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**Spices — Ginger (*Zingiber officinale*  
Roscoe) — Specification**

*Épices — Gingembre (*Zingiber officinale* Roscoe) — Spécifications*

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## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 1003 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 7, *Spices, culinary herbs and condiments*.

This second edition cancels and replaces the first edition (ISO 1003:1980), which has been technically revised.

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# Spices — Ginger (*Zingiber officinale* Roscoe) — Specification

## 1 Scope

This International Standard specifies requirements for ginger (*Zingiber officinale* Roscoe).

Annex A specifies a method for the determination of calcium. Recommendations for storage and transport conditions are given in Annex B.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

ISO 927, *Spices and condiments — Determination of extraneous matter and foreign matter content*

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

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

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

ISO 948, *Spices and condiments — Sampling*

ISO 1208, *Spices and condiments — Determination of filth*

ISO 6571, *Spices, condiments and herbs — Determination of volatile oil content (hydrodistillation method)*

## 3 Description

### 3.1 Form and appearance

Ginger is the dried, peeled or unpeeled rhizome of *Zingiber officinale* Roscoe, in irregular pieces not less than 20 mm in length, in slices, in small cut pieces or ground. The ginger shall be yellowish-white in colour. It can be peeled or scraped, then washed and dried. The ginger may be lime bleached. Ginger may be graded on the basis of place of production, type of processing or colour.

### 3.2 Odour and taste

The odour and taste of ginger shall be characteristic: slightly sharp, pungent, fresh, and lemony. The material shall not have a musty odour or a rancid or bitter taste.

## 4 Requirements

### 4.1 General requirements

The spice shall conform to international, regional and national food safety and consumer protection regulations relating to adulteration (including colouring with natural or synthetic colours), contaminants (such as heavy metals and mycotoxins), pesticides, and hygienic practices.

Treatments, such as methylbromide, aluminium phosphide<sup>1)</sup>, ethylene oxide or irradiation as well as processing aids and chemical bleaching agents, may only be applied after agreement between buyer and seller.

### 4.2 Physical requirements

#### 4.2.1 Infestation

Ginger shall be free from living insects and shall be practically free from visible dead insects or insect fragments.

In the case of ground ginger, the contamination shall be determined by the method specified in ISO 1208.

#### 4.2.2 Extraneous and foreign matter

The proportion of extraneous matter in ginger shall be not more than 1 % mass fraction and foreign matter shall be not more than 0,5 % mass fraction when determined by the method specified in ISO 927.

#### 4.2.3 Freedom from coarse particles

Ground ginger shall be free from coarse particles and fibres. The fineness shall be agreed between the buyer and the seller.

### 4.3 Chemical requirements

Ginger shall comply with the requirements specified in Table 1.

Sulfur dioxide shall only be used for bleaching ginger after explicit agreement between buyer and seller. The content of sulfur dioxide, e.g. as a mass fraction, shall comply with national or international legislation in force in the destination country.

1) Phostoxin is an example of a commercially available product. This information is given for the convenience of users of this International Standard, and does not constitute an endorsement of this product by ISO.

Table 1 — Chemical requirements for ginger

Characteristic	Requirement	Test method
<b>Moisture content on dry basis:</b>		
a) whole/pieces, max. % mass fraction	12,0	ISO 939
b) ground, max. % mass fraction	11,0	
<b>Total ash on dry basis, max. % mass fraction</b>	8,0	ISO 928
<b>Acid-insoluble ash on dry basis, max. % mass fraction</b>	1,5	ISO 930
<b>Volatile oil content on dry basis:</b>		
a) whole/pieces, min. % mass fraction	1,5	ISO 6571
b) ground, min. % mass fraction	1,0	
<b>Calcium (as oxide) on dry basis:</b>		
a) unbleached, max. % mass fraction	1,1	Annex A
b) bleached (optional) <sup>a</sup> , max. % mass fraction	2,5	
<sup>a</sup> On agreement between buyer and seller.		

#### 4.4 Hygienic requirements

**4.4.1** The ginger shall be prepared in accordance with the appropriate sections of the *Recommended International Code of Practice — General principles of food hygiene* (Reference [1]) and *Code of hygienic practice for spices and dried aromatic plants* (Reference [2]).

**4.4.2** The product shall:

- a) be free from microorganisms in amounts which can represent a hazard to health — more detailed requirements to be agreed between buyer and seller;
- b) be free from parasites which can represent a hazard to health;
- c) comply with relevant food safety legislation in force in the destination country.

#### 5 Sampling

**5.1** The ginger shall be sampled using the method specified in ISO 948.

**5.2** Samples of ginger, whole or in pieces, shall be ground so that the whole of the material passes through a sieve of nominal size of openings 1 mm, complying with ISO 565. The material thus ground shall be used for determining the characteristics specified in Table 1.

#### 6 Test methods

The samples of ginger shall be tested for conformity with the requirements of this International Standard using the test methods indicated in Table 1.

For the determination of total ash, incineration shall be carried out at  $600\text{ }^{\circ}\text{C} \pm 25\text{ }^{\circ}\text{C}$  (instead of  $550\text{ }^{\circ}\text{C} \pm 25\text{ }^{\circ}\text{C}$  as specified in ISO 928).

#### 7 Packing, marking or labelling

##### 7.1 Packing

Ginger shall be packed in new, sound, clean, sealed packaging made of material which cannot affect the product quality or safety but which protects it from the ingress of moisture, loss of volatile matter or colour.

The packing material shall comply with any international, regional and/or national legislation relating to food grade material and environmental protection.

