INTERNATIONAL STANDARD

ISO 959-1

First edition
1989-11-15

Pepper (*Piper nigrum* Linnaeus), whole or ground — Specification —

Part 1 : Black pepper

Poivre (Piper nigrum Linnaeus), entier ou en poudre — Spécifications —

Partie 1 : Poivre noir

Reference number
ISO 959-1 : 1989 (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 approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 959-1 was prepared by Technical Committee ISO/TC 34, *Agricultural food products.*

This first edition of ISO 959-1, together with ISO 959-2 : 1989, cancels and replaces Recommendation ISO/R 959 : 1969, of which the two parts constitute a technical revision.

ISO 959 consists of the following parts, under the general title *Pepper (*Piper nigrum *Linnaeus), whole or ground — Specification*:

— *Part 1: Black pepper*

— *Part 2: White pepper*

Annexes A and B form an integral part of this part of ISO 959. Annexes C, D and E are for information only.

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Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Pepper (*Piper nigrum* Linnaeus), whole or ground — Specification —

Part 1: Black pepper

1 Scope

This part of ISO 959 specifies requirements for black pepper (*Piper nigrum* Linnaeus) (see ISO 676), whole or ground, at the following commercial stages:

— pepper sold by the producing country without cleaning or after a partial cleaning, without preparation or grading, called "non-processed (NP) or semi-processed (SP) pepper" in this part of ISO 959;

— pepper sold by the producing country after cleaning, preparation and/or grading, called "processed (P) pepper", which can, in certain cases, be re-sold directly to the consumers.

When the term "black pepper" is used alone, it means that the specification applies to both types described, without distinction.

This part of ISO 959 does not apply to black pepper categories called "light".

NOTE — Specifications of white pepper are given in ISO 959-2.

Recommendations relating to storage and transport conditions are given in annex C. Information regarding the microscopic structure of the fruit of the pepper plant is given in annex D. The main producing countries and current trade-names of categories of black pepper are listed in annex E.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 959. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 959 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 676 : 1982, *Spices and condiments — Nomenclature — First list.*

ISO 927 : 1982, *Spices and condiments — Determination of extraneous matter content.*

ISO 928 : 1980, *Spices and condiments — Determination of total ash.*

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

ISO 939 : 1980, *Spices and condiments — Determination of moisture content — Entrainment method.*

ISO 948 : 1980, *Spices and condiments — Sampling.*

ISO 1108 : 1980, *Spices and condiments — Determination of non-volatile ether extract.*

ISO 1208 : 1982, *Spices and condiments — Determination of filth.*

ISO 5498 : 1981, *Agricultural food products — Determination of crude fibre content — General method.*

ISO 5564 : 1982, *Black pepper and white pepper, whole or ground — Determination of piperine content — Spectrophotometric method.*

ISO 6571 : 1984, *Spices, condiments and herbs — Determination of volatile oil content.*

3 Definitions

For the purposes of this part of ISO 959, the following definitions apply.

3.1 black pepper: Berry of *Piper nigrum* Linnaeus having an unbroken pericarp.

3.2 black pepper, non-processed or semi-processed: Pepper that has not undergone any treatment or has solely been partially processed by the producing country before being exported, and is in conformity with the requirements of this part of ISO 959.

3.3 black pepper, processed: Pepper that has been processed (cleaning, drying, preparation, grading, etc.) by the producing country before being exported and is in conformity with the requirements of this part of ISO 959.

3.4 black pepper, ground: Black pepper obtained by grinding whole berries without any added matter.

3.5 grey pepper: Commercial name sometimes given to ground black pepper.

3.6 light berry: Berry that has reached an apparently normal stage of development but the kernel of which does not exist.

3.7 pinhead: Berry of very small size that has not developed.

3.8 broken berry: Berry that has been separated in two or more pieces.

3.9 extraneous matter : All materials other than black pepper berries, irrespective of whether they are of vegetable (e.g. stems and leaves) or mineral (e.g. sand) origin. Light berries, pinheads or broken berries are not considered as extraneous matter.

4 Requirements

4.1 Description (see figures 1 and 2)

Whole black pepper is the whole dry berry of *Piper nigrum* Linnaeus, generally picked before complete ripening. Berries of black pepper have a diameter of 3 mm to 6 mm and are of a brown, grey or black colour with a wrinkled pericarp.

Ground black pepper is obtained by grinding whole berries, without any added matter.

See figure 3 for an indication of the anatomical constitution of black pepper berries.

4.2 Odour and flavour

The flavour of black pepper when it is ground shall be characteristic, strongly sharp and very aromatic. The product shall be free from extraneous odours and flavours, including mouldy and rancid odours.

NOTE — The appearance of berries has no direct relation to their flavour. Small berries can be more aromatic than berries of better appearance or larger size.

