Food and Agriculture Organization of the United Nations

World Health Organization

CODEX ALIMENTARIUS
INTERNATIONAL FOOD STANDARDS

CODEX ALIMENTARIUS
STANDARD

GENERAL STANDARD FOR FRUIT JUICES AND NECTARS
CXS 247-2005

ADOPTED 2005
AMENDED 2025

CXS 247-2005

History of the standard

2025 Amendments

Following decisions taken at the Forty-eighth Session of the Codex Alimentarius Commission in November 2025, amendments were made in Section 9: "Methods of analysis and sampling" to align with the *Recommended methods of analysis and sampling* (CXS 234-1999).

This publication was redesigned and published in 2025.

2024 Amendment

The Forty-seventhSession of the Codex Alimentarius Commission agreed to amend the *General standard for fruit juices and nectars* (CXS 247-2005) by inserting a note in the annex under the entry for "*Vitis vinifera* L. or hybrids thereof, *Vitis labrusca* or hybrids thereof," Grape, under the value of 16.0 for the minimum Brix level for reconstituted fruit juice and fruit purée.

2022 Amendments

Following decisions taken at the Forty-fifth Session of the Codex Alimentarius Commission in December 2022, amendments were made in Section 8.2: "Labelling of non-retail containers".

Adopted in 2005.

1 Scope

This standard applies to all products as defined in Section 2.1: "Product definition".[i]

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 (CAC).

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, organoleptic and nutritional characteristics of the juices of the fruit from which it comes. The juice may be cloudy or clear and may have restored aromatic substances and volatile flavour components,[ii] 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 cells obtained by suitable physical means from the same kind of fruit may be added.[iii]

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:

- **fruit juice** directly expressed by mechanical extraction processes; and
- **fruit juice from concentrate** by reconstituting concentrated fruit juice defined in Section 2.1.2: "Concentrated fruit juice" with potable water that meets the criteria described in Section 3.1.1(c): "Basic ingredients".

i This standard supersedes individual standards for fruit juices and related products, as indicated below: Fruit juices preserved exclusively by physical means: *Orange juice* (CXS 45-1981), *Grapefruit juice* (CXS 46-1981), *Lemon juice* (CXS 47-1981), *Apple juice* (CXS 48-1981), *Tomato juice* (CXS 49-1981), *Grape juice* (CXS 82-1981), *Pineapple juice* (CXS 85-1981), *Blackcurrant juice* (CXS 120-1981) and *General standard for fruit juices not covered by individual standards* (CXS 164-1989). Concentrated fruit juices preserved exclusively by physical means: *Concentrated apple juice* (CXS 63-1981), *Concentrated orange juice* (CXS 64-1981), *Concentrated grape juice* (CXS 83-1981), *Concentrated labrusca type grape juice, sweetened* (CXS 84-1981), *Concentrated blackcurrant juice* (CXS 121-1981) and *Concentrated pineapple juice* (CXS 138-1983).Concentrated fruit juices with preservatives for manufacturing: *Concentrated pineapple juice* (CXS 139-1983). Fruit nectars preserved exclusively by physical means: *Apricot, peach and pear nectars* (CXS 44-1981), *Guava nectar* (CXS 148-1985), *Non-pulpy blackcurrant nectar* (CXS 101-1981), *Pulpy nectars of certain small fruits* (CXS 122-1981), *Nectars of certain small fruits* (CXS 122-1981), *Nectars of certain citrus fruits* (CXS 134-1981), *General standard for fruit nectars not covered by individual standards* (CXS 161-1989) and *Liquid pulpy mango products* (CXS 149-1985).Guidelines: *Guidelines for mixed fruit juices* (CXG 11-1991) and *Guidelines for mixed fruit nectars* (CXG 12-1991).

ii 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.

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

2.1.2 Concentrated fruit juice

Concentrated fruit juice is the product that complies with the definition given in Section 2.1.1: "Fruit juice", except water has been physically removed in an amount sufficient to increase the Brix level to a value at least 50 percent 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 restored[iv] 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 cells[v] 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.

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 CAC.

Fruit purée may have restored aromatic substances and volatile flavour components,[vi] 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 cells[vii] 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 percent greater than the Brix value established for reconstituted juice from the same fruit, as indicated in Annex I.

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

iv 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.
v For citrus fruits, pulp or cells are the juice sacs obtained from the endocarp.
vi 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.
vii For citrus fruits, pulp or cells are the juice sacs obtained from the endocarp..
viii 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.

