SRI LANKA STANDARD 168 : 1999

UDC 661.731 : 663.374.24

SPECIFICATION FOR
COCONUT VINEGAR
(SECOND REVISION)

SRI LANKA STANDARDS INSTITUTION

(Attached AMD 359 and AMD 391)

Gr.5

SRI LANKA STANDARD
SPECIFICATION FOR COCONUT VINEGAR
(SECOND REVISION)

FOREWORD

This Standard was approved by the Sectoral Committee on Agriculture and Food Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 1999-11-11 .

Vinegar is internationally recognized as a condiment and is widely used for culinary purposes. Presence of secondary products generated during fermentation confers upon natural vinegar a 'smoothness', 'bouquet' and aroma which is lacking in the artificial commodity. Coconut vinegar produce in Sri Lanka is categorized into two types, namely : coconut toddy vinegar and coconut water vinegar.

This standard was first published in 1972 and revised in 1996. The second revision was considered to accomodate, particularly the type coconut water vinegar.

Guidelines for the determination of compliance of a lot with the requirements of this standard based on statistical sampling and inspection are given in Appendix **A.**

During the formulation of this specification due consideration has been given to the relevant provisions made under the Sri Lanka Food Act No. 26 of 1980. Specific requirements given in this specification, wherever applicable, are in accordance with the relevant regulations. However, general provisions made under the Sri Lanka Food Act have not been included in this specification and, therefore, the attention of the user of this specification is drawn to these general provisions.

For the purpose of deciding whether a particular requirement of this specification 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 **CS 102.** The number of significant places retained in the rounded off value shall be the same as that of the specified value in the specification.

In revising this specification, the assistance derived from the following publication is gratefully acknowledged:

CODEX STAN 162 - 1987 Vinegar

1 SCOPE

This specification prescribes the requirements and methods of test for coconut vinegar.

2 REFERENCES

CS 102 Presentation of numerical values
SLS 143 General principles of food hygiene
SLS 428 Random sampling methods
SLS 467 Labelling of prepackaged foods

3 DEFINITIONS

For the purpose of this specification, the following definitions shall apply:

coconut toddy vinegar : Coconut vinegar produced by the alcoholic and acetous fermentation of the exudate obtained from the unopened inflorescence of the coconut palm (*Cocos nucifera*) by the process of tapping.

coconut water vinegar : Coconut vinegar produced by the alcholic and acetous fermentation of the coconut water (enriched with sucrose) from mature nuts of the coconut palm (*Cocos nucifera*).

4 REQUIREMENTS

4.1 The product shall be manufactured and packed under hygienic conditions as prescribed in **SLS 143.**

4.2 The product shall have a characteristic aroma and taste. It shall be free from any objectionable odours and from foreign matter.

4.3 The product shall not contain any added colouring matter other than caramel.

4.4 The product shall not contain any acid other than acetic acid and acids produced during normal fermentation process involved in its production.

4.5 The product shall be free from vinegar eels. It shall also be free of sediments.

4.6 The product shall conform to the requirements given in Table **1** when tested as given in Column 4 of the table.

TABLE 1 - Requirements for coconut vinegar

Sl. No. (1)	Characteristic (2)	Requirement (3)	Method of test (4)
i	Total acidity, as acetic acid, g per 100 ml, min.	04	Appendix **B**
ii	Total solids, g per 1 0 ml , min.	01	Appendix **C**
iii	Permanganate oxidation value, min.	750	Appendix **D**
iv	Alkaline oxidation value, min.	80	Appendix **D**
v	Iodine value, min.	160	Appendix **D**
vi	Residual ethyl alