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**Nutmeg, whole or broken, and mace, whole  
or in pieces (*Myristica fragrans* Houtt.) —  
Specification**

*Muscade entière ou brisée et macis entier ou en morceaux (Myristica  
fragrans Houtt.) — Spécifications*

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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 6577 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 7, *Spices and condiments*.

This second edition cancels and replaces the first edition (ISO 6577:1990), of which it constitutes a minor revision.

Annex A of this International Standard is for information only.

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# Nutmeg, whole or broken, and mace, whole or in pieces (*Myristica fragrans* Houtt.) — Specification

## 1 Scope

This International Standard specifies requirements for nutmeg, whole or broken, and for mace, whole or in pieces, obtained from the nutmeg tree (*Myristica fragrans* Houtt.) for wholesale commercial purposes.

NOTE As nutmeg and mace are obtained from the same plant, it was considered preferable to give the specifications for these two spices in one International Standard.

It is not applicable to Papua-type nutmeg and mace (*Myristica argentea* Warburg).

Recommendations relating to storage and transport conditions are given in annex A.

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

ISO 928:1997, *Spices and condiments — Determination of total ash*

ISO 930:1997, *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 1003:1980, *Spices and condiments — Ginger, whole, in pieces, or ground — Specification*

ISO 2825:1981, *Spices and condiments — Preparation of a ground sample for analysis*

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

### 3 Terms and definitions

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

#### 3.1

##### **fruit of the nutmeg tree**

fruit comprising a green to pale yellow pericarp (depending on its ripeness), a woody shell, an aril (mace) and a kernel (nutmeg)

See Figures 1 and 2.

#### 3.2

##### **nutmeg, whole or broken**

kernel of the dried ripe fruit of the nutmeg tree (*Myristica fragrans* Houtt.)

See Figures 2 and 3.

#### 3.3

##### **mace, whole or in pieces**

dried aril of the ripe fruit of the nutmeg tree (*Myristica fragrans* Houtt.)

See Figures 2 and 3.

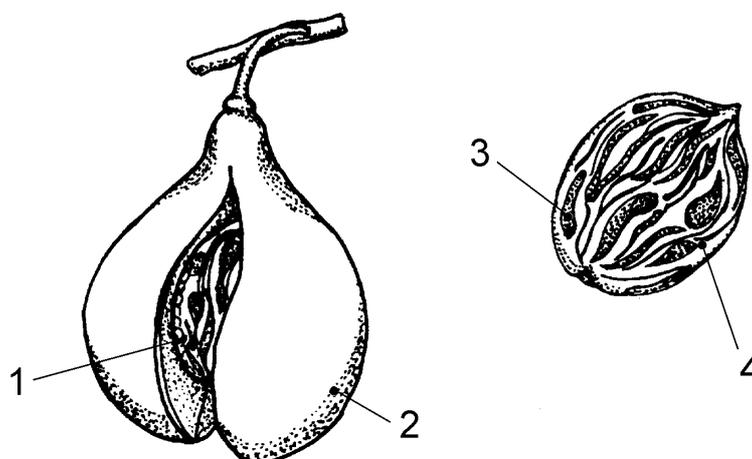
#### 3.4

##### **aril**

fleshy or membraneous tissue surrounding certain seeds and attached to the seeds at one point only, i.e. the hilum

