieces of skin, calyx, leaf, peduncle, twigs, bits of wood or any other foreign matter among or on the pomegranate

3 Requirements

3.1 Description

Pomegranates shall be sound and clean. Annex C contains some characteristic compositional data.

3.2 Odour and taste

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

3.3 Freedom from insects, moulds, etc.

Pomegranates shall be free from mites or other parasites and moulds, and shall be practically free from dead insects, insect fragments and rodent contamination visible to the naked eye.

4 Classification

4.1 General

Pomegranates shall be classified on the basis of colour and the presence of defects, extraneous matter and other features, as specified in Table 1. They may also be separated into sizes.

Pomegranates are classified into three classes defined in 4.2.1 to 4.2.3.

4.2 Classes

4.2.1 Extra class

Pomegranates in this class shall be of superior quality. Pomegranates in this class shall not exceed the allowable percentages for the various defects given in Table 1.

4.2.2 Class I

Pomegranates 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 pomegranate retains its essential characteristic as regards general appearance, quality and presentation: skin defect, coloration defects.

4.2.3 Class II

This class includes pomegranates 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 pomegranate retains its essential characteristics as regards general appearance, quality and presentation: skin defect, coloration defects.

Table 1 — Requirements for pomegranate classes

	Extra	Class I	Class II
Pest-infested fruits , max. number of damaged fruits/100 fruits (%)	1	2	3
Spoiled fruits , max. number of spoiled fruits/100 fruits (%)	2	3	4
Immature fruits , max. number of immature fruits/100 fruits (%)	1	2	3
Extraneous matter mass fraction, % (max.)	0,5	1,0	1,5
Colour	light reddish	reddish	brown
Fermented fruits , max. number of fermented fruits/100 fruits (%)	1	2	3
Fruit mass (g)	> 480	380 to 480	< 380

4.3 Tolerances

Subject to agreement between the interested parties, tolerances with respect to characteristic 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.

6 Test methods

Samples of pomegranates shall be tested for conformity of the product to the requirements of Table 1 by the test method specified in Annex A.

The phenolic compounds content shall be tested in accordance with Annex B.

7 Packing and marking

7.1 Packing

Pomegranates 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 1,0 kg, 2,0 kg or 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 15 kg.

7.2 Marking

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

- a) the name of the product or variety, and the trademark or brand name, if any;
- b) the name and address of the producer or packer, trade mark;
- c) the code or batch number;
- d) the net mass, or gross mass (according to the request of the importing country);
- e) the class of product;
- f) the producing country;
- g) the expiry date;
- h) any other marking required by the purchaser, such as year of harvest and date of packing (if known);
- i) a reference to this International Standard (optional).

8 Contaminants

The contents of contaminants (heavy metals, pesticide residues, etc.) of the pomegranate fruit shall not exceed the maximum limits established by the Codex Alimentarius Commission for this commodity and/or shall comply with relevant food safety legislation in force in the target country:

- iron 15,0 mg/kg max.;
- copper 5,0 mg/kg max.;
- arsenic 0,2 mg/kg max.;
- lead 0,2 mg/kg max.;
- zinc 5,0 mg/kg max.

9 Hygienic requirements

9.1 It is recommended that the pomegranate fruit be prepared in accordance with the appropriate sections of the Recommended International Code of Practice — General Principles of Food Hygiene ^[1] and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to the product.

9.2 The product

- a) shall be free from microorganisms in amounts which may represent a hazard to health;
- b) shall be free from parasites which may represent a hazard to health, such as
- 1) total mesophilic aerobic bacteria 1×10^5 cfu/g max.,
 - 2) *Escherichia coli* 0 cfu/g max.,
 - 3) mould-yeast 1×10^3 cfu/g max.,
 - 4) *Salmonella* 0 cfu per 25 g max.,
 - 5) *Staphylococcus aureus* 0 cfu/g max.

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Annex A (normative)

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

A.1 Principle

A test portion of pomegranate fruits is visually inspected by physical separation of the damaged pieces, immature fruits and extraneous matter from the sound, healthy and ripe pieces of the sample.

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 pomegranates, immature fruits, extraneous matter and the pomegranates which show deviations from the main colour.

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

A.3 Calculation

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

$$p = \frac{m_1}{m_0} \times 100 \%$$

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:

- a) all information necessary for the complete identification of the sample;
- b) the sampling method used, if known;
- c) the test method used, with reference to this International Standard;
- d) 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(s);
- e) the test result(s) obtained, or, if the repeatability has been checked, the final quoted result obtained.

Annex B (normative)

Folin-Ciocalteu method for measurement of total phenolics

B.1 Principle

This procedure is based on the quantitative analysis of phenolic compounds by phenol reagent.

B.2 Reagent

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

B.2.1 Folin-Ciocalteu phenol reagent, commercially available, ready prepared.

Before analysis, Folin-Ciocalteu phenol reagent should be diluted to 1:10 by using distilled water. Discard any unused diluted reagent.

Store according to manufacturer's recommendations, and ensure that the reagent is protected from light.

B.2.2 Sodium carbonate, 75 g Na_2CO_3 diluted to 1 l by using distilled water.

B.2.3 Standard phenolic compound solutions.

For preparing the calibration curve, gallic acid or ferulic acid could be used as a standard phenolic compound. Prepare a 500 mg/l gallic acid or ferulic acid stock-solution and dilute it to obtain the following series of working solution: 0,25 mg/l, 50 mg/l, 100 mg/l, 125 mg/l and 250 mg/l.

B.3 Apparatus

Usual laboratory apparatus and, in particular, the following.

B.3.1 UV/VIS spectrophotometer (725 nm).

B.3.2 Waring blender.

B.4 Procedure

B.4.1 Extraction

Blend 100 g pomegranate fruit by using the blender (B.3.2).

Weigh 10 g and make to volume with distilled water into 100 ml and mix.

Filter through filter paper.

B.4.2 Absorbance determination

Add 0,2 ml pomegranate extract and 1,15 ml distilled water and then 0,15 ml Folin-Ciocalteu phenol reagent. Mix well and let the mixture sit at room temperature for 5 min. Add 1,5 ml sodium carbonate solution (B.2.2) and mix well. Let the mixture sit at room temperature for 90 min and read the absorbance at 725 nm by using UV/VIS spectrophotometer (B.3.1).

B.4.3 Calculation

Calculate the amount of phenolic compounds, $m_{t,p}$ by using the following formula:

$$m_{t,p} = \frac{(20,9 \times A) - 0,44}{100} \times f \times \frac{V_e}{V_a} \times \frac{100}{m_s}$$

where

$m_{t,p}$ is the mass, in milligrams, of the total phenolic per 100 g gallic acid or ferulic acid;

A is the absorbance (abs. at 725 nm);

f is the dilution factor, in millilitres;

V_e is the extract volume, in millilitres;

V_a is the assay volume, in millilitres;

m_s is the mass of the sample in grams.

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