

CODEX ALIMENTARIUS

INTERNATIONAL FOOD STANDARDS



Food and Agriculture
Organization of
the United Nations



World Health
Organization

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GENERAL STANDARD FOR FRUIT JUICES AND NECTARS

CXS 247-2005

Adopted in 2005. Amended in 2022.

This Standard supersedes individual standards for fruit juices and related products, as indicated below:

Fruit juices preserved exclusively by physical means: orange juice (CODEX STAN 45-1981), grapefruit juice (CODEX STAN 46-1981), lemon juice (CODEX STAN 47-1981), apple juice (CODEX STAN 48-1981), tomato juice (CODEX STAN 49-1981), grape juice (CODEX STAN 82-1981), pineapple juice (CODEX STAN 85-1981), blackcurrant juice (CODEX STAN 120-1981) and General Standard for Fruit Juices not covered by Individual Standards (CODEX STAN 164-1989).

Concentrated fruit juices preserved exclusively by physical means: concentrated apple juice (CODEX STAN 63-1981), concentrated orange juice (CODEX STAN 64-1981), concentrated grape juice (CODEX STAN 83-1981), concentrated labrusca type grape juice, sweetened (CODEX STAN 84-1981), concentrated blackcurrant juice (CODEX STAN 121-1981) and concentrated pineapple juice (CODEX STAN 138-1983).

Concentrated fruit juices with preservatives for manufacturing: concentrated pineapple juice (CODEX STAN 139-1983).

Fruit nectars preserved exclusively by physical means: apricot, peach and pear nectars (CODEX STAN 44-1981), guava nectar (CODEX STAN 148-1985), non-pulpy blackcurrant nectar (CODEX STAN 101-1981), pulpy nectars of certain small fruits (CODEX STAN 122-1981), nectars of certain citrus fruits (CODEX STAN 134-1981), General Standard for Fruit Nectars not covered by Individual Standards (CODEX STAN 161-1989) and liquid pulpy mango products (CODEX STAN 149-1985).

Guidelines: Guidelines for Mixed Fruit Juices (CAC/GL 11-1991) and Guidelines for Mixed Fruit Nectars (CAC/GL 12-1991).

2022 Amendment

The following amendment was made to the text of the standard following decisions taken at the forty-fifth session of the Codex Alimentarius Commission in December 2022.

Page	Location	Text in previous version	Text in amended version
8	Section 8.2 Labelling of Non-Retail Containers	<p>Section 8.2 Non-Retail Containers</p> <p>Information for non-retail containers not destined to final consumers shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, net contents and the name and address of the manufacturer, packer, distributor or importer, as well as storage instructions, shall appear on the container, except that for tankers the information may appear exclusively in the accompanying documents. However, lot identification, and the name and address of the manufacturer, packer, distributor or importer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.</p>	<p>Section 8.2 Labelling of Non-Retail Containers</p> <p>The labelling of non-retail containers should be in accordance with <i>the General Standard for the Labelling of Non-Retail Containers of Foods</i> (CXS 346-2021). In addition, the following specific provisions apply:</p> <p>8.2.1 Date marking may be indicated.</p> <p>8.2.2 For tankers the information may appear exclusively in the accompanying documents.</p>

1. SCOPE

This Standard applies to all products as defined in Section 2.1 below.

2. DESCRIPTION

2.1 Product definition

2.1.1 *Fruit juice*

Fruit juice is the unfermented but fermentable liquid obtained from the edible part of sound, appropriately mature and fresh fruit or of fruit maintained in sound condition by suitable means including post harvest surface treatments applied in accordance with the applicable provisions of the Codex Alimentarius Commission.

Some juices may be processed with pips, seeds and peel, which are not usually incorporated in the juice, but some parts or components of pips, seeds and peel, which cannot be removed by Good Manufacturing Practices (GMP) will be acceptable.

The juice is prepared by suitable processes, which maintain the essential physical, chemical, organoleptical and nutritional characteristics of the juices of the fruit from which it comes. The juice may be cloudy or clear and may have restored¹ aromatic substances and volatile flavour components, all of which must be obtained by suitable physical means, and all of which must be recovered from the same kind of fruit. Pulp and cells² obtained by suitable physical means from the same kind of fruit may be added.

A single juice is obtained from one kind of fruit. A mixed juice is obtained by blending two or more juices or juices and purées, from different kinds of fruit.

Fruit juice is obtained as follows:

2.1.1.1 Fruit juice directly expressed by mechanical extraction processes.

2.1.1.2 Fruit juice from concentrate by reconstituting concentrated fruit juice defined in Section 2.1.2 with potable water that meets the criteria described in Section 3.1.1(c).

2.1.2 *Concentrated fruit juice*

Concentrated fruit juice is the product that complies with the definition given in Section 2.1.1 above, except water has been physically removed in an amount sufficient to increase the Brix level to a value at least 50% greater than the Brix value established for reconstituted juice from the same fruit, as indicated in the Annex. In the production of juice that is to be concentrated, suitable processes are used and may be combined with simultaneous diffusion of the pulp cells or fruit pulp by water provided that the water extracted soluble fruit solids are added in-line to the primary juice, before the concentration procedure.

Fruit juice concentrates may have restored¹ aromatic substances and volatile flavour components, all of which must be obtained by suitable physical means, and all of which must be recovered from the same kind of fruit. Pulp and cells² obtained by suitable physical means from the same kind of fruit may be added.

2.1.3 *Water extracted fruit juice*

Water Extracted Fruit Juice is the product obtained by diffusion with water of:

- Pulpy whole fruit whose juice cannot be extracted by any physical means, or
- Dehydrated whole fruit.

