SRI LANKA STANDARD 32: 2017

UDC 665: 353.6

SPECIFICATION FOR
COCONUT OIL
(Third Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard
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(Third Revision)

SLS 32: 2017

(Attached AMD 505)

(Incorporated Erratum No.1)

Gr. 6

SRI LANKA STANDARDS INSTITUTION
No 17, Victoria Place
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SRI LANKA

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This Standard does not purport to include all the necessary provisions of a contract.

Sri Lanka Standard
SPECIFICATION FOR COCONUT OIL
(Third Revision)

FOREWORD

This Sri Lanka Standard was approved by the Sectoral Committee on Food Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2017-12-04.

This Standard was first published in 1968 and revised in 1979 and 2002. In this revision, new categories of coconut oil have been introduced under edible and non-edible types. In addition to that, the chromatographic analysis of fatty acid composition has been introduced to assure the purity of coconut oil. Maximum limits for aflatoxins, maximum limits for heavy metals, maximum limits for polycyclic aromatic hydrocarbons and microbiological levels have been introduced to safeguard the quality of coconut oil as well as to protect the consumer.

This Standard is subject to the restrictions imposed under the Coconut Development Act No. 46 of 1971 and the Sri Lanka Food Act No. 26 of 1980 and the regulations framed thereunder.

For the purpose of deciding whether a particular requirement of this Standard is complied with the final value, observed or calculated, expressing the result of a test or an analysis shall be rounded off in accordance with **SLS 102.** The number of significant places to be retained in the rounded off value shall be the same as that of the specified value in this Standard.

In revising this Standard, the assistance derived from the relevant publications of the Codex Alimentarius Commission, Department of Standards Malaysia and Bureau of Product Standards Philippine are gratefully acknowledged.

1 SCOPE

This Standrad prescribes the requirements and methods of test for coconut oil used for edible and non-edible purposes.

2 REFERENCES

Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), 20th Edition, 2016

SLS 102 Rules for rounding off numerical values

SLS 143 Code of practice for general principles of food hygiene

SLS 313 Methods for analysis of animal and vegetable fats and oils

- Part 1/ Section 1 Determination of physical characteristics/ Preparation of test sample
- Part 1/ Section 2 Determination of physical characteristics/ Determination of the relative density at t ^{0}C/ t_0 ^{0}C in air

	Part 1/ Section 4	Determination of physical characteristics/ Determination of Lovibond colour
	Part 1/ Section 5	Determination of physical characteristics/ Determination of refractive index
	Part 2/ Section 1	Determination of chemical characteristics/ Determination of saponification value
	Part 2/ Section 2	Determination of chemical characteristics/ Determination of iodine value
	Part 2/ Section 6	Determination of chemical characteristics/ Determination of acid value and acidity
	Part 3/ Section 4	Determination of foreign substances and parameters affecting quality and stability/ Determination of insoluble impurities content
	Part 3/ Section 5	Determination of foreign substances and parameters affecting quality and stability/ Determination moisture and volatile matter content
	Part 3/ Section 7	Determination of foreign substances and parameters affecting quality and stability/ Determination of peroxide value - Iodometric (visual) end point determination
	Part 3/ Section 14	Determination of foreign substances and parameters affecting quality and stability/ Determination of mineral acids
	Part 3/ Section 15	Determination of foreign substances and parameters affecting quality and stability/ Determination of benzo[a]pyrene - reverse-phase high performance liquid chromatography method
	Part3/ Section 16	Determination of foreign substances and parameters affecting quality and stability/ Determination of polycyclic aromatic hydrocarbons by on-line donor-acceptor complex chromatography and HPLC with fluorescence detection
	Part 4/ Section 2	Determination of principle constituents and natural constituents/ Analysis by gas chromatography of methyl esters of fatty acids
	Part 4/ Section 3	Determination of principle constituents and natural constituents/ Determination of unsaponifiable matter - Method using diethyl ether extraction
SLS 467	Code of Practice for labeling of pre-packaged food	
SLS 516	Methods of test for microbiology of food and animal feeding stuffs	
	Part 2/ Section 2	Horizontal method for the enumeration of yeasts and moulds/ Colony count technique in products with water activity less than or equal to 0.95
SLS 664	Method of sampling animal and vegetable fats and oils	
SLS 962	Method for determination of aflatoxin in foods	

3 DEFINITIONS

For the purpose of this Standard the following definitions shall apply:

3.1 coconut: Fruit of the coconut palm (*Cocos nucifera* Linn.)

