BELIZE STANDARD

BZS 38: 202X

BELIZE STANDARD SPECIFICATION FOR COCONUT OIL

BBS
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BELIZE NATIONAL STANDARD SPECIFICATION FOR COCONUT OIL

Committee Representation

The preparation of this standard for the Standards Advisory Council established under the Standards Act 1992 was carried out under the supervision of the Bureau's Technical Committee for Coconut Products, which at the time comprised the following members:

TECHNICAL COMMITTEE

CHAIRMAN	**REPERESENTING**

MEMBERS	**REPERESENTING**

Technical Secretary

Mr. Lloyd Orellano

Belize Bureau of Standards

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BELIZE STANDARD SPECIFICATION FOR COCONUT OIL

0 FOREWORD

0.4 In reviewing this standard, assistance was derived from the following documents:

0.5 This standard is intended to be compulsory.

1 SCOPE

This standard specifies the requirements, methods of sampling and testing for coconut oil intended for domestic and commercial use.

2 NORMATIVE REFERENCES

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

2.1 National Standards

a) BZS 1: Part 3: Labelling of Prepackaged Foods

2.2 International Organization for Standardization (ISO)

a) ISO 660, Animal and vegetable fats and oils -- Determination of acid value and acidity;
b) ISO 661, Animal and vegetable fats and oils - Preparation of test sample;
c) ISO 662, Animal and vegetable fats and oils — Determination of moisture and volatile matter content;
d) ISO 663, Animal and vegetable fats and oils —Determination of insoluble impurities content;
e) ISO 3596, Animal and vegetable fats and oils —Determination of unsaponifiable matter —Method using diethyl ether extraction;
f) ISO 3657, Animal and vegetable fats and oils — Determination of saponification value;
g) ISO 3960, Animal and vegetable fats and oils —Determination of peroxide value — Iodometric (visual) endpoint determination;
h) ISO 3961 Animal and vegetable fats and oils —Determination of iodine value;
i) ISO 5555, Animal and Vegetable Fats and Oils —Sampling;
j) ISO 6320, Animal and vegetable fats and oils —Determination of refractive index;
k) ISO 6321, Animal and vegetable fats and oils — Determination of melting point in open capillary tubes (slip point);

l) ISO 9936, Animal and vegetable fats and oils —Determination of tocopherol and tocotrienol contents by high-performance liquid chromatography;
m) ISO 10539, Animal and Vegetable Fats and oils —Determination of Alkalinity;
n) ISO 15305, Animal and vegetable fats and oils — Determination of Lovibond colour;
o) ISO 18609, Animal and vegetable fats and oils —Determination of unsaponifiable matter —Method using hexane extraction.

2.2 American Oil Chemists' Society (AOCS)

a) AOCS Ca 6b-53, Unsaponifiable Matter
b) AOCS Cc 7-25, Refractive Index
c) AOCS Cc17-95, Soap in Oïl Titrimetric Method
d) AOCS Cd 1d-1992, Iodine Value of Fats and Oils Cyclohexane-Acetic Acid Method
e) AOCS Cd 3-25, Saponification Value
f) AOCS Cd 3d-63, Acid Value
g) AOCS Cd 5-40, Reichert-Meissl, Polenske, and Kirschner Values, Modified AOAC Methods
h) AOCS Cd 8d-90, Peroxide Value Acetic Acid-Isooctane Method
i) AOCS Ce 8-89, Determination of Tocopherols and Tocotrienols in Vegetable Oils and Fats by HPLC

2.3 American Organization of American Chemists

a) AOAC 993.20, Iodine Value of Fats and Oils Wijs (Cyclohexane–Acetic Acid Solvent)

2.4 CODEX Alimentarius Commission

a) CAC/GL 21 – 1997, FAO/WHO Codex Alimentarius, Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods

b) CODEX STAN 193-1995, FAO/WHO Codex Alimentarius General Standards for Contaminants and Toxins in Food and Feed

2.5 Other Standards

a) IS 548-1, Methods of sampling and test for oils and fats, Part I: Methods of sampling, physical and chemical tests

3 TERMS AND DEFINITIONS

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

3.1 **acid value** means weight of potassium hydroxide (KOH), expressed in milligrams, required to neutralise the free fatty acids present in one gram of the coconut oil.