Such products may be concentrated and reconstituted.

The solids content of the finished product shall meet the minimum Brix level for reconstituted juice specified in the Annex.

¹ Introduction of aromas and flavours are allowed to restore the level of these components up to the normal level attained in the same kind of fruit.

² For citrus fruits, pulp or cells are the juice sacs obtained from the endocarp.

2.1.4 Fruit purée for use in the manufacture of fruit juices and nectars

Fruit purée for use in the manufacture of Fruit Juices and Nectars is the unfermented but fermentable product obtained by suitable processes e.g. by sieving, grinding, milling the edible part of the whole or peeled fruit without removing the juice. The fruit must be sound, appropriately mature, and fresh or preserved by physical means or by treatment(s) applied in accordance with the applicable provisions of the Codex Alimentarius Commission.

Fruit purée may have restored¹ aromatic substances and volatile flavour components, all of which must be obtained by suitable physical means, and all of which must be recovered from the same kind of fruit. Pulp and cells² obtained by suitable physical means from the same kind of fruit may be added.

2.1.5 Concentrated fruit purée for use in the manufacture of fruit juices and nectars

Concentrated fruit purée for use in the manufacture of Fruit Juices and Nectars is obtained by the physical removal of water from the fruit purée in an amount sufficient to increase the Brix level to a value at least 50% greater than the Brix value established for reconstituted juice from the same fruit, as indicated in the Annex.

Concentrated fruit purée may have restored¹ aromatic substances and volatile flavour components, all of which must be obtained by suitable physical means, and all of which must be recovered from the same kind of fruit.

2.1.6 Fruit nectar

Fruit Nectar is the unfermented but fermentable product obtained by adding water with or without the addition of sugars as defined in Section 3.1.2(a), honey and/or syrups as described in Section 3.1.2(b), and/or food additive sweeteners as listed in the *General Standard for Food Additives (GSFA)* to products defined in Sections 2.1.1, 2.1.2, 2.1.3, 2.1.4 and 2.1.5 or to a mixture of those products. Aromatic substances, volatile flavour components, pulp and cells² all of which must be recovered from the same kind of fruit and be obtained by suitable physical means may be added. That product moreover must meet the requirements defined for fruit nectars in the Annex.

A mixed fruit nectar is obtained from two or more different kinds of fruit.

2.2 Species

The species indicated as the botanical name in the Annex shall be used in the preparation of fruit juices, fruit purées and fruit nectars bearing the product name for the applicable fruit.

For fruit species not included in the Annex, the correct botanical or common name shall apply.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Composition

3.1.1 Basic ingredients

- (a) For directly expressed fruit juices, the Brix level shall be the Brix as expressed from the fruit and the soluble solids content of the single strength juice shall not be modified, except by blendings with the juice of the same kind of fruit.
 - (b) The preparation of fruit juice that requires reconstitution of concentrated juices must be in accordance with the minimum Brix level established in the Annex, exclusive of the solids of any added optional ingredients and additives. If there is no Brix level specified in the Table, minimum Brix shall be calculated on the basis of the soluble solids content of the single strength juice used to produce such concentrated juice.
 - (c) For reconstituted juice and nectar, the potable water used in reconstitution shall, at a minimum, meet the latest edition of the *Guidelines for Drinking Water Quality of the World Health Organization* (Volumes 1 and 2).
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3.1.2 Other permitted Ingredients

Except as otherwise provided, the following shall be subject to ingredient labelling requirements:

- (a) Sugars with less than 2% moisture as defined in the *Standard for Sugars* (CXS 212-1999): sucrose³, dextrose anhydrous, glucose⁴, fructose, may be added to all products defined in Section 2.1. (The addition of ingredients listed in Sections 3.1.2(a) and 3.1.2(b) applies only to products intended for sale to the consumer or for catering purposes).
- (b) Syrups (as defined in the *Standard for Sugars*), liquid sucrose, invert sugar solution, invert sugar syrup, fructose syrup, liquid cane sugar, isoglucose and high fructose syrup may be added only to fruit juice from concentrate, as defined in Section 2.1.1.2, concentrated fruit juices, as defined in Section 2.1.2, concentrated fruit purée as defined in Section 2.1.5, and fruit nectars as defined in Section 2.1.6. Honey and/or sugars derived from fruits may be added only to fruit nectars as defined in Section 2.1.6.
- (c) Subject to national legislation of the importing country, lemon (*Citrus limon* (L.) Burm. f. *Citrus limonum* Rissa) juice or lime (*Citrus aurantifolia* (Christm.)) juice, or both, may be added to fruit juice up to 3 g/l anhydrous citric acid equivalent for acidification purposes to unsweetened juices as defined in Sections 2.1.1, 2.1.2, 2.1.3, 2.1.4 and 2.1.5. Lemon juice or lime juice, or both, may be added up to 5 g/l anhydrous citric acid equivalent to fruit nectars as defined in Section 2.1.6.
- (d) The addition of both sugars (defined in subparagraphs (a) and (b)) and acidifying agents (listed in the GSFA) to the same fruit juice is prohibited.
- (e) Subject to national legislation of the importing country, the juice from *Citrus reticulata* and/or hybrids with *reticulata* may be added to orange juice in an amount not to exceed 10% of soluble solids of the *reticulata* to the total of soluble solids of orange juice.
- (f) Salt and spices and aromatic herbs (and their natural extracts) may be added to tomato juice.
- (g) For the purposes of product fortification, essential nutrients (e.g. vitamins, minerals) may be added to products defined in Section 2.1. Such additions shall comply with the texts of the Codex Alimentarius Commission established for this purpose.

