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**Peppercorns (*Piper nigrum* L.) in brine —  
Specification and test methods**

*Poivre vert (Piper nigrum L.) en saumure — Spécifications et méthodes  
d'essai*

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## 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.

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.

International Standard ISO 11162 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 7, *Spices and condiments*.

Annexes A, B, C and D form a normative part of this International Standard.

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# Peppercorns (*Piper nigrum* L.) in brine — Specification and test methods

## 1 Scope

This International Standard specifies the requirements for peppercorns (*Piper nigrum* L.) in brine.

## 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 927, *Spices and condiments — Determination of extraneous matter content.*

ISO 939, *Spices and condiments — Determination of moisture content — Entrainment method.*

ISO 948, *Spices and condiments — Sampling.*

ISO 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth.*

ISO 5564, *Black pepper and white pepper, whole or ground — Determination of piperine content — Spectrophotometric method.*

## 3 Terms and definitions

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

### 3.1

#### peppercorns in brine

product prepared under controlled conditions from fresh green pepper berries of the plant *Piper nigrum* L. which have reached a proper degree of maturity and which satisfy the requirements of this International Standard

### 3.2

#### total acidity of brine

acidity produced by all the acids contained in the brine, expressed as a mass fraction of citric acid, in percent

NOTE Citric acid is a triacid with a molar mass equal to 192,13 g.

### 3.3

#### piperine content

quantity of pungent components (piperine and similar compounds) contained in the product, determined by the method specified in this International Standard

NOTE It is expressed as a mass fraction in percent.

### 3.4

#### **chloride content**

mass fraction of chloride ions, expressed as sodium chloride, present in the brine of peppercorns when determined in accordance with the method specified in this International Standard

## 4 Requirements

### 4.1 Colour and size

The berries shall possess characteristic colour of green pepper of proper maturity varying from pale green to green. The berries are between 3 mm to 6 mm in diameter and shall be more or less of a uniform size within a same batch.

### 4.2 Odour and flavour

The berries shall have the characteristic odour and flavour of fresh green pepper berries and shall be completely devoid of any objectionable taste or odour.

### 4.3 Extraneous matter

For the purposes of this International Standard, all materials other than green pepper berries, irrespective of whether they are of vegetable (e.g. stem or leaves) or mineral (e.g. sand) origin, shall be considered as extraneous matter.

NOTE Light berries, pinhead or broken berries are not considered as extraneous matter.

The total percentage of extraneous matter, when determined by the method specified in ISO 927, shall not exceed 1 % (mass fraction).

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### 4.4 Defective berries

The maximum limit for defective berries, including discoloured, dark coloured, light and broken berries and pinheads, shall be 4 % (mass fraction) when determined on a sample of 500 g (drained mass) by physical separation.

### 4.5 Freedom from moulds, insects, preservatives, colouring matter and flavouring agents

Peppercorns in brine shall be free from moulds and insects. They shall also be free from preservatives, colouring matter and flavouring agents unless permitted under the national legislation of the importing country.

### 4.6 Piperine content of peppercorns in brine

The piperine content shall be determined following the method given in annex A.

### 4.7 Characteristics of the brine and processing conditions

4.7.1 The brine shall comply with the requirements given in Table 1.

4.7.2 The peppercorns in brine shall be processed under hygienic conditions.

### 4.8 Drained mass

The drained mass of the content shall be not less than 50 % (mass fraction) of the net mass when tested in accordance with the method specified in annex D.

Table 1 — Requirements for the brine

Characteristic	Specification	Test method
Appearance	Clear and practically free from sediment	Visual examination
Acetic acid or citric acid, % max.	0,6	Method given in annex B
Chloride content, expressed as sodium chloride, %	Between 12 and 15	Method given in annex C
pH	Between 4,0 and 4,5	pH-meter

## 5 Sampling

Sampling shall be carried out as specified in ISO 948.

## 6 Packaging and marking

### 6.1 Packaging

The product shall be packed in clean and sound containers made of a material which does not affect the product and which protects it from damage or spoilage.

The packaging shall also comply with any national legislation relating to environmental protection.

### 6.2 Marking

The following particulars shall be marked directly on each container or shall be marked on a label attached to the container:

- a) name of the product and tradename, if any;
- b) name and address of the processor or packer;
- c) brand name, if any;
- d) batch or code number;
- e) net mass;
- f) best before (month and year);
- g) any other markings required by the purchaser (such as the year of harvest, the date of packing) or by national regulation (for example, percentage of citric acid in the brine);
- h) processing country; and
- i) reference of this International Standard.

## Annex A (normative)

### Determination of piperine content

#### A.1 Introduction

Studies have determined that the test method described in ISO 5564 for the determination of piperine, on a dry basis, does not give consistent results when applied to peppercorns in brine. Studies have shown that this is due to the presence of sodium chloride and therefore it is necessary to take this into account in the calculation of the piperine content of peppercorns in brine. This is the reason why a method specific to peppercorns in brine has been established.

#### A.2 Principle

The piquant compounds are extracted with ethanol and determined spectrometrically at a wavelength of 343 nm. Then their piperine content is calculated.

#### A.3 Reagents

Use only reagents of recognized analytical grade.

**A.3.1 Ethanol**, 96 % (volume fraction).

#### A.4 Apparatus

Use the apparatus described in ISO 5564, together with the following.

**A.4.1 Plastic cuvette**, of diameter greater than 10 cm.

**A.4.2 Oven**, capable of being maintained at  $50\text{ °C} \pm 5\text{ °C}$ .

**A.4.3 Analytical balance**, capable of weighing to the nearest 0,01 g.

#### A.5 Preparation of test sample

Drain the brine from the green pepper berries.

Weigh, to the nearest 0,01 g, between 50 g and 60 g of the drained berries in the plastic cuvette (A.4.1). Spread them uniformly over the surface then place them in the oven (A.4.2) set at  $50\text{ °C}$  for a minimum of 24 h.

#### A.6 Procedure

##### A.6.1 Determination of sodium chloride content

Determine the sodium chloride content using the method specified in annex C.

##### A.6.2 Determination of moisture content

Determine the moisture content of the drained, dried (see A.5) then crushed berries in accordance with the method specified in ISO 939.



### A.6.3 Determination of piperine content

Determine the piperine content on a dry basis of the drained, dried (see A.5) then crushed berries in accordance with the method given in ISO 5564 but using a test sample of 0,7 g rather than 0,5 g.

### A.7 Expression of results

The piperine content, on a dry basis, is calculated from the following:

$$P / \left[ \left( 1 - \frac{H}{100} \right) \left( 1 + \frac{S}{100} \right) - \frac{S}{100} \times \frac{(m_1 - m_0)}{(m_2 - m_0)} \right]$$

where

$P$  is the piperine content of the drained, dried and crushed berries, expressed as a mass fraction in percent, as obtained in A.6.3;

$H$  is the water content of the drained, dried and crushed berries, expressed as a mass fraction in percent, as obtained in A.6.2;

$S$  is the sodium chloride content of the brine, expressed as a mass fraction in percent, as obtained in A.6.1;

$m_0$  is the mass, in grams, of the empty plastic cuvette;

$m_1$  is the mass, in grams, of the empty plastic cuvette and drained berries;

$m_2$  is the mass, in grams, of the empty plastic cuvette and the drained dried berries.

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