3.2 **admixture** means combination of different substances retaining their individual properties.

3.3 **coconut oil** means oil obtained from the mature kernel of the coconut (Cocos nucifera Linnaeus) by a process of expression, solvent extraction or by an approved method of processing.

3.4 **coconut milk** means white, creamy and smooth liquid extracted from the grated flesh of mature fresh coconuts.

3.5 **competent authority** means a Minister, Ministry or any named Agency or number of Agencies legally authorised to administer separately or jointly, any requirement pertaining to coconut oil.

3.6 **copra** means dehydrated or dried coconut kernel.

3.7 **expression** means process of extracting milk or oils by using pressure.

3.8 **good manufacturing practice** (in relation to a food additive) means maximum level, recommended by the CODEX Committee on Food Additives, for an additive in a product to achieve a particular objective.

3.9 **Wijs iodine value** means mass of iodine expressed in grams absorbed per 100 grams of the coconut oil, when determined using Wijs' solution.

3.10 **mature kernel** means whole kernel 9 to 12 months' old.

3.11 **melting point** means temperature at which the oil softens or becomes sufficiently fluid to slip or run.

3.12 **moisture content** means the ratio of mass of water and other volatile substances in a sample to the mass of solids in the sample expressed as a percentage.

3.13 **polenske value** means indicator of how much volatile fatty acid can be extracted from fat through saponification.

3.14 **refractive index** means ratio of the velocity of light in the first of two media to the velocity in the second as it passes from one into the other.

NOTE: The refractive index expresses the ratio between the sine of the angle of incidence of the ray of light and the sine of the angle of refraction when a ray of light of known wavelength passes from air into the oil. Refractive index can be used as a measure of total solids in solution and purity of substances and so on.

3.15 **Reichert-Meissl value** means volume, expressed in millilitres, of 0.1M aqueous sodium hydroxide solution required to neutralise the steam-volatile water-soluble fatty acids distilled from 5 grams of the oil under the precise conditions specified in the method.

3.16 **oleaginous material** means having the nature or qualities of oil.

3.17 **saponification** means a chemical reaction in which an oil or fat is heated with an alkali, such as potassium Hydroxide (KOH), to make soap.

3.18 **saponification value** means mass of potassium hydroxide (KOH) required to saponify completely one gram of oil or fat.

3.19 **specific gravity** means ratio of the weight in air of a given volume of the oil at 30ºC to the weight in air of an equal volume of water at 30ºC.

3.20. **unsaponifiable matter** means fraction of substances in the oil which is not saponified by sodium hydroxide but which is soluble in ordinary fat solvents

4 PRODUCT DESCRIPTION

4.1 Crude coconut oil

Crude coconut oil shall be the product obtained by expression and/or solvent extraction from the copra of the coconut Cocos nucifera L. and shall be free from admixture with other oils or fats.

4.2. Refined coconut oil

Refined coconut oil shall be the product obtained from copra of the coconut, Cocos nucifera L. by the process of expression or solvent extraction or both, and which has been neutralised, bleached with bleaching earth or activated carbon, or both, and deodorised with steam. A physical refining process may also be used where there is a wash with citric acid to remove gum bleaching and steam-stripping or deodorising. The product shall be free from admixture with other oils or fats.

4.3. Virgin coconut oil

Virgin coconut oil (VCO) is obtained from fresh and mature kernel of the coconut (Cocos nucifera L.) by mechanical or natural means with or without the application of heat, which does not lead to alteration of the nature of the oil. VCO has not undergone chemical refining, bleaching or deodorising. It can be consumed in its natural state without the need for further processing. Virgin coconut oil consists mainly of medium chain triglycerides, which are resistant to peroxidation. The fatty acids in virgin coconut oil are distinct from animal fats which contain mainly of long chain saturated fatty acids. Virgin coconut oil is colourless, free of sediment with natural fresh coconut scent. It is free from rancid odour or taste.