3.2 Quality criteria

The fruit juices and fruit nectars shall have the characteristic colour, aroma and flavour of juice from the same kind of fruit from which it is made.

The fruit shall retain no more water from washing, steaming or other preparatory operations than technologically unavoidable.

3.3 Authenticity

Authenticity is the maintenance of the product's essential physical, chemical, organoleptical, and nutritional characteristics of the fruit(s) from which it comes.

3.4 Verification of composition, quality and authenticity

Fruit juices and nectars should be subject to testing for authenticity, composition, and quality where applicable and where required. The analytical methods used should be those found in Section 9, Methods of Analysis and Sampling.

The verification of a sample's authenticity/quality can be assessed by comparison of data for the sample, generated using appropriate methods included in the Standard, with that produced for fruit of the same type and from the same region, allowing for natural variations, seasonal changes and for variations occurring due to processing.

4. FOOD ADDITIVES

Food additives listed in Tables 1 and 2 of the *General Standard for Food Additives* in Food Categories 14.1.2.1 (Fruit juice), 14.1.2.3 (Concentrates for fruit juice), 14.1.3.1 (Fruit nectar) and 14.1.3.3 (Concentrates for fruit nectar) may be used in foods subject to this Standard.

³ Termed "white sugar" and "mill sugar" in the *Standard for Sugars* (CXS 212-1999).

⁴ Termed "dextrose anhydrous" in the *Standard for Sugars* (CXS 212-1999).

5. PROCESSING AIDS – MAXIMUM LEVEL OF USE IN LINE WITH GOOD MANUFACTURING PRACTICES

Function	Substance	
Antifoaming Agent	Polydimethylsiloxane ⁵	
Clarifying Agents	Adsorbent clays (bleaching, natural or activated earths)	
	Adsorbent resins	
	Activated carbon (only from plants)	
	Bentonite	
	Calcium hydroxide ⁶	
	Cellulose	
	Chitosan	
	Colloidal silica	
	Diatomaceous earth	
	Gelatin (from skin collagen)	
	Ion exchange resins (cation and anion)	
	Filtration Aids	Isinglass ⁷
	Flocculating Agents	Kaolin
		Perlite
		Polyvinylpolypyrrolidone
		Potassium caseinate ⁷
		Potassium tartrate ⁶
		Precipitated calcium carbonate ⁶
		Rice hulls
Silicasol		
Sodium caseinate ⁷		
Sulphur dioxide ^{6, 8}		
Tannin		
Enzyme preparations ⁹	Pectinases (for breakdown of pectin), Proteinases (for breakdown of proteins), Amylases (for breakdown of starch) and Cellulases (limited use to facilitate disruption of cell walls).	
Packing gas ¹⁰	Nitrogen	
	Carbon dioxide	

⁵ 10 mg/l is the maximum residue limit of the compound allowed in the final product.

⁶ Only in grape juice.

⁷ Use of these processing aids should take into account their allergenic potential. If there is any carry over of these processing aids into finished product, they are subject to ingredient declaration in accordance with Sections 4.2.1.4 and 4.2.4 of the of the *General Standard for the Labelling of Pre-packaged Foods* (CXS 1-1985).

⁸ 10 mg/l (as residual SO₂).

⁹ Enzyme preparations may be used as processing aids provided these preparations do not result in a total liquefaction and do not substantially affect the cellulose content of the processed fruit.

¹⁰ May also be used e.g. for preservation.

6. CONTAMINANTS

6.1 Pesticide residues

The products covered by the provisions of this Standard should comply with those maximum residue limits for pesticides established by the Codex Alimentarius Commission for these products.

6.2 Other Contaminants

The products covered by the provisions of this Standard should comply with those maximum levels for contaminants established by the Codex Alimentarius Commission for these products.

7. HYGIENE

7.1 It is recommended that the products covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of the *General Principles of Food Hygiene* (CXC 1-1969), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

7.2 The products should comply with any microbiological criteria established in accordance with the *Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods* (CXG 21-1997).

8. LABELLING

In addition to the *General Standard for the Labelling of Pre-packaged Foods* (CXS 1-1985), the following specific provisions apply:

8.1 Containers destined for the final consumer

8.1.1 *The name of the product*

The name of the product shall be the name of the fruit used as defined in Section 2.2. The fruit name shall be filled in the blank of the product name mentioned under this Section. These names may only be used if the product conforms to the definition in Section 2.1 or which otherwise conform to this Standard.

8.1.1.1 Fruit Juice defined under Section 2.1.1

The name of the product shall be “_____ juice” or “juice of _____”.

8.1.1.2 Concentrated Fruit Juice defined under Section 2.1.2

The name of the product shall be “concentrated _____ juice” or “_____ juice concentrate”.

8.1.1.3 Water Extracted Fruit Juice defined under Section 2.1.3

The name of the product shall be “water extracted _____ juice” or “water extracted juice of _____”.

8.1.1.4 Fruit Purée defined under Section 2.1.4

The name of the product shall be “_____ purée” or “Purée of _____”.

8.1.1.5 Concentrated Fruit Purée defined under Section 2.1.5

The name of the product shall be “concentrated _____ purée” or “_____ purée concentrated”.

8.1.1.6 Fruit Nectars defined under Section 2.1.6

The name of the product shall be “_____ nectar” or “nectar of _____”.