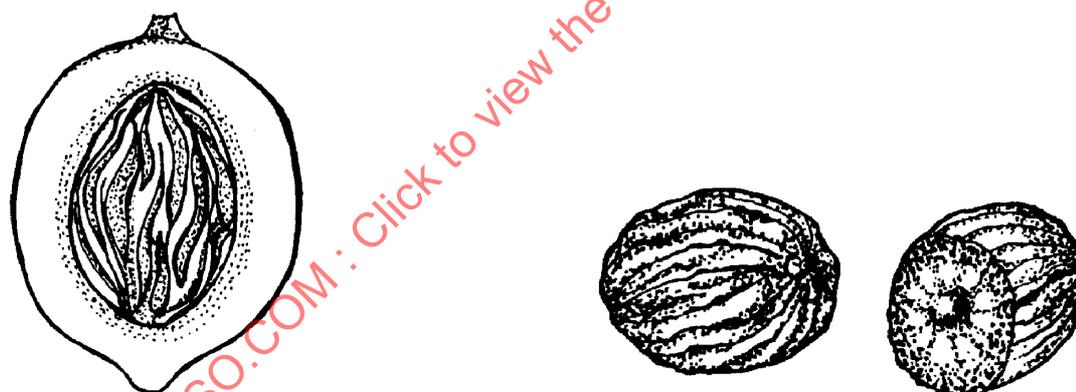


Figure 1 — Nutmeg tree — Twig with fruit (about half life-size)

**Key**

- 1 Woody shell
- 2 Pericarp
- 3 Kernel
- 4 Aril (mace)

Figure 2 — Nutmeg — Schematic detail of various parts of the fruit



a) Longitudinal section of the fruit

b) Kernel and transverse section of the kernel

Figure 3 — Nutmeg sections

## 4 Types and classification

### 4.1 Nutmeg

#### 4.1.1 Whole or broken nutmeg (Siauw type or Banda type)

**Origin:** South-east Asia.

Siauw-type or Banda-type nutmeg is generally of a greyish-brown colour, but it may be white if it has been subjected to liming for the purpose of protecting it from insects and as an aid to conservation. It is spherical or slightly ovoid in shape, its length generally varying from 20 mm to 30 mm and its width from 15 mm to 25 mm. Its surface is hard to the touch, marked with numerous braided furrows and with a narrow groove which extends from the hilum to the chalaza on the least-convex side.

#### 4.1.2 Whole or broken nutmeg (Grenada type)

**Origin:** West Indies.

Grenada-type nutmeg has the same colour characteristics as the nutmeg described in 4.1.1. It is never limed and it is of a slightly more elongated shape than the Siauw-type or Banda-type nutmeg.

### 4.2 Mace

#### 4.2.1 Mace, whole or in pieces (Siauw type or Banda type)

**Origin:** South-east Asia.

Siauw-type or Banda-type mace is a flattened, dried, quite wide aril with a horny texture, reddish-yellow to brownish-red in colour, and generally 30 mm to 40 mm long and 1 mm thick.

#### 4.2.2 Mace, whole or in pieces (Grenada type)

**Origin:** West Indies

Grenada-type mace is a flattened, dried, quite wide aril with a horny texture, generally 30 mm to 40 mm long and 1 mm thick. Its colour varies according to the category (see Table 3).

### 4.3 Commercial categories

#### 4.3.1 Nutmeg (Siauw type, Banda type and Grenada type)

Nutmegs are classified according to

- the producing region (South-east Asia or West Indies), and
- the category (see Table 1).

**Table 1 — Categories of nutmeg**

Category	Commercial designation	Description
1	Whole sound nutmegs	Whole, sound and well-formed nutmegs classified as a function of size. <sup>a</sup>
2	Sound shrivels	Shrivelled, but sound, nutmegs which have not been attacked by insects.
3	BWP (South-east Asia) or defectives ((West Indies)	Broken nutmegs or whole nutmegs that have been attacked by insects (but with no living insects and practically free from dead insects). They may have been limed.

<sup>a</sup> Whole nutmegs are sold either as an "assorted" mixture (ABCD), without sorting by size, or by the number of nutmegs to the (English) pound after sizing. For example, "Whole sound nutmegs 80" would indicate nutmegs of category 1, of a size corresponding to 80 to the pound. The most commonly used size ranges in commerce are 60 to 65, 80 to 85, 100 to 110, 110 to 120, 120 to 130 and 130 to 150.

#### 4.3.2 Mace (Siauw type, Banda type and Grenada type)

Mace is classified according to

- the producing region (South-east Asia or West Indies), and
- the category (see Tables 2 and 3).