5 GENERAL REQUIREMENTS

5.1 The coconut oil shall be obtained from good quality coconut milk or copra.

5.2 Solvent extracted oil shall be obtained from the oleaginous material using a food grade solvent.

5.3 The coconut oil shall be clear and free from rancidity, adulterants, sediment, suspended impurities and separated water.

5.4 The coconut oil shall be free from admixture with other oils or fats when tested according to the methods prescribed.

5.5 Crude refined and virgin coconut oils shall also conform to the physical and chemical requirements set out in Table 1, when determined by the appropriate methods.

Table 1: Physical and chemical requirements for crude, refined and virgin coconut oil

Item	Characteristic	Requirements			Methods of Test
		Refined	Virgin	Crude	
1	Specific Gravity at 30 °C / 30 °C	0.915 – 0.920	0.915 – 0.920	0.908 – 0.921	IS 548-1
2	Refractive Index at 40 °C	1.4480 – 1.4490	1.4480 – 1.4490	1.4480 – 1.450	ISO 6320: 2000; or AOCS Cc 7-25
3	Melting Point (°C)	22.0 – 26.0	22.0 - 26.0	22.0 – 26.0	ISO 6321
4	Colour (Lovibond Units): 1 in. cell	< 5.0Y < 1.2R	Colourless	< 5.0Y < 2.0R	ISO 15305
5	Saponification Value; mg KOH/g oil	248 – 265	248 – 265	248 – 265	ISO 3657; or AOCS Cd 3-25
6	Iodine Value (Wijs)	6.3 – 10.6	6.3 – 10.6	6.3 – 10.6	Wijs; or ISO 3961; or AOAC 993.20; or AOCS Cd 1d-1992; or NMKL 39
7	Unsaponifiable matter; max. % (m/m)	0.5	0.5	0.8	ISO 3596; or ISO 18609; or AOCS Ca 6b-53
8	Acid value; mg KOH/g	0.6	4	10	AOCS 3d-63
9	Peroxide value; milli-equivalents peroxide oxygen /kg	Up to 10	Up to 15	Up to 15	AOCS Cd 8b-90; or ISO 3960
10	Moisture and volatile matter at 105 °C; max. % (m/m)	0.2	0.2	0.5	ISO 662
11	Insoluble impurities; max. % (m/m)	0.05	0.05	0.5	ISO 663
12	Soap Content; max. % (m/m)	0.005	-	-	ISO 10539; or AOCS Cc 17-95
13	Polenske value Reichert-Meissl value	13.0 7.5	13.0 6.0 – 8.0	13.0 6.0 – 8.0	AOCS Cd 5-40 or ISO 660
14	Smoke Point (°C)	177	177	177	

5.6 When required, the fatty acid profile of coconut oil given in Table 2, shall be determined by the methods described in Official and Tentative Methods published by American Oil Chemists' Society (latest edition) or alternatively Official Methods of Analysis published by the Association of Official Analytical Chemists (latest edition).

NOTE: The number of double bonds in a molecule is indicated by 0, 1, 2 or 3 following the number of carbon atoms.

Table 2: Fatty acid profile for coconut oil

Fatty acid	%(m/m) of total fatty acid
C6:0 Caprolic	Non Detectable (ND)-0.7
C8:0 Caprylic	4.6 – 10.
C10:0 Capric	5 –- 8
C12:0 Lauric	45.1 – 53.2
C14:0 Myristic	16.8 – 21.0
C16:0 Palmitic	7.5 – 10.2
C16:1 Palmitoleic	ND
C18:0 Stearic	2.0 – 4.0
C18:1 Oleic	5.0 – 10.0
C18:2 Linoleic	1.0 – 2.5
C18:3 Linolenic	ND – 0.2
C20:0 Arachidic	ND – 0.2
C20:1 Gadoleic	ND – 0.2
C22 and higher	ND

5.7 Samples falling within the appropriate ranges specified in Table 2 are in compliance with this standard.

NOTE: Supplementary criteria may be considered, as necessary, to confirm that a sample is in compliance with the standards.

EXAMPLE: national geographical and/or climate variations

6 FOOD ADDITIVES

6.1 In the preparation of coconut oil for commercial sale, all food additives in the product shall:

a) have functional significance;

b) be legally permitted for use with the product in accordance with good manufacturing practice; and

c) be used, whether singly or in combination, in accordance with good manufacturing practices.