8.1.1.7 In the case of fruit juice products (as defined in Section 2.1) manufactured from two or more fruits, the product name shall include the names of the fruit juices comprising the mixture in descending order of proportion by weight (m/m) or the words "fruit juice blend", "a fruit juice mixture", "mixed fruit juice" or other similar wording.

8.1.1.8 For fruit juices, fruit nectars and mixed fruit juice/nectar, if the product contains or is prepared from concentrated juice and water or the product is prepared from juice from concentrate and directly expressed juice or nectar, the words “from concentrate” or “reconstituted” must be entered in conjunction with or close to the product name, standing out well from any background, in clearly visible characters, not less than 1/2 the height of the letters in the name of the juice.

8.1.2 *Additional requirements*

The following additional specific provisions apply:

8.1.2.1 For fruit juices, fruit nectars, fruit purée and mixed fruit juices/nectars/purées, if the product is prepared by physically removing water from the fruit juice in an amount sufficient to increase the Brix level to a value at least 50% greater than the Brix value established for reconstituted juice from the same fruit, as indicated in table of the Annex, it shall be labelled “concentrated”.

- 8.1.2.2** For products defined in Sections 2.1.1 to 2.1.5, where one or more of the optional sugar or syrup ingredients as described in Section 3.1.2(a) and (b) are added, the product name shall include the statement called “sugar(s) added” after the fruit juice or mixed fruit juice’s name. When food additive sweeteners are employed as substitutes for sugars in fruit nectars and mixed fruit nectars, the statement, “with sweetener(s),” shall be included in conjunction with or in close proximity to the product name.
- 8.1.2.3** Where concentrated fruit juice, concentrated fruit purée, concentrated fruit nectar or mixed concentrated fruit juice/nectar/purée is to be reconstituted before consumption as fruit juice, fruit purée, fruit nectar or mixed fruit juices/nectars/purées, the label must bear appropriate directions for reconstitution on a volume/volume basis with water to the applicable Brix value in the Annex for reconstituted juice.
- 8.1.2.4** Distinct varietal denominations may be used in conjunction with the common fruit names on the label where such use is not misleading.
- 8.1.2.5** Fruit nectars and mixed fruit nectars must be conspicuously labelled with a declaration of “juice content ___%” with the blank being filled with the percentage of purée and/or fruit juice computed on a volume/volume basis. The words “juice content ___%” shall appear in close proximity to the name of the product in clearly visible characters, not less than 1/2 the height of the letters in the name of the juice.
- 8.1.2.6** An ingredient declaration of “ascorbic acid” when used as an antioxidant does not, by itself, constitute a “Vitamin C” claim.
- 8.1.2.7** Any added essential nutrients declaration should be labelled in accordance with the *General Guidelines on Claims* (CXG 1-1979), *Guidelines on Nutrition Labelling* (CXG 2-1985) and the *Guidelines for Use of Nutrition Claims* (CXG 23-1997).
- For fruit nectars in which a food additive sweetener has been added in order to replace wholly or in part the added sugars or other sugars or syrups, including honey and/or sugars derived from fruits as listed in Sections 3.1.2(a) and (b), any nutrient content claims related to the reduction in sugars should conform to the *General Guidelines on Claims* (CXG 1-1979), *Guidelines for Use of Nutrition Claims* (CXG 23-1997) and *Guidelines on Nutrition Labelling* (CXG 2-1985).
- 8.1.2.8** A pictorial representation of fruit(s) on the label should not mislead the consumer with respect to the fruit so illustrated.
- 8.1.2.9** Where the product contains added carbon dioxide the term “carbonated” or “sparkling” shall appear on the label near the name of the product.
- 8.1.2.10** Where tomato juice contains spices and/or aromatic herbs in accordance with Section 3.1.2(f), the term “spiced” and/or the common name of the aromatic herb shall appear on the label near the name of the juice.
- 8.1.2.11** Pulp and cells added to juice over that normally contained in the juice shall be declared in the list of ingredients. Aromatic substances, volatile flavour components, pulp and cells added to nectar over that normally contained in the juice shall be declared in the list of ingredients.

8.2 Labelling of non-retail containers

The labelling of non-retail containers should be in accordance with the *General Standard for the Labelling of Non-Retail Containers of Foods* (CXS 346-2021). In addition, the following specific provisions apply:

- 8.2.1** Date marking may be indicated.
- 8.2.2** For tankers the information may appear exclusively in the accompanying documents.

9. METHODS OF ANALYSIS AND SAMPLING

PROVISION	METHOD	PRINCIPLE	TYPE
Acetic acid (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 12632 IFU Method No. 66 (1996)	Enzymatic determination	II
Alcohol (ethanol) (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	IFU Method No. 52 (1996)	Enzymatic determination	II
Anthocyanins (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	IFU Method No. 71 (1998)	High performance liquid chromatography (HPLC)	I
Ascorbic acid-L (Section 4 Additives)	IFU Method No. 17a (1995)	High performance liquid chromatography (HPLC)	II
Ascorbic acid-L (Section 4 Additives)	AOAC 967.21 IFU Method No. 17 ISO 6557-2:1984	Indophenol method	III
Ascorbic acid-L (Section 4 Additives)	ISO 6557-1:1986	Fluorescence spectrometry	IV
Ash in fruit products (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 940.26 EN 1135 (1994) IFU Method No. 9 (1989)	Gravimetry	I
Beet sugar in fruit juices (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 995.17	Deuterium Nuclear Magnetic Resonance (Deuterium NMR)	II
Benzoic acid as a marker in orange juice (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 994.11	High performance liquid chromatography (HPLC)	III
Benzoic acid and its salts	ISO 5518:1978 ISO 6560:1983	Spectrometry	III
Benzoic acid and its salts; sorbic acid and its salts	IFU Method No. 63 (1995) NMKL 124 (1997)	High performance liquid chromatography (HPLC)	II
C¹³/C¹² ratio of ethanol derived from fruit juices (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	JAOAC 79, No. 1, 1996, 62-72	Stable isotope mass spectrometry	II

¹¹ See Section 3.4 - Verification of Composition, Quality and Authenticity.