2.1.6 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): "Other permitted ingredients", honey and/or syrups as described in Section 3.1.2(b): "Other permitted ingredients", and/or food additive sweeteners as listed in the *General standard for food additives* (CXS 192-1995)[1] 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 cells,[ix] 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 Annex I.

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 Annex I, 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 World Health Organization's *Guidelines for drinking-water quality* (volumes 1 and 2).[2]

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

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 percent moisture as defined in the *Standard for sugars* (CXS 212-1999):[3] sucrose,[x] dextrose anhydrous, glucose,[xi] fructose, may be added to all products defined in Section 2.1: "Product definition". The addition of ingredients listed in Section 3.1.2(a) and Section 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* (CXS 212-1999)), 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 2.1.2: "Concentrated fruit juice", concentrated fruit purée as defined in Section 2.1.5: "Concentrated fruit purée for use in the manufacture of fruit juices and nectars", and fruit nectars as defined in Section 2.1.6: "Fruit nectar". Honey and/or sugars derived from fruits may be added only to fruit nectars as defined in Section 2.1.6: "Fruit nectar".

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: "Fruit nectar".

d) The addition of both sugars (defined in paragraphs 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 r*eticulata* may be added to orange juice in an amount not to exceed 10 percent 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: "Product definition". Such additions shall comply with the texts of the CAC 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, organoleptic, and nutritional characteristics of the fruit(s) from which it comes.

x Termed "white sugar" and "mill sugar" in the Standard for sugars (CXS 212-1999).
xi Termed "dextrose anhydrous" in the Standard for sugars (CXS 212-1999).

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* (CXS 192-1995) 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.

5 Processing aids – maximum level of use in line with good manufacturing practices

Table 1: Processing aids – Maximum level of use in line with good manufacturing practices

Function	Substance
Antifoaming agent	Polydimethylsiloxane[a]
Clarifying agents Filtration aids Flocculating agents	Adsorbent clays (bleaching, natural or activated earths)
	Adsorbent resins
	Activated carbon (only from plants)
	Bentonite
	Calcium hydroxide[b]
	Cellulose
	Chitosan
	Colloidal silica
	Diatomaceous earth
	Gelatine (from skin collagen)
	Ion exchange resins (cation and anion)
	Isinglass[c]
	Kaolin
	Perlite
	Polyvinylpolypyrrolidone
	Potassium casseinate[c]
	Potassium tartrate[b]
	Precipitated calcium carbonate[b]

Function	Substance
	Rice hulls
	Silicasol
	Sodium caseinate[c]
	Sulphur dioxide [b,d]
	Tannin
Enzyme preparations[e]	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[f]	Nitrogen
	Carbon dioxide

Notes:

[a] 10 mg/l is the maximum residue limit of the compound allowed in the final product.
[b] Only in grape juice.
[c] 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 Section 4.2.1.4 and Section 4.2.4: "Processing aids and carry-over of food additives" of the of the *General standard for the labelling of pre-packaged foods* (CXS 1-1985).
[d] 10 mg/l (as residual SO2).
[e] 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.
[f] 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 CAC 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 CAC for these products.

7 Hygiene

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),[4] and other relevant Codex texts such as codes of hygienic practice and codes of practice.

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).[5]

8 Labelling

In addition to the *General standard for the labelling of pre-packaged foods* (CXS 1-1985),[6] the following specific provisions apply:

8.1 Containers destined for the final consumer

8.1.1 Name of the product

The name of the product shall be the name of the fruit used as defined in Section 2.2: "Species". 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: "Product definition" or which otherwise conform to this standard.

8.1.1.1 *Fruit juice defined under Section 2.1.1: "Fruit juice"*

The name of the product shall be "_____ juice" or "juice of _____".

8.1.1.2 *Concentrated fruit juice defined under Section 2.1.2: "*Concentrated fruit juice*"*

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: "Water-extracted fruit juice"*

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: "Fruit purée for use in the manufacture of fruit juices and nectars"*

The name of the product shall be " _____ purée" or "purée of _____".

8.1.1.5 *Concentrated fruit purée defined under Section 2.1.5: "Concentrated fruit purée for use in the manufacture of fruit juices and nectars"*

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

8.1.1.6 *Fruit nectars defined under Section 2.1.6: "Fruit nectar"*

The name of the product shall be " _____ nectar" or "nectar of _____".