Table 2 — Categories of Siauw-type and Banda-type mace

Category	Commercial designation	Description
1	Whole	Whole mace containing not more than 5 % of about quarter-size broken pieces.
2	A	Broken mace I
	B	Broken mace II
3	A	Sifting I
	B	Sifting II

Table 3 — Categories of Grenada-type mace

Category	Commercial designation	Description
1	Whole No. 1	Whole mace, pale yellow in colour, containing not more than 5 % of broken pieces.
2	Broken No. 2	Pieces ranging from yellow to dark red in colour but, overall, yellow, of at least quarter-size, with a proportion of smaller pieces and dust (less than 5 %).
3	Mace pickings	Dust and discoloured pieces of mace ranging from yellow to black and containing damaged "country" mace.

## 5 Requirements

### 5.1 Odour and flavour

The odour of nutmeg and mace shall be characteristic and aromatic, that of mace being more pronounced, however. Their flavour is bitter, acrid and hot.

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

Nutmeg and mace shall be free from living insects 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 used is greater than  $\times 10$ , this fact shall be stated in the test report.

### 5.3 Extraneous matter

For the purposes of this International Standard, the following are considered to be extraneous matter:

- all vegetable matter other than the kernel and the aril, in particular pieces of shell;
- all other extraneous animal, vegetable or mineral matter.

The total content of this extraneous matter, determined using the method specified in ISO 927, shall not exceed 0,5 % (by mass).

Nutmeg in mace and, inversely, mace in nutmeg is not considered as extraneous matter but, in both cases, their content shall not be greater than 3 % (by mass).

## 5.4 Chemical requirements

### 5.4.1 Nutmeg

Whole or broken nutmeg shall comply with the requirements given in Table 4.

### 5.4.2 Mace

Mace, whole or in pieces, shall comply with the requirements given in Table 5.

**Table 4 — Chemical requirements for nutmeg, whole or broken** (Siau w type, Banda type and Grenada type)

Characteristic	Requirement	Test method
Moisture content, % (by mass), max.	10	ISO 939
Total ash, % (by mass), max., on dry basis	3	ISO 928
Acid-insoluble ash, % (by mass), max., on dry basis	0,5	ISO 930
Volatile oils content (ml/100 g) min., on dry basis	6,5	ISO 6571
Calcium content expressed as CaO, % (by mass), max., on dry basis	0,35	ISO 1003:1980, annex A

**Table 5 — Chemical requirements for mace, whole or in pieces** (Siau w type, Banda type and Grenada type)

Characteristic	Requirement	Test method
Moisture content, % (by mass), max.	10	ISO 939
Total ash, % (by mass), max., on dry basis	4	ISO 928
Acid-insoluble ash, % (by mass), max., on dry basis	0,5	ISO 930
Volatile oils content ((ml/100 g) min., on dry basis		
Categories 1 and 2	7,5	ISO 6571
Category 3	5	

## 6 Sampling

Sampling shall have been carried out in accordance with ISO 948.

## 7 Test methods

Prepare the ground sample for analysis using the method specified in ISO 2825.

Because of the high fat content of these two spices, heating during the grinding process should be avoided. Cryogenic grinding is therefore strongly recommended.

The product thus ground shall be tested for conformity with the requirements of this International Standard using the test methods indicated, **with the exception that for the determination of total ash**, heating should be carried out at 600 °C, instead of 550 °C, as specified in ISO 928, to achieve total incineration.

## 8 Packing and marking

### 8.1 Packing

Nutmeg and mace shall be packed in clean, dry and sound containers made of a material which does not affect the product.

## 8.2 Marking

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

- a) name of the product (botanical name) and tradename, if any;
- b) name and address of the producer or packager and, if applicable, the trademark;
- c) batch or code number;
- d) net mass;
- e) category;
- f) producing country;

and, if necessary,

- g) any other information required by the purchaser, such as year of harvest and date of packing;
- h) reference to this International Standard.

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