PROVISION	METHOD	PRINCIPLE	TYPE
Carbon dioxide (Sections 4 Additives and 5 Processing aids)	IFU Method No. 42 (1976)	Titrimetry (back-titration after precipitation)	IV
Carbon stable isotope ratio of apple juice (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 981.09 - JAOAC 64, 85 (1981)	Stable isotope mass spectrometry	II
Carbon stable isotope ratio of orange juice (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 982.21	Stable isotope mass spectrometry	II
Carotenoid, total/individual groups (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 12136 (1997) IFU Method No. 59 (1991)	Spectrophotometry	I
Cellobiose	IFU Recommendation No. 4 October 2000	Capillary gas chromatography	IV
Centrifugable pulp (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 12134 (1997) IFU Method No. 60 (1991)	Centrifugation/% value	I
Chloride (expressed as sodium chloride) (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN12133 (1997) IFU Method No. 37 (1991)	Electrochemical titrimetry	III
Citric acid ¹² (Section 4 Additives)	AOAC 986.13	High performance liquid chromatography (HPLC)	II
Citric acid ¹² (Section 4 Additives)	EN 1137:1994 IFU Method No. 22 (1985)	Enzymatic determination	III
Essential oils (Scott titration) (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 968.20 IFU Method No. 45b ¹³	(Scott) distillation, titration	I
Essential oils (in citrus fruit) (volume determination) ¹³ (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	ISO 1955:1982	Distillation and direct reading of the volume determination	I
Fermentability (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	IFU Method No. 18 (1974)	Microbiological method	I
Formol number (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 1133 (1994) IFU Method No. 30 (1984)	Potentiometric titration	I
Free amino acids (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 12742 (1999) IFU Method No. 57 (1989)	Liquid Chromatography	II

¹² All juices except citrus based juices.

¹³ Because there is no numerical value in the Standard, duplicate Type I methods have been included which may lead to different results.

PROVISION	METHOD	PRINCIPLE	TYPE
Fumaric acid (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	IFU Method No. 72 (1998)	High performance liquid chromatography (HPLC)	II
Glucose and fructose – Determination of glucose, fructose and saccharose (Section 3.1.2 Permitted ingredients)	EN 12630 IFU Method No. 67 (1996) NMKL 148 (1993)	High performance liquid chromatography (HPLC)	II
Glucose-D and fructose-D (Section 3.1.2 Permitted ingredients)	EN 1140 IFU Method No. 55 (1985)	Enzymatic determination	II
Gluconic acid (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	IFU Method No. 76 (2001)	Enzymatic determination	II
Glycerol (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	IFU Method No. 77 (2001)	Enzymatic determination	II
Hesperidin and naringin (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 12148 (1996) IFU Method No. 58 (1991)	High performance liquid chromatography (HPLC)	II
High Fructose Corn Syrup and Hydrolyzed Inulin Syrup in apple juice (Section 3.1.2 Permitted ingredients)	JAOAC 84, 486 (2001)	Capillary gas chromatography (CAP GC Method)	IV
Hydroxymethylfurfural (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	IFU Method No. 69 (1996)	High performance liquid chromatography (HPLC)	II
Hydroxymethylfurfural (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	ISO 7466:1986	Spectrometry	III
Isocitric acid-D (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 1139 (1999) IFU Method No. 54 (1984)	Enzymatic determination	II
Lactic acid- D and L (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 12631 (1999) IFU Method No. 53 (1983/1996)	Enzymatic determination	II
L-malic/total malic acid ratio in apple juice (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 993.05	Enzymatic determination and high performance liquid chromatography (HPLC)	II
Malic acid (Section 4 Additives)	AOAC 993.05	Enzymatic determination and high performance liquid chromatography (HPLC)	III

PROVISION	METHOD	PRINCIPLE	TYPE
Malic acid-D	EN 12138 IFU Method No. 64 (1995)	Enzymatic determination	II
Malic acid-D in apple juice	AOAC 995.06	High performance liquid chromatography (HPLC)	II
Malic acid-L	EN 1138 (1994) IFU Method No. 21 (1985)	Enzymatic determination	II
Naringin and neohesperidin in orange juice (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 999.05	High performance liquid chromatography (HPLC)	III
Pectin (Section 4 Additives)	IFU Method No. 26 (1964/1996)	Precipitation/photometry	I
pH-value (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	NMKL 179:2005	Potentiometry	II
pH-value (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 1132 (1994) IFU Method No. 11 (1989) ISO 1842:1991	Potentiometry	IV
Phosphorus/phosphate (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 1136 (1994) IFU Method No. 50 (1983)	Photometric determination	II
Preservatives in fruit juices - (sorbic acid and its salts)	ISO 5519:1978	Spectrometry	III
Proline by photometry – non-specific determination (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 1141 (1994) IFU Method No. 49 (1983)	Photometry	I
Quinic, malic and citric acid in cranberry juice cocktail and apple juice (Section 3.1.2 Permitted ingredients and 4 Additives)	AOAC 986.13	High performance liquid chromatography (HPLC)	III
Relative density (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 1131 (1993) IFU Method No. 1 (1989) & IFU Method No. General sheet (1971)	Pycnometry	II
Relative density (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	IFU Method No. 1A	Densitometry	III