In the case of fruit juice products (as defined in Section 2.1: "Product definition") 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.

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 half the height of the letters in the name of the juice.

8.1.2 Additional requirements

The following additional specific provisions apply:

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 percent greater than the Brix value established for reconstituted juice from the same fruit, as indicated in table in Annex I, it shall be labelled "concentrated".

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 Section 3.1.2(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.

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.

Distinct varietal denominations may be used in conjunction with the common fruit names on the label where such use is not misleading.

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 half the height of the letters in the name of the juice.

An ingredient declaration of "ascorbic acid" when used as an antioxidant does not, by itself, constitute a "Vitamin C" claim.

Any added essential nutrients declaration should be labelled in accordance with the *General guidelines on claims* (CXG 1-1979),[7] *Guidelines on nutrition labelling* (CXG 2-1985)[8] and the *Guidelines for use of nutrition claims* (CXG 23-1997).[9]

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 Section 3.1.2(a): "Other permitted ingredients" and Section 3.1.2(b): "Other permitted ingredients", any nutrient content claims related to the reduction in sugars should conform to the *General guidelines on claims* (CXG 1-1979), the *Guidelines for use of nutrition claims* (CXG 23-1997) and the *Guidelines on nutrition labelling* (CXG 2-1985).

A pictorial representation of fruit(s) on the label should not mislead the consumer with respect to the fruit illustrated.

Where the product contains added carbon dioxide, the term "carbonated" or "sparkling" shall appear on the label near the name of the product.

Where tomato juice contains spices and/or aromatic herbs in accordance with Section 3.1.2(f): "Other permitted ingredients", the term "spiced" and/or the common name of the aromatic herb shall appear on the label near the name of the juice.

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).[10] In addition, the following specific provisions apply:

Date marking may be indicated.

For tankers, the information may appear exclusively in the accompanying documents.

9 Methods of analysis and sampling

Table 2: Methods of analysis and sampling

Provision	Method	Principle	Type
Acetic acid (Section 3.2" "Quality criteria" and Section: 3.3 "Authenticity")[a]	EN 12632 IFU Method No. 66 (1996)	Enzymatic determination	II
Alcohol (ethanol) (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	IFU Method No. 52 (1996)	Enzymatic determination	II
Anthocyanins (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	IFU Method No. 71 (1998)	High-performance liquid chromatography (HPLC)	I
Ascorbic acid-L (Section 4: "Additives")	IFU 17a	HPLC	II
Ascorbic acid-L (Section 4: "Additives")	IFU 17b	Iodine method	III
Ascorbic acid-L (Section 4: "Additives")	AOAC 967.21 / ISO 6557-2	Indophenol method	III
Ascorbic acid-L (Section 4: "Additives")	ISO 6557-1	Fluorescence spectrometry	IV
Ash in fruit products (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 940.26 EN 1135 (1994) IFU Method No. 9 (1989)	Gravimetry	I
Beet sugar in fruit juices (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 995.17	Deuterium Nuclear Magnetic Resonance (Deuterium NMR)	II
Benzoic acid as a marker in orange juice (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 994.11	High-performance liquid chromatography (HPLC)	III

Provision	Method	Principle	Type
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 (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	JAOAC 79, No. 1, 1996, 62-72	Stable isotope mass spectrometry	II
Carbon stable isotope ratio of apple juice (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 981.09 – JAOAC 64, 85 (1981)	Stable isotope mass spectrometry	II
Carbon stable isotope ratio of orange juice (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 982.21	Stable isotope mass spectrometry	II
Carotenoid, total/individual groups (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 12136 (1997) IFU Method No. 59 (1991)	Spectrophotometry	I
Cellobiose	IFU Recommendation No. 4 October 2000	Capillary gas chromatography	IV
Centrifugable pulp (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 12134 (1997) IFU Method No. 60 (1991)	Centrifugation/% value	I
Chloride (expressed as sodium chloride) (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN12133 (1997) IFU Method No. 37 (1991)	Electrochemical titrimetry	III
Citric acidb (Section 4: "Additives")	AOAC 986.13	High-performance liquid chromatography (HPLC)	II
Citric acid[b] (Section 4: "Additives")	EN 1137:1994 IFU Method No. 22 (1985)	Enzymatic determination	III
Essential oils (Scott titration) (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 968.20 IFU Method No. 45bc	(Scott) distillation, titration	I
Essential oils (in citrus fruit) (volume determination)[c] (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	ISO 1955:1982	Distillation and direct reading of the volume determination	I
Fermentability (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	IFU Method No. 18 (1974)	Microbiological method	I