6.2 No food additives shall be used in virgin coconut oil.

6.3 The use of food additives in crude and refined coconut oils shall be limited to the types and values specified in 6.3.1 to 6.3.4.

6.3.1 Colours

The following colours are permitted for the purpose of restoring natural loss in processing or the purpose of standardising the colour, as long as the added colour does not deceive or mislead the consumer:

a) Beta-carotene;

b) Canthaxanthine;

c) Beta-apo-8-caratenal; and

d) Methyl and ethyl esters of beta-apo-8-caratenic acid.

6.3.2. Antioxidants

Antioxidants shall be limited to the types and amount specified in Table 3.

Table 3: Recommended permissible antioxidants in coconut oil

Antioxidant	Maximum level
Ascorbyl palmitate and Ascorbyl stearate	500 mg/kg individually or in combination
Mixed tocopherols concentrate	300 mg/kg individually or in combination
Alpha- tocopherol	
Synthetic gamma- tocopherol	
Synthetic delta tocopherol	
Propyl gallate	100 mg/kg
Tertiary hydroxyquinone TBHQ)	120 mg/kg
Butylated hydroxyanisole (BHA)	175 mg/kg
Butylated hydroxytoluene (BHT)	75 mg/kg
Any combination of galletes, BHA, BHT, and/or TBHQ	200 mg/kg but individual limits are not to be exceeded
Dialauryl-thiodipropionatee	200 mg/kg

6.3.3 Antioxidant-synergists

Antioxidant-synergists are permitted to the types and amounts specified in Table 4.

Table 4: Recommended antioxidant-synergist for coconut oil

Antioxidant-synergist	Maximum level
Citric acid	GMP
Sodium dihydrogen citrates and Trisodium citrates	GMP
Isopropyl citrates and Monoglyceride	100 mg/kg individually or in combination

6.3.4 Antifoaming agent

Antifoaming agent shall be limited to polydimethyl siloxane and shall not exceed the limit of 10 mg/kg.

7 CONTAMINANTS

7.1. Heavy metals

Coconut oils shall comply with the maximum levels for heavy metals established by the CODEX Alimentarius Commission for this commodity as per CODEX STAN 193 – General standard for contaminants and toxins in food and feed.

7.2. Pesticide residues

Pesticide residue in coconut oils shall not exceed those maximum pesticide residue limits established by the CODEX Alimentarius Commission for this commodity as per CAC/MRL 1 – Maximum residue limits (MRL) for pesticides.

8 HYGIENE

8.1 It is recommended that coconut oils be prepared and handled in accordance with the requirements of the most recent revision of the CARICOM Regional Code of Practice CRCP 5 – General Principles of Food Hygiene.

8.2 Coconut oils shall comply with any micro-biological criteria established in accordance with the most recent edition of Codex Alimentarius Commission CAC/GL 27 Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods.

9 PACKAGING

9.1 Containers shall be clean, with stoppers or tightly closed lids and shall not leak.

9.2 The containers used should be of food grade quality and inert to coconut oil

9.3 Coconut oil in bulk shall be shipped in vessel deep tanks or wing tanks with steam coils, in tank trucks, in lighter or other appropriate containers.

10 MARKING AND LABELLING

10.1. External packaging for shipping shall be marked in accordance with BZS 1: Part 1: Labelling General Principles, unless otherwise specified.

10.2. Retail containers shall be labelled in accordance with BZS 1: Part 3: Labelling of Pre-Packaged Foods and or national labelling standards for pre-packaged foods.

10.3. Label claims for fortification with vitamins or any other essential food constituent shall be in accordance with the latest edition of the CODEX standard CAC/GL1 General Guidelines on Claims A claim may be made only in cases where a single serving of the product provides one-sixth of the recommended daily dietary allowance of the named vitamin or other essential food constituent.

11 SAMPLING

Product sampling shall be in accordance with ISO 5555, Animal and Vegetable Fats and Oils —Sampling and ISO661, Animal and vegetable fats and oils -- Preparation of test sample

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