PROVISION	METHOD	PRINCIPLE	TYPE
Saccharin	NMKL 122 (1997)	Liquid chromatography	II
Sodium, potassium, calcium, magnesium in fruit juices (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 1134 (1994) IFU Method No. 33 (1984)	Atomic Absorption Spectroscopy	II
Soluble solids	AOAC 983.17 EN 12143 (1996) IFU Method No. 8 (1991) ISO 2173:2003	Indirect by refractometry	I
Sorbitol-D (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	IFU Method No. 62 (1995)	Enzymatic determination	II
Stable carbon isotope ratio in the pulp of fruit juices (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	ENV 13070 (1998) Analytica Chimica Acta 340 (1997)	Stable isotope mass spectrometry	II
Stable carbon isotope ratio of sugars from fruit juices (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	ENV 12140 Analytica Chimica Acta 271 (1993)	Stable isotope mass spectrometry	II
Stable hydrogen isotope ratio of water from fruit juices (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	ENV 12142 (1997)	Stable isotope mass spectrometry	II
Stable oxygen isotope ratio in fruit juice water (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	ENV 12141(1997)	Stable isotope mass spectrometry	II
Starch (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 925.38 (1925) IFU Method No. 73 (2000)	Colorimetric	I
Sucrose (Section 3.1.2 Permitted ingredients)	EN 12630 IFU Method No. 67 (1996) NMKL 148 (1993)	High performance liquid chromatography (HPLC)	II
Sucrose (Section 3.1.2 Permitted ingredients)	EN 12146 (1996) IFU Method No. 56 (1985/1998)	Enzymatic determination	III
Sugar beet derived syrups in frozen concentrated orange juice $\delta^{18}\text{O}$ measurements in water (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 992.09	Oxygen isotope ratio analysis	I

PROVISION	METHOD	PRINCIPLE	TYPE
Sulphur dioxide (Section 4 Additives)	Optimized Monier Williams AOAC 990.28 IFU Method No. 7A (2000) NMKL 132 (1989)	Titrimetry after distillation	II
Sulphur dioxide (Section 4 Additives)	ISO 5522:1981 ISO 5523:1981	Titrimetry after distillation	III
Sulphur dioxide (Section 4 Additives)	NMKL 135 (1990)	Enzymatic determination	III
Tartaric acid in grape juice (Section 4 Additives)	EN 12137 (1997) IFU Method No. 65 (1995)	High performance liquid chromatography (HPLC)	II
Titrate acids, total (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 12147 (1995) IFU Method No. 3 (1968) ISO 750:1998	Titrimetry	I
Total dry matter (vacuum-oven drying at 70°C)¹³ (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 12145 (1996) IFU Method No. 61 (1991)	Gravimetric determination	I
Total nitrogen	EN 12135 (1997) IFU Method No. 28 (1991)	Digestion/titration	I
Total solids (Microwave oven drying)¹³ (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 985.26	Gravimetric determination	I
Vitamin C (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	EN 14130 (2004)	High performance liquid chromatography (HPLC)	II
Vitamin C (dehydro-ascorbic acid and ascorbic acid) (Sections 3.2 Quality Criteria and 3.3 Authenticity) ¹¹	AOAC 967.22	Microfluorometry	III

ANNEX

MINIMUM BRIX¹⁴ LEVEL FOR RECONSTITUTED JUICE AND RECONSTITUTED PURÉE
AND MINIMUM JUICE AND/OR PURÉE CONTENT FOR FRUIT NECTARS (% v/v)¹⁵ AT 20°C

Botanical Name	FRUIT' S COMMON NAME	Minimum Brix Level for Reconstituted Fruit Juices and Reconstituted Purée	Minimum Juice and/or Purée Content (% v/v) for Fruit Nectars
<i>Actinidia deliciosa</i> (A. Chev.) C. F. Liang & A. R. Ferguson	Kiwi	(*) ¹⁶	(*) ¹⁶
<i>Anacardium occidentale</i> L.	Cashewapple	11.5	25.0
<i>Ananas comosus</i> (L.) Merrill <i>Ananas sativis</i> L. Schult. f.	Pineapple	12.8 ¹⁷ It is recognized that in different countries, the Brix level may naturally differ from this value. In cases where the Brix level is consistently lower than this value, reconstituted juice of lower Brix from these countries introduced into international trade will be acceptable, provided it meets the authenticity methodology listed in the General Standard for Fruit Juices and Nectars and the level will not be below 10°Brix for pineapple juice and apple juice.	40.0
<i>Annona muricata</i> L.	Soursop	14.5	25.0
<i>Annona squamosa</i> L.	Sugar Apple	14.5	25.0
<i>Averrhoa carambola</i> L.	Carambola / Starfruit	7.5	25.0
<i>Carica papaya</i> L.	Papaya	(*) ¹⁶	25.0
<i>Chrysophyllum cainito</i>	Star Apple	(*) ¹⁶	(*) ¹⁶
<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai var. Lanatus	Water Melon	8.0	40.0
<i>Citrus aurantifolia</i> (Christm.) (swingle)	Lime	8.0 ¹⁷	According to the legislation of the importing country
<i>Citrus aurantium</i> L.	Sour Orange	(*) ¹⁶	50.0

¹⁴ For the purposes of the Standard the Brix is defined as the soluble solids content of the juice as determined by the method found in the Section on Methods of Analysis and Sampling.