Provision	Method	Principle	Type
Formol number (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 1133 (1994) IFU Method No. 30 (1984)	Potentiometric titration	I
Free amino acids (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 12742 (1999) IFU Method No. 57 (1989)	Liquid chromatography	II
Fumaric acid (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	IFU Method No. 72 (1998)	High-performance liquid chromatography (HPLC)	II
Glucose and fructose – Determination of glucose, fructose and saccharose (Section 3.1.2: "Other 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 (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	IFU Method No. 76 (2001)	Enzymatic determination	II
Glycerol (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	IFU Method No. 77 (2001)	Enzymatic determination	II
Hesperidin and naringin (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 12148 (1996) IFU Method No. 58 (1991)	High-performance liquid chromatography (HPLC)	II
High fructose corn syrup and hydrolysed inulin syrup in apple juice (Section 3.1.2: "Other permitted ingredients")	Determination of HFCS and HIS by Capillary GC method JAOAC 84. 486 (2001) / IFU recommendation No. 4	Gas chromatography	IV
Hydroxymethylfurfural (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	IFU Method No. 69 (1996)	High-performance liquid chromatography (HPLC)	II
Hydroxymethylfurfural (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	ISO 7466:1986	Spectrometry	III
Isocitric acid-D (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 1139 (1999) IFU Method No. 54 (1984)	Enzymatic determination	II
Lactic acid-D and L (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 12631 (1999) IFU Method No. 53 (1983/1996)	Enzymatic determination	II
L-malic/total malic acid ratio in apple juice (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 993.05	Enzymatic determination and high-performance liquid chromatography (HPLC)	II

Provision	Method	Principle	Type
Malic acid (Section 4: "Food additives")	AOAC 993.05	Enzymatic determination and HPLC	III
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	IFU 21	Enzymatic determination	II
Naringin and neohesperidin in orange juice (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 999.05	High-performance liquid chromatography (HPLC)	III
Pectin (Section 4: "Food additives")	IFU Method No. 26 (1964/1996)	Precipitation/photometry	I
pH-value (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	NMKL 179:2005	Potentiometry	II
pH-value (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 1132 (1994) IFU Method No. 11 (1989) ISO 1842:1991	Potentiometry	IV
Phosphorus / phosphate (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 1136 / IFU 50	Photometric determination	II
Preservatives in fruit juices (sorbic acid and its salts)	ISO 5519	Spectrometry	III
Proline by photometry – non-specific determination (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	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: "Other permitted ingredients" and Section 4: "Food additives")	AOAC 986.13	High-performance liquid chromatography (HPLC)	III
Relative density (Sections 3.2: "Quality criteria" and 3.3: "Authenticity")[a]	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")[a]	IFU Method No. 1A	Densitometry	III
Saccharin	NMKL 122	HPLC	II

Provision	Method	Principle	Type
Sodium, potassium, calcium, magnesium in fruit juices (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 1134 (1994) IFU Method No. 33 (1984)	Atomic absorption spectroscopy	II
Soluble solids	AOAC 983.17 / EN 12143 (1996) / IFU 8 / ISO 2173	Indirect by refractometry	I
Sorbitol-D (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	IFU Method No. 62 (1995)	Enzymatic determination	II
Stable carbon isotope ratio in the pulp of fruit juices (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	ENV 13070 (1998) Analytica Chimica Acta 340 (1997)	Stable isotope mass spectrometry	II
Stable carbon isotope ratio of sugars from fruit juices (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	ENV 12140 Analytica Chimica Acta 271 (1993)	Stable isotope mass spectrometry	II
Stable hydrogen isotope ratio of water from fruit juices (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	ENV 12142 (1997)	Stable isotope mass spectrometry	II
Stable oxygen isotope ratio in fruit juice water (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	ENV 12141(1997)	Stable isotope mass spectrometry	II
Starch (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 925.38 (1925) IFU Method No. 73 (2000)	Colorimetric	I
Sucrose (Section 3.1.2: "Other permitted ingredients")	EN 12630 IFU Method No. 67 (1996) NMKL 148 (1993)	High-performance liquid chromatography (HPLC)	II
Sucrose (Section 3.1.2: "Other permitted ingredients")	EN 12146 / IFU 56	Enzymatic determination	III
Sugar beet derived syrups in frozen concentrated orange juice $\delta^{18}O$ measurements in water (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")a	AOAC 992.09	Oxygen isotope ratio analysis	I
Sulphur dioxide (Section 4: "Food additives")	Optimized Monier Williams AOAC 990.28 IFU Method No. 7A (2000) NMKL 132 (1989)	Titrimetry after distillation	II