4.3 Absence of mould, insects, etc.

Black pepper shall be free from mould and living insects and practically free from dead insects, insect fragments and rodent contamination visible to the naked eye (corrected, if necessary, for abnormal vision) or with magnification if necessary in certain specific cases. If the magnification used is greater than × 10, this fact shall be mentioned in the test report. Furthermore, in the case of ground black pepper, impurities shall be determined according to the method described in ISO 1208.

4.4 Physical characteristics

Whole black pepper shall meet the requirements given in table 1.

Table 1 — Requirements for physical characteristics of whole black pepper

Characteristic	Requirements		Reference test method
	Pepper NP or SP	Pepper P	
Extraneous matter, % (*m*/*m*) max.	2,5	1,5	ISO 927
Light berries, % (*m*/*m*) max.	10	5,0	Annex A
Pinheads or broken berries, % (*m*/*m*) max.	7,0	4,0	Physical separation and weighing
Bulk density, g/l, min.	450	490	Annex B

NOTE — In addition, especially in the case of ground pepper, it is recommended that a microscopic examination be carried out (see annex D).

4.5 Chemical characteristics

The black pepper shall meet the requirements given in table 2.

Table 2 — Requirements concerning chemical characteristics of black pepper, whole or ground

Characteristic	Requirements			Reference test method
	Pepper NP or SP	Pepper P	Ground pepper	
Moisture content, % (*m*/*m*) max.	14,0	14,0	14,0	ISO 939
Total ash, % (*m*/*m*) max., on dry basis	7,0	6,0	6,0	ISO 928
Non-volatile ether extract, % (*m*/*m*) min., on dry basis	6,0	6,0	6,0	ISO 1108
Volatile oils, % (ml/100 g) min., on dry basis	2,0	2,0	1,0[1]	ISO 6571
Piperine content, % (*m*/*m*) min.	4,0	4,0	4,0	ISO 5564
Acid-insoluble ash, % (*m*/*m*) max., on dry basis	—	—	1,2	ISO 930
Crude fibre, insoluble index, % (*m*/*m*) max., on dry basis	—	—	17,5	ISO 5498

1) The volatile oil content should be determined immediately after grinding.

5 Sampling

Black pepper shall be sampled using the method specified in ISO 948.

Samples of whole black pepper shall be ground so that all material passes through a sieve with apertures of size 1 mm. The material thus ground shall be used for determining the characteristics given in table 2.

6 Test methods

The black pepper samples shall be analysed to ensure conformity with the requirements of this part of ISO 959, following the methods described in International Standards referred to in tables 1 and 2, and in annexes A and B of this part of ISO 959.

7 Packing and marking

7.1 Packing

Whole black pepper and ground black pepper shall be packed in clean, sound, dry packages, made of a material which does not affect the product.

7.2 Marking

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

a) name of the product and the trade-name, if any;

b) name and address of the manufacturer or packer, or trade-mark;

c) code or batch number;

d) net mass;

e) grade of the product (if classified) according to national standards;

f) producing country;

g) destination by the name of port or town;

and, if necesssary,

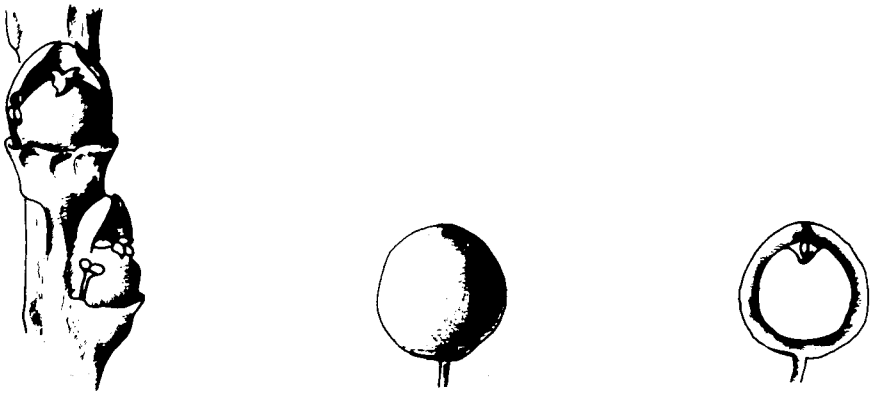
h) any other information requested by the buyer, such as year of harvest and date of packaging;

i) reference to this part of ISO 959.

7.3 Labelling

In the case of small packages intended for retail sale, labelling shall be signed and dated according to regulations in force concerning labelling of food commodities.