3.2 coconut kernel: Endosperm of the coconut consisting of the white meat with its outer brown skin (testa)

3.3 coconut oil: Product obtained from the coconut kernel *(Cocos nucifera* Linn.*)* by a process of expelling with or without heat followed by filtration

3.4 virgin coconut oil: Product obtained from the fresh, mature kernel without testa of the coconut by mechanical processes, with or without the use of heat not exceeding 60 ^{o}C, without undergoing chemical refining, bleaching or deodorizing and which does not lead to the alteration of the nature of the oil.

3.5 whole kernel virgin coconut oil: Product obtained from the fresh, mature kernel of the coconut by mechanical process, with or without the use of heat not exceeding 60 ^{o}C, without undergoing chemical refining, bleaching or deodorizing and which does not lead to the alteration of the nature of the oil

3.6 white coconut oil: Edible grade coconut oil expelled from the mature and dried kernel (copra) which may have been purified by physical processes such as washing, settling, filtration, refrigeration and centrifugation only

3.7 refined and bleached coconut oil: Coconut oil which has been refined by neutralization with alkali/ physical process and bleached with bleaching earth or activated carbon or both, no other chemical agents being used

3.8 refined, bleached and deodorized coconut oil: Coconut oil which has been refined by neutralization with alkali/ physical process and bleached with bleaching earth or activated carbon or both and deodorized with steam, no other chemical agents being used

3.9 edible paring oil: Coconut oil extracted hygienically from the outer layers of the endosperm (testa) in a manner that preserves its natural integrity

3.10 crude coconut oil: Product obtained from the coconut kernel (*Cocos nucifera* Linn.) by a process of expelling with or without heat which is suitable for direct consumption after further processing only

3.11 industrial coconut oil: Non edible oil. This category of oil cannot be further processed for edible purposes

4. TYPES

Coconut oil shall be of the following types.

4.1 Edible type

Edible type shall be of the following categories:

4.1.1 *Coconut oil*
4.1.2 *Virgin coconut oil*
4.1.3 *Whole kernel virgin coconut oil*
4.1.4 *White coconut oil*
4.1.5 *Refined and bleached coconut oil*
4.1.6 *Refined, bleached and deodorized* (*RBD*) *coconut oil*
4.1.7 *Paring coconut oil*

4.2 Non edible type

4.2.1 *Crude coconut oil*
4.2.2 *Industrial coconut oil*

5. REQUIREMENTS

5.1 General requirements

5.1.1 The coconut oil prepared for edible purposes shall be processed, packaged, stored, transported and distributed in accordance with the hygienic conditions prescribed in **SLS 143**.

5.1.2 The edible types of coconut oil shall

a) be free from adulterants, visible sediments, suspended and other foreign matter, separated water, added colouring and flavouring substances and chemicals;

b) have the typical physical characteristics of coconut oil;

c) be clear when heated to a temperature of 30 ^{o}C; and

d) have the characteristic odour and taste of the designated product and shall be free from foreign and rancid odour and taste.

5.2 Fatty acid composition

The product shall conform to the fatty acid composition as given in Table **1**, when tested according to the method given in Column **4** of the table.

TABLE 1 - Fatty acid composition of coconut oil

Sl No (1)	**Fatty acid composition (as methyl esters), percentage by mass** (2)	**Requirement** (3)	**Method of test** (4)
i)	C6:0	ND to 0.7	**SLS 313** Part **4** Section **2**
ii)	C8:0	4.6 to 10.0	
iii)	C10:0	5.0 to 8.0	
iv)	C12:0	45.1 to 53.2	
v)	C14:0	16.8 to 21.0	
vi)	C16:0	7.5 to 10.2	
vii)	C18:0	2.0 to 4.0	
viii)	C18:1	4.5 to 10.0	
ix)	C18:2	1.0 to 2.5	
x)	C18:3	ND to 0.2	

ND – Not detectable (defined as ≤ 0.05)

NOTE
Checking for fatty acids may not be necessary for routine analysis and may be carried out if only required or requested

5.3. Permitted antioxidants

Edible coconut oil, except virgin coconut oil and whole kernel virgin coconut oil may contain permitted antioxidants as prescribed in the relevant regulations of the Food Act.

5.4 Other requirements

The product shall conform to the requirements given in Table **2** or Table **3**, when tested according to the methods given in Column **10** of the Table **2** and column **5** of the Table **3** respectively.