Provision	Method	Principle	Type
Sulphur dioxide (Section 4: "Food additives")	ISO 5522:1981 ISO 5523:1981	Titrimetry after distillation	III
Sulphur dioxide (Section 4: "Food additives")	NMKL 135 (1990)	Enzymatic determination	III
Tartaric acid in grape juice (Section 4: "Food additives")	EN 12137 (1997) IFU Method No. 65 (1995)	High-performance liquid chromatography (HPLC)	II
Titrable acids, total (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 12147 (1995) IFU Method No. 3 (1968) ISO 750:1998	Titrimetry	I
Total dry matter (vacuum-oven drying at 70°C)c (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	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)[c] (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 985.26	Gravimetric determination	I
Vitamin C (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	EN 14130 (2004)	High-performance liquid chromatography (HPLC)	II
Vitamin C (dehydro-ascorbic acid and ascorbic acid) (Section 3.2: "Quality criteria" and Section 3.3: "Authenticity")[a]	AOAC 967.22	Microfluorometry	III

Notes:

[a] See Section 3.4: "Verification of composition, quality and authenticity".
[b] All juices except citrus-based juices.
[c] Because there is no numerical value in the standard, duplicate Type I methods have been included which may lead to different results.

ANNEX I

Table A1: Minimum Brix[xii] level for reconstituted juice and reconstituted purée and minimum juice and/or purée content for fruit nectars (% v/v)[b] at 20°C

Botanical name	Fruit common name	Minimum Brix level for reconstituted fruit juices and reconstituted purée	Minimum juice and/or purée content (% v/v) for fruit nectars
Actinidia deliciosa (A. Chev.) C. F. Liang & A. R. Ferguson	Kiwi	(*)[c]	(*)[c]
Anacardium occidentale L.	Cashewapple	11.5	25.0
Ananas comosus (L.) Merrill *Ananas sativis L. Schult. f.*	Pineapple	12.8[d] 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
Annona muricata L.	Soursop	14.5	25.0
Annona squamosa L	Sugar apple	14.5	25.0
Averrhoa carambola L.	Carambola/ Starfruit	7.5	25.0
Carica papaya L.	Papaya	(*)[c]	25.0
Chrysophyllum cainito	Star apple	(*)[c]	(*)[c]
Citrullus lanatus (Thunb.) Matsum. & Nakai var. Lanatus	Watermelon	8.0	40.0
Citrus aurantifolia (Christm.) (swingle)	Lime	8.0[d]	According to the legislation of the importing country
Citrus aurantium L.	Sour orange	(*)[c]	50.0
Citrus limon (L.) Burm. *f. Citrus limonum* Rissa	Lemon	8.0[d]	According to the legislation of the importing country
Citrus paradisi Macfad	Grapefruit	10.0[d]	50.0
Citrus paradisi, *Citrus grandis*	Sweetie grapefruit	10.0	50.0

N.B. Table note information can be found on the last page of this table.

Botanical name	Fruit common name	Minimum Brix level for reconstituted fruit juices and reconstituted purée	Minimum juice and/or purée content (% v/v) for fruit nectars
Citrus reticulata Blanca	Mandarine/ Tangerine	11.8[d]	50.0
Citrus sinensis (L.)	Orange	11.8 – 11.2[d] 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
Cocos nucifera L.[e]	Coconut	5.0	25.0
Cucumis melo L.	Melon	8.0	35.0
Cucumis melo L subsp. *melo* var. *inodorus* H. Jacq.	Casaba melon	7.5	25.0
Cucumis melo L. subsp. *melo* var. *inodorus* H. Jacq	Honeydew melon	10.0	25.0
Cydonnia oblonga Mill.	Quince	11.2	25.0
Diospyros khaki Thunb.	Persimmon	(*)[c]	40.0
Empetrum nigrum L.	Crowberry	6.0	25.0
Eribotrya japonesa	Loquat	(*)[c]	(*)[c]
Eugenia syringe	Guavaberry Birchberry	(*)[c]	(*)[c]
Eugenia uniflora Rich.	Suriname cherry	6.0	25.0
Ficus carica L.	Fig	18.0	25.0
Fortunella Swingle sp.	Kumquat	(*)[c]	(*)[c]