Figure 1 — Pepper plant (*Piper nigrum* Linnaeus) — Branch with fruit-bearing spike (reduced)

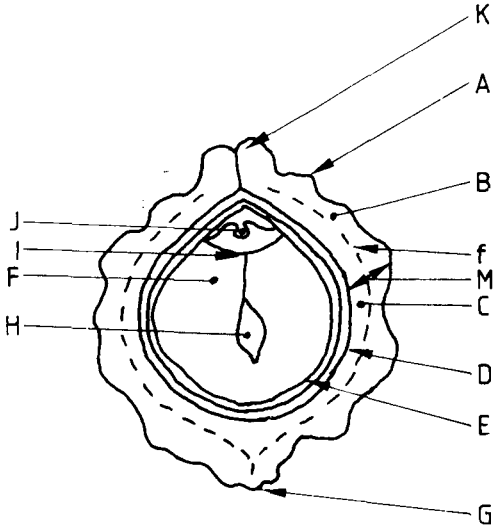


a) **Part of spike showing two flowers** (greatly magnified)

b) **Fruit** (magnified)

c) **Fruit cut longitudinally** (magnified)

Figure 2 — Pepper plant (*Piper nigrum* Linnaeus)



Pericarp
- A — epicarp
- M — mesocarp
  - B — external mesocarp
  - C — internal mesocarp (f — liber-ligneous bundle)
- D — endocarp
- G — pseudo-peduncle
- K — micropyle

Seed
- E — tegument
- F — perisperm
- H — seed cavity, more or less developed
- I — *proper albumen*
- J — embryo of two cotyledons

Figure 3 — Anatomical constitution of black pepper berry

Annex A
(normative)

Determination of percentage of light berries in black pepper

A.1 Reagent

Alcohol-water solution, of relative density $d_{20}^{20} = 0{,}80$ to 0,82[1].

The alcohol used in the preparation of this solution can be ethanol, denatured alcohol previously rectified, or propan-2-ol.

A.2 Procedure

A.2.1 Test portion

Weigh, to the nearest 0,01 g, 50,0 g of sample, from which the extraneous matter has been previously removed, into a 600 ml glass beaker.

A.2.2 Determination

Add 300 ml of the alcohol-water solution (clause A.1) to the glass beaker and mix the contents with a spoon. Leave the product standing for 2 min, then remove the floating berries with the spoon. Only berries floating on the surface shall be removed and not those that remain in suspension some distance below the surface of the alcohol-water solution. Repeat the stirring, standing and removal operations until no more berries float after two successive stirrings.

Dry the berries removed on blotting paper to eliminate the excess liquid, then spread them in dry air on a piece of paper, textile or other absorbent material. Leave the berries for 1 h, then weigh to the nearest 0,01 g.

A.3 Expression of results

The percentage by mass of light berries in the sample 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 light berries removed.

1) If the temperature is different, a correction factor is to be used.

Annex B
(normative)

Whole black pepper: Determination of apparent bulk density

B.1 Scope

This annex specifies a method of determination of the apparent bulk density of whole black pepper.

B.2 Principle

Weighing a volume, exactly measured, of 1 l of pepper.

B.3 Apparatus [1)]

B.3.1 Apparatus for measuring bulk density, consisting of

— **cylinder,** of capacity 1 l or a cylinder of greater capacity, but equipped with apparatus allowing levelling of the product to the 1 l level;

— **hopper,** of capacity greater than 1 l and equipped with a gate;

— **device,** for fixing the hopper above the cylinder at a certain distance, to allow free fall of the product into the cylinder from a constant height.

Figure B.1 shows an example of such apparatus.

B.3.2 Balance

A special balance allowing the cylinder to be hooked to one side of the beam and equipped on the other side with a suitable plate serving as tare.

B.4 Procedure

B.4.1 Determination

Weigh the empty cylinder, if necessary.

Place the cylinder on a horizontal plane and set the hopper on it with a fixing device.

Pour the pepper into the hopper until it is filled. Open the gate and allow the pepper berries to flow freely into the cylinder until the level slightly exceeds the upper level or the 1 l level, according to the apparatus used.

Level the pepper, according to the case, to the upper level of the cylinder with a ruler, or to the 1 l level with a suitable device with which the cylinder is equipped. (In the latter case remove the excess berries.)

Remove the hopper and its support, then weigh the cylinder filled with the pepper.

B.4.2 Number of determinations

Carry out three determinations.

B.5 Expression of results

B.5.1 Method of calculation

The apparent bulk density of pepper, expressed in grams per litre, is given by the mass of pepper contained in the cylinder.

Take as the result, the arithmetic mean of the three determinations if the repeatability conditions (see B.5.2) are satisfied. Otherwise, carry out three further determinations. If the former conditions are still not satisfied, take the arithmetic mean of the six determinations as the result.

B.5.2 Repeatability

The difference between the results of two determinations carried out in rapid succession by the same analyst using the same apparatus shall not exceed 5 g per litre.

B.6 Test report

The test report shall specify the method used and the result obtained. It shall also mention all operating details not specified in this annex, or regarded as optional, together with details of any incidents which may have influenced the results.

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

1) This is the apparatus applicable to the reference method. However, for routine control and when the apparatus described is not available, it is possible to use a cylinder of 1 l capacity and a funnel.