TABLE 2 - Requirements for edible coconut oil

Sl No	Characteristic	Coconut oil	Virgin coconut oil	Whole kernel virgin coconut oil	White coconut oil	Refined and bleached coconut oil	Refined, bleached and deodorized coconut oil	Paring oil	Method of test (SLS 313)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	Relative density at 30 °C/ 30 °C	0.915 to 0.920	0.915 to 0.920	0.915 to 0.920	0.915 to 0.920	0.915 to 0.920	0.915 to 0.920	0.915 to 0.920	Part **1** Section **2**
ii)	Refractive index at 40 °C	1.4480 to 1.4492	1.4480 to 1.4492	1.4480 to 1.4492	1.4480 to 1.4492	1.4480 to 1.4492	1.4480 to 1.4492	1.4480 to 1.4492	Part **1** Section **5**
iii)	Iodine value	7.5 to 11.0	4.1 to 6.0	4.1 to 7.5	7.5 to 11.0	7.5 to 11.0	7.5 to 11.0	9.0 to 16.0	Part **2** Section **2**
iv)	Saponification value	248 to 265	255 to 265	255 to 265	248 to 265	248 to 265	248 to 265	248 to 265	Part **2** Section **1**
v)	Unsaponifiable matter, per cent by mass, max	0.8	0.2	0.2	0.8	0.8	0.5	0.8	Part **4** Section **3**
vi)	Colour 25 mm cell on the Lovibond colour scale expressed in Y+ 5R, not deeper than	5	1	2	4	2	2	5	Part **1** Section **4**
vii)	Moisture & other volatile matter at 105 °C, max.	0.4	0.2	0.2	0.4	0.1	0.1	1.0	Part **3** Section **5**
viii)	Insoluble impurities per cent by mass, max.	0.05	0.05	0.05	0.05	0.05	0.05	0.05	Part **3** Section **4**
ix)	Free fatty acids, calculated as lauric acid per cent by mass, max	0.8	0.2	0.2	0.8	0.1	0.1	1.0	Part **2** Section **6**
x)	Mineral acidity	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Part **3** Section **14**
xi)	Peroxide value meq/ kg, max.	3.0	3.0	3.0	3.0	3.0	3.0	10.0	Part **3** Section **7**

NOTE

Acid value should be tested only if considered as necessary

TABLE 3 – Requirements for non edible coconut oil

Sl No (1)	**Characteristic** (2)	**Crude coconut oil** (3)	**Industrial coconut oil** (4)	**Method of test (SLS 313)** (5)
i)	Relative density at 30 °C/ 30 °C	0.915 to 0.920	0.915 to 0.920	Part **1** Section **2**
ii)	Refractive index at 40 °C	1.4480 to 1.4492	1.4480 to1.4492	Part **1** Section **5**
iii)	Iodine value	7.5 to 11.0	7.5 to 18.0	Part **2** Section **2**
iv)	Saponification value	248 to 265	248 to 265	Part **2** Section **1**
v)	Unsaponifiable matter, per cent by mass, max	0.8	0.8	Part **4** Section **3**
vi)	Colour 25 mm cell on the Lovibond colour scale expressed in Y+ 5R, not deeper than	10	NS	Part **1** Section **4**
vii)	Moisture & other volatile matter at 105 °C, max.	0.5	1.0	Part **3** Section **5**
viii)	Insoluble impurities per cent by mass, max.	0.5	NS	Part **3** Section **4**
ix)	Free fatty acids, calculated as lauric acid per cent by mass, max.	5.0	As traded	Part **2** Section **6**
x)	Mineral acidity	Nil	Nil	Part **3** Section **14**
xi)	Peroxide value meq/ kg, max.	10	NS	Part **3** Section **7**

NS: Not Specified

5.5 Microbiological limits

Coconut oil shall conform to the microbiological limits given in Table **4** when tested according to the method given in Column **4** of the table.

TABLE 4 – Microbiological limits

Sl No (1)	**Test organism** (2)	**Limit** (3)	**Method of test** (4)
i)	Yeasts and moulds, cfu, per g, max.	10.0	**SLS 516: Part 2/ Section 2**

6 CONTAMINANTS

6.1 Aflatoxins

The product shall not exceed the level 5.0 µg/ kg for aflatoxin B_1 and 10.0 µg/ kg for total aflatoxin, when determined according to the method given in **SLS 962**.

6.2 Polycyclic Aromatic Hydrocarbon (PAH)

The product shall not exceed the level 2.0 µg/ kg for Benzo(a)pyrene and 20.0 µg/ kg for the total PAH, when determined according to the methods given in Section **15** and **16** of Part **3** of **SLS 313** respectively.