Botanical name	Fruit common name	Minimum Brix level for reconstituted fruit juices and reconstituted purée	Minimum juice and/or purée content (% v/v) for fruit nectars
Fragaria x. ananassa Duchense(*Fragaria chiloensis* Duchesne *x Fragaria virginiana* Duchesne)	Strawberry	7.5	40.0
Genipa americana	"Genipap"	17.0	25.0
Hippophae elaeguacae	Sea buckthorn	(*)[c]	25.0
Hipppohae rhamnoides L.	Buckthornberry = Sallow-thornberry	6.0	25.0
Litchi chinensis Sonn.	Litchi/Lychee	11.2	20.0
Lycopersicum esculentum L.	Tomato	5.0	50.0
Malpighia sp. (Moc. & Sesse)	Acerola (West Indian cherry)	6.5	25.0
Malus domestica 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* (CXS 247-2005) and the level will not be below 10° Brix for pineapple juice and apple juice.	50.0
Malus prunifolia (Willd.) Borkh. *Malus sylvestris* Mill.	Crab apple	15.4	25.0
Mammea americana	Mammee apple	(*)[c]	(*)[c]
Mangifera indica L	Mango	13.5	25.0
Morus sp.	Mulberry	(*)[c]	30.0
Musa species including *M. acuminata* and *M. paradisiaca* but excluding other plantains	Banana	(*)[c]	25.0
Passiflora edulis	Yellow passion fruit	(*)[c]	(*)[c]

Botanical name	Fruit common name	Minimum Brix level for reconstituted fruit juices and reconstituted purée	Minimum juice and/or purée content (% v/v) for fruit nectars
Pasiflora edulis Sims. f. edulus Passiflora edulis Sims. f. Flavicarpa O. Def.	Passion fruit	12[d]	25.0
Passiflora quadrangularis	Passion fruit	(*)[c]	(*)[c]
Phoenix dactylifera L.	Date	18.5	25.0
Pouteria sapota	Sapote	(*)[c]	(*)[c]
Prunus armeniaca L.	Apricot	11.5	40.0
Prunus avium L.	Sweet cherry	20.0	25.0
Prunus cerasus L.	Sour cherry	14.0	25.0
Prunus cerasus L. cv. Stevnsbaer	Stonesbaer	17.0	25.0
Prunus domestica L. subsp. *domestica*	Plum	12.0	50.0
Prunus domestica L. subsp. *domestica*	Prune	18.5	25.0
Prunus domestica L. subsp. *domestica*	Quetsche	12.0	25.0
Prunus persica (L.) Batsch var. *nucipersica* (Suckow) c. K. Schneid.	Nectarine	10.5	40.0
Prunus persica (L.) Batsch var. *persica*	Peach	10.5	40.0
Prunus spinosa L.	Sloe	6.0	25.0
Psidium guajava L.	Guava	8.5	25.0
Punica granatum L.	Pomegranate	12.0	25.0
Pyrus arbustifolia (L.) Pers.	Aronia/Chokeberry	(*)[c]	(*)[c]
Pyrus communis L.	Pear	12.0	40.0
Ribes nigrum L.	Black Currant	11.0	30.0
Ribes rubrum L.	Red Currant	10.0	30.0
Ribes rubrum L.	White Currant	10.0	30.0
Ribes uva-crispa	Red gooseberry	(*)[c]	30.0
Ribes uva-crispa L.	Gooseberry	7.5	30.0
Ribes uva-crispa L.	White gooseberry	(*)[c]	30.0