## **7.2 Marking or labelling**

Marking or labelling requirements shall be agreed between buyer and seller and may comprise:

- a) name of the product (botanical name and type of presentation) and trade name or brand name, where appropriate;
- b) name and address of the producer, and/or the packer;
- c) trademark, if any;
- d) code or batch number;
- e) quality category, if any;
- f) net mass;
- g) shelf-life of the product;
- h) name of the country of origin;
- i) producing area of the country of origin;
- j) any other information requested by the buyer;
- k) reference to this International Standard if the product fulfils its specifications.

The above information or part of it may instead appear in the documentation after agreement between the buyer and the seller.

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## Annex A (normative)

### Determination of calcium

#### A.1 Terms and definitions

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

##### A.1.1

##### calcium content

mass fraction of substances determined under the conditions specified in this International Standard

NOTE The calcium content is expressed as a percentage mass fraction of calcium oxide.

#### A.2 Principle

A test portion is incinerated to give the total ash. The ash is treated with hydrochloric acid to precipitate the calcium as calcium oxalate, which is then titrated against potassium permanganate.

#### A.3 Reagents

Unless otherwise stated, use only reagents of recognized analytical grade, and only distilled or deionized water or water of at least equivalent purity.

##### A.3.1 Acetic acid.

**A.3.2 Concentrated hydrochloric acid**,  $\rho_{20}(\text{HCl}) = 1,16 \text{ g/ml}$ .

##### A.3.3 Dilute hydrochloric acid.

Dilute 2 volumes of concentrated hydrochloric acid (A.3.2) with 5 volumes of water.

**A.3.4 Ammonium hydroxide solution**,  $\rho_{20}(\text{NH}_4\text{OH}) = 0,90 \text{ g/ml}$ .

**A.3.5 Ammonium oxalate**, saturated solution.

**A.3.6 Sulfuric acid**, 20 % mass fraction solution.

Dilute 1 volume of concentrated sulfuric acid,  $\rho_{20}(\text{H}_2\text{SO}_4) = 1,84 \text{ g/ml}$ , with 4 volumes of water.

**A.3.7 Potassium permanganate**,  $c(\text{KMnO}_4) = 0,05 \text{ mol/l}$  standard volumetric solution.

**A.3.8 Bromocresol green** indicator, 0,4 g/l solution.

Weigh (A.4.6), to the nearest 0,001 g, 0,1 g of bromocresol green and grind it with 14,3 ml of 0,01 mol/l sodium hydroxide solution in an agate mortar (A.4.8). Transfer the contents of the mortar quantitatively to a 250 ml one-mark volumetric flask (A.4.7) and make up to the mark with water. This solution has a pH range of 3,8 to 5,4. It turns yellow in an acid medium and blue in an alkaline medium.

## A.4 Apparatus

Usual laboratory equipment, and in particular the following.

**A.4.1 Incineration dish.**

**A.4.2 Filter paper**, ashless.

**A.4.3 Beaker**, of capacity 250 ml.

**A.4.4 Steam bath.**

**A.4.5 Water bath.**

**A.4.6 Analytical balance.**

**A.4.7 Volumetric flasks.**

**A.4.8 Agate mortar.**

## A.5 Procedure

### A.5.1 Test portion

Weigh (A.4.6), to the nearest 0,001 g, 2 g to 4 g of the product.

### A.5.2 Determination

Incinerate the test portion by the method specified in ISO 928. Digest the ash in the dish (A.4.1) with the dilute hydrochloric acid (A.3.3). Evaporate to dryness on the steam bath (A.4.4). Digest the dry residue again with the dilute hydrochloric acid and again evaporate to dryness. Treat the residue with 5 ml to 10 ml of the concentrated hydrochloric acid (A.3.2), then add about 50 ml of water. Allow to stand on the water bath for a few minutes, and filter into the 250 ml beaker. Wash the insoluble residue with hot water, collecting the washings in the same beaker. Add to the beaker 8 drops to 10 drops of the bromocresol green (A.3.8) and add the ammonium hydroxide solution (A.3.4) until the colour of the solution is distinctly blue (pH 4,8 to pH 5,0). Add acetic acid (A.3.1) drop by drop to change the colour to distinct green, i.e. until the pH is changed to between 4,4 and 4,6.

Filter the solution quantitatively, collecting the filtrate and washings in the beaker. Boil the solution and add the ammonium oxalate solution (A.3.5) dropwise until a precipitate forms and then add an excess. Heat to boiling. Allow to stand for at least 3 h. Decant the clear solution through the filter paper (A.4.2). Pour 13 ml to 20 ml of hot water on to the precipitate and again decant the clear solution.

Dissolve any precipitate and again decant the clear solution. Dissolve any precipitate remaining on the filter paper by washing with hot dilute hydrochloric acid (A.3.3) into the original beaker. Wash the filter paper thoroughly with hot water. Then reprecipitate while boiling hot, by adding sufficient ammonium hydroxide solution (A.3.4) and a little ammonium oxalate solution (A.3.5). Allow to stand for at least 3 h, as before, then filter through the same filter and wash with hot water until the filtrate is chloride free.

Perforate the apex of the filter cone. Wash the precipitate into the beaker used for precipitation. Then wash the filter paper with hot sulfuric acid (A.3.6) and titrate the solution at a temperature not lower than 70 °C against the potassium permanganate solution (A.3.7) until the appearance of a persistent pink coloration.

## A.6 Expression of results

The calcium content,  $w_{\text{CaO}}$ , expressed as a percentage mass fraction of calcium oxide, is given by Equation (A.1):

$$w_{\text{CaO}} = \frac{0,028 \times V \times 100}{m} \quad (\text{A.1})$$

where

$m$  is the mass, in grams, of the test portion (A.5.1);

$V$  is the volume, in millilitres, of the potassium permanganate solution (A.3.7) required for the titration.

If the concentration of the potassium permanganate solution differs from 0,05 mol/l, apply an appropriate correction factor.

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