6.3 Heavy metals

The product shall not exceed the limits given in Table **5**, when tested in accordance with the methods given in Column **4** of the table.

TABLE 5 - Limits for heavy metals

Sl No (1)	**Heavy metal** (2)	**Limit** (3)	**Methods of test** (4)
i)	Arsenic, as As, mg/ kg, max.	0.1	**AOAC 986.15** or **2013.06**
ii)	Lead, as Pb, mg/ kg, max.	0.1	**AOAC 999.11** or **2013.06**
iii)	Cadmium, as Cd, mg/ kg, max	0.1	**AOAC 999.11** or **2013.06**

7 PACKAGING

7.1 The product shall be packaged in appropriate, clean and food grade packages or containers.

7.2 The packaging material which comes into contact directly with the product shall be sufficiently inert to preclude substances from being transferred to food in quantities large enough to endanger human health or to bring about an unacceptable change in the composition of the product or deterioration in its organoleptic properties.

8 MARKING AND/ OR LABELLING

8.1 The following shall be marked or labeled legibly and indelibly on each package or container

a) Name of the product with type;
b) Brand name or trademark, if any;
c) Net content, in ‘ml’ or ‘l’;
d) Name and address of the manufacturer/ processor;
e) Name and address of the packer/ distributor;

f) Batch number or Code number or a decipherable code marking;
g) Date of manufacture;
h) Date of expiry;
j) Date of repacking, if relevant;
k) Declaration of antioxidants added, if any; and
m) Country of origin in case of imported products.

8.2 The marking and labeling shall also be in accordance with **SLS 467**.

9 SAMPLING

9.1 A representative sample of the product for ascertaining conformity to the requirements of this Standard shall be obtained in accordance with the relevant Clauses of **SLS 664**.

The sampling method shall be applied where compliance of a lot to the requirements of this Standard is to be assessed based on statistical sampling and inspection.

Where compliance with this Standard is to be assured based on manufacturer's control systems coupled with type testing and check tests or any other procedure, appropriate method of sampling and inspection shall be adopted.

9.2 Number of tests

9.2.1 Each package/ container selected as in **6.8** of **SLS 664** shall be examined for packaging and marking/ labeling requirements of this Standard.

9.3 The laboratory sample prepared as in **6.9** of **SLS 664** and **SLS 313** Part **1**: Section **1** shall be inspected/ tested for the requirements given in Clause **5** of this Standard.

10 METHOD OF TEST

Tests shall be carried out as prescribed in Sections **2, 4** and **5** of Part **1**, Sections **1, 2** and **6** of Part **2**, Sections **4, 5, 7, 14, 15** and **16** of Part **3,** Sections **2** and **3** of Part **4** of **SLS 313**, Section **2** of Part **2** of **SLS 516**, **SLS 962** and Official Methods of Analysis of the Association of Official Analytical Chemists (**AOAC**).

11 CRITERIA FOR CONFOMITY

A lot shall be declared as conforming to the requirements of this Standard if the following conditions are satisfied:

11.1 Each package/ container examined as in **9.2.1** satisfies the packaging and marking/ labeling requirements of this Standard.

11.2 The test results of the laboratory sample when tested as in **9.3** satisfy the requirements given in Clause **5** of this Standard.

Amendment No: 1 Approved on 2018-08-10 to SLS 32: 2017

AMENDMENT NO: 1 TO SLS 32: 2017
SRI LANKA STANDARD SPECIFICATION FOR COCONUT OIL (THIRD REVISION)

EXPLANATORY NOTE

This amendment is issued after a decision taken by the Working group on Coconut oil, in order to amend the general requirements to avoid using previously used crude coconut oil for refinery purposes and also to amend the maximum level of unsaponifiable matter per cent by mass, of refined and bleached coconut oil.

Amendment No: 1 Approved on 2018-08-10 to SLS 32: 2017

AMENDMENT NO: 1 TO SLS 32: 2017
SRI LANKA STANDARD SPECIFICATION FOR COCONUT OIL
(THIRD REVISION)

Page 6
Clause 5
Insert a new Clause as "**5.1.3**" after Clause 5.1.2 and insert the following sentence.
"Refined and bleached (RB) coconut oil and refined, bleached and deodorized (RBD) coconut oil shall be prepared from the crude coconut oil which is not previously used."

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Table 2
Sl No v), Column No (7)
Replace the value "0.8" by "0.5"

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

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SRI LANKA STANDARDS INSTITUTION

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