¹⁵ If a juice is manufactured from a fruit not mentioned in the above list, it must, nevertheless, comply with all the provisions of the Standard, except that the minimum Brix level of the reconstituted juice shall be the Brix level as expressed from the fruit used to make the concentrate.

¹⁶ No data currently available. The minimum Brix level of the reconstituted juice shall be the Brix level as expressed from the fruit used to make the concentrate.

¹⁷ Acid corrected as determined by the method for total titratable acids in the Section on Methods of Analysis.

Botanical Name	FRUIT' S COMMON NAME	Minimum Brix Level for Reconstituted Fruit Juices and Reconstituted Purée	Minimum Juice and/or Purée Content (% v/v) for Fruit Nectars
<i>Citrus limon</i> (L.) Burm. f. <i>Citrus limonum</i> Rissa	Lemon	8.0 ¹⁷	According to the legislation of the importing country
<i>Citrus paradisi</i> Macfad	Grapefruit	10.0 ¹⁷	50.0
<i>Citrus paradisi</i> , <i>Citrus grandis</i>	Sweetie grapefruit	10.0	50.0
<i>Citrus reticulata</i> Blanca	Mandarine/ Tangerine	11.8 ¹⁷	50.0
<i>Citrus sinensis</i> (L.)	Orange	11.8 – 11.2 ¹⁷ and consistent with the application of national legislation of the importing country but not lower than 11.2. It is recognized that in different countries, the Brix level may naturally differ from this range of values. In cases where the Brix level is consistently lower than this range of values, reconstituted juice of lower Brix from these countries introduced into international trade will be acceptable, provided it meets the authenticity methodology listed in the General Standard for Fruit Juices and Nectars and the level will not be below 10°Brix.	50.0
<i>Cocos nucifera</i> L. ¹⁸	Coconut	5.0	25.0
<i>Cucumis melo</i> L.	Melon	8.0	35.0
<i>Cucumis melo</i> L subsp. <i>melo</i> var. <i>inodorus</i> H. Jacq.	Casaba Melon	7.5	25.0
<i>Cucumis melo</i> L. subsp. <i>melo</i> var. <i>inodorus</i> H. Jacq	Honeydew Melon	10.0	25.0
<i>Cydonia oblonga</i> Mill.	Quince	11.2	25.0
<i>Diospyros khaki</i> Thunb.	Persimmon	(*) ¹⁶	40.0
<i>Empetrum nigrum</i> L.	Crowberry	6.0	25.0
<i>Eriobotrya japonica</i>	Loquat	(*) ¹⁶	(*) ¹⁶
<i>Eugenia syriaca</i>	Guavaberry Birchberry	(*) ¹⁶	(*) ¹⁶
<i>Eugenia uniflora</i> Rich.	Suriname Cherry	6.0	25.0
<i>Ficus carica</i> L.	Fig	18.0	25.0
<i>Fortunella Swingle</i> sp.	Kumquat	(*) ¹⁶	(*) ¹⁶

¹⁸ This product is 'coconut water' which is directly extracted from the coconut without expressing the coconut meat.

Botanical Name	FRUIT' S COMMON NAME	Minimum Brix Level for Reconstituted Fruit Juices and Reconstituted Purée	Minimum Juice and/or Purée Content (% v/v) for Fruit Nectars
<i>Fragaria x. ananassa</i> Duchense(<i>Fragaria chiloensis</i> Duchesne x <i>Fragaria virginiana</i> Duchesne)	Strawberry	7.5	40.0
<i>Genipa americana</i>	"Genipap"	17.0	25.0
<i>Hippophae elaeagnaceae</i>	Sea Buckthorn	(*) ¹⁶	25.0
<i>Hippophae rhamnoides</i> L.	Buckthornberry = Sallow-thornberry	6.0	25.0
<i>Litchi chinensis</i> Sonn.	Litchi/Lychee	11.2	20.0
<i>Lycopersicum esculentum</i> L.	Tomato	5.0	50.0
<i>Malpighia sp.</i> (Moc. & Sesse)	Acerola (West Indian Cherry)	6.5	25.0
<i>Malus domestica</i> Borkh.	Apple	11.5 It is recognized that in different countries, the Brix level may naturally differ from this value. In cases where the Brix level is consistently lower than this value, reconstituted juice of lower Brix from these countries introduced into international trade will be acceptable, provided it meets the authenticity methodology listed in the General Standard for Fruit Juices and Nectars and the level will not be below 10°Brix for pineapple juice and apple juice.	50.0
<i>Malus prunifolia</i> (Willd.) Borkh. <i>Malus sylvestris</i> Mill.	Crab Apple	15.4	25.0
<i>Mammea americana</i>	Mammee Apple	(*) ¹⁶	(*) ¹⁶
<i>Mangifera indica</i> L	Mango	13.5	25.0
<i>Morus sp.</i>	Mulberry	(*) ¹⁶	30.0
<i>Musa species</i> including <i>M. acuminata</i> and <i>M. paradisiaca</i> but excluding other plantains	Banana	(*) ¹⁶	25.0
<i>Passiflora edulis</i>	Yellow Passion Fruit	(*) ¹⁶	(*) ¹⁶
<i>Passiflora edulis</i> Sims. f. <i>edulis</i> <i>Passiflora edulis</i> Sims. f. <i>Flavicarpa</i> O. Def.	Passion Fruit	12 ¹⁷	25.0
<i>Passiflora quadrangularis</i>	Passion Fruit	(*) ¹⁶	(*) ¹⁶
<i>Phoenix dactylifera</i> L.	Date	18.5	25.0