Botanical name	Fruit common name	Minimum Brix level for reconstituted fruit juices and reconstituted purée	Minimum juice and/or purée content (% v/v) for fruit nectars
Rosa canina L.	Cynorrhodon	(*)[c]	40.0
Rosa sp. L.	Rosehip	9.0	40.0
Rubus chamaemorus L.	Cloudberry	9.0	30.0
Rubus chamaemorus L. *Morus* hybrid	Mulberry	(*)[c]	40.0
Rubus fruitcosus L.	Blackberry	9.0	30.0
Rubus hispidus (of North America) *R. caesius* (of Europe)	Dewberry	10.0	25.0
Rubus idaeus L. *Rubus strigosus* Michx.	Red raspberry	8.0	40.0
Rubus loganobaccus L. H. Bailey	Loganberry	10.5	25.0
Rubus occidentalis L.	Black raspberry	11.1	25.0
Rubus ursinus Cham. & Schltdl.	Boysenberry	10.0	25.0
Rubus vitifolius x Rubus idaeus Rubus baileyanis	Youngberry	10.0	25.0
Sambucus nigra L. *Sambucus canadensis.*	Elderberry	10.5	50.0
Solanum quitoense Lam.	"Lulo"	(*)[c]	(*)[c]
Sorbus aucuparia L.	Rowanberry	11.0	30.0
Sorbus domestica	Sorb	(*)[c]	30.0
Spondia lutea L.	"Cajá"	10.0	25.0
Spondias tuberosa Arruda ex *Kost.*	"Umbu"	9.0	25.0
Syzygiun jambosa	Pome apple	(*)[c]	(*)[c]
Tamarindus indica	Tamarind (Indian date)	13.0	Adequate content to reach a minimum acidity of 0.5
Theobroma cacao L.	Cocoa pulp	14.0	50.0
Theobroma grandiflorum L.	"Cupuaçu"	9.0	35.0
Vaccinium macrocarpon Aiton *Vaccinium oxycoccos* L.	Cranberry	7.5	30.0

Botanical name	Fruit common name	Minimum Brix level for reconstituted fruit juices and reconstituted purée	Minimum juice and/or purée content (% v/v) for fruit nectars
Vaccinium myrtillus L. *Vaccinium corymbosum* L. *Vaccinium angustifolium*	Bilberry/Blueberry	10.0	40.0
Vaccinium vitis-idaea L.	Lingonberry	10.0	25.0
Vitis vinifera L. or hybrids thereof Vitis labrusca or hybrids thereof	Grape	16.0 Minimum Brix level of 14 may apply for grape juice from Vitis labrusca and hybrids thereof produced under specific edaphoclimatic conditions, if supported by national composition data and if consistent with the application of national legislation of the importing country. In specific edaphoclimatic conditions, the Brix level for grape juice from Vitis labrusca and hybrids thereof may in some years be lower than 16. The reconstituted juice shall meet the authenticity methodology listed in the General standard for fruit juices and nectars (CXS 247-2005) and the Brix level shall correspond to the Brix level as expressed from the Vitis labrusca and hybrids thereof used to make the concentrate.	50.0
	Other: High acidity		Adequate content to reach a minimum acidity of 0.5
	Other: High pulp content or strong flavour		25.0

Botanical name	Fruit common name	Minimum Brix level for reconstituted fruit juices and reconstituted purée	Minimum juice and/or purée content (% v/v) for fruit nectars
	Other: Low acidity, low pulp content, or low/medium flavour		50.0

Notes:

[a] 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.
[b] 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.
[c] 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.
[d] Acid corrected as determined by the method for total titratable acids in the section on methods of analysis and sampling.
[e] This product is coconut water, which is directly extracted from the coconut without expressing the coconut meat.

Referenced texts

1 *General standard for food additives* (CXS 192-1995).

2 WHO (World Health Organization). 2022. Guidelines for drinking-water quality: fourth edition incorporating the first and second addenda. https://www.who.int/publications/i/item/9789240045064

3 *Standard for sugars* (CXS 212-1999).

4 *General principles of food hygiene* (CXC 1-1969).

5 *Principles and guidelines for the establishment and application of microbiological criteria related to foods* (CXG 21-1997).

6 *General standard for the labelling of pre-packaged foods* (CXS 1-1985).

7 *General guidelines on claims* (CXG 1-1979).

8 *Guidelines on nutrition labelling* (CXG 2-1985).

9 *Guidelines for use of nutrition claims* (CXG 23-1997).

10 *General standard for the labelling of non-retail containers of foods* (CXS 346-2021).

Codex Alimentarius

A collection of international food standards developed to protect consumer health and ensure fair practices in the food trade. Codex standards are adopted by the Codex Alimentarius Commission, an intergovernmental body with 189 Members, established by FAO and WHO. The standards are recognized by the World Trade Organization as the benchmark for the safety of internationally traded food.

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FAO and WHO. 2026. *General standard for fruit juices and nectars*.
Codex Alimentarius Standard, No. CXS 247-2005. Codex Alimentarius Commission. Rome.