Botanical Name	FRUIT' S COMMON NAME	Minimum Brix Level for Reconstituted Fruit Juices and Reconstituted Purée	Minimum Juice and/or Purée Content (% v/v) for Fruit Nectars
<i>Pouteria sapota</i>	Sapote	(*) ¹⁶	(*) ¹⁶
<i>Prunus armeniaca</i> L.	Apricot	11.5	40.0
<i>Prunus avium</i> L.	Sweet Cherry	20.0	25.0
<i>Prunus cerasus</i> L.	Sour Cherry	14.0	25.0
<i>Prunus cerasus</i> L. cv. Stevnsbaer	Stonesbaer	17.0	25.0
<i>Prunus domestica</i> L. subsp. <i>domestica</i>	Plum	12.0	50.0
<i>Prunus domestica</i> L. subsp. <i>domestica</i>	Prune	18.5	25.0
<i>Prunus domestica</i> L. subsp. <i>domestica</i>	Quetsche	12.0	25.0
<i>Prunus persica</i> (L.) Batsch var. <i>nucipersica</i> (Suckow) c. K. Schneid.	Nectarine	10.5	40.0
<i>Prunus persica</i> (L.) Batsch var. <i>persica</i>	Peach	10.5	40.0
<i>Prunus spinosa</i> L.	Sloe	6.0	25.0
<i>Psidium guajava</i> L.	Guava	8.5	25.0
<i>Punica granatum</i> L.	Pomegranate	12.0	25.0
<i>Pyrus arbustifolia</i> (L.) Pers.	Aronia/Chokeberry	(*) ¹⁶	(*) ¹⁶
<i>Pyrus communis</i> L.	Pear	12.0	40.0
<i>Ribes nigrum</i> L.	Black Currant	11.0	30.0
<i>Ribes rubrum</i> L.	Red Currant	10.0	30.0
<i>Ribes rubrum</i> L.	White Currant	10.0	30.0
<i>Ribes uva-crispa</i>	Red Gooseberry	(*) ¹⁶	30.0
<i>Ribes uva-crispa</i> L.	Goosberry	7.5	30.0
<i>Ribes uva-crispa</i> L.	White Goosberry	(*) ¹⁶	30.0
<i>Rosa canina</i> L.	Cynorrhodon	(*) ¹⁶	40.0
<i>Rosa sp.</i> L.	Rosehip	9.0	40.0
<i>Rubus chamaemorus</i> L.	Cloudberry	9.0	30.0
<i>Rubus chamaemorus</i> L. <i>Morus hybrid</i>	Mulberry	(*) ¹⁶	40.0
<i>Rubus fruitcosus</i> L.	Blackberry	9.0	30.0
<i>Rubus hispидus</i> (of North America) <i>R. caesius</i> (of Europe)	Dewberry	10.0	25.0

Botanical Name	FRUIT' S COMMON NAME	Minimum Brix Level for Reconstituted Fruit Juices and Reconstituted Purée	Minimum Juice and/or Purée Content (% v/v) for Fruit Nectars
<i>Rubus idaeus</i> L. <i>Rubus strigosus</i> Michx.	Red Raspberry	8.0	40.0
<i>Rubus loganobaccus</i> L. H. Bailey	Loganberry	10.5	25.0
<i>Rubus occidentalis</i> L.	Black Raspberry	11.1	25.0
<i>Rubus ursinus</i> Cham. & Schltldl.	Boysenberry	10.0	25.0
<i>Rubus vitifolius</i> x <i>Rubus idaeus</i> <i>Rubus baileyana</i>	Youngberry	10.0	25.0
<i>Sambucus nigra</i> L. <i>Sambucus canadensis</i> .	Elderberry	10.5	50.0
<i>Solanum quitoense</i> Lam.	"Lulo"	(*) ¹⁶	(*) ¹⁶
<i>Sorbus aucuparia</i> L.	Rowanberry	11.0	30.0
<i>Sorbus domestica</i>	Sorb	(*) ¹⁶	30.0
<i>Spondia lutea</i> L.	"Cajá"	10.0	25.0
<i>Spondias tuberosa</i> Arruda ex Kost.	"Umbu"	9.0	25.0
<i>Syzygiun jambosa</i>	Pome Apple	(*) ¹⁶	(*) ¹⁶
<i>Tamarindus indica</i>	Tamarind (Indian date)	13.0	Adequate content to reach a minimum acidity of 0.5
<i>Theobroma cacao</i> L.	Cocoa pulp	14.0	50.0
<i>Theobroma grandiflorum</i> L.	"Cupuaçu"	9.0	35.0
<i>Vaccinium macrocarpon</i> Aiton <i>Vaccinium oxycoccos</i> L.	Cranberry	7.5	30.0
<i>Vaccinium myrtillus</i> L. <i>Vaccinium corymbosum</i> L. <i>Vaccinium angustifolium</i>	Bilberry/Blueberry	10.0	40.0
<i>Vaccinium vitis-idaea</i> L.	Lingonberry	10.0	25.0
<i>Vitis Vinifera</i> L. or hybrids thereof <i>Vitis Labrusca</i> or hybrids thereof	Grape	16.0	50.0
	Other: High acidity		Adequate content to reach a minimum acidity of 0.5
	Other: High pulp content, or Strong flavour		25.0
	Other: Low acidity, Low pulp content, or Low/medium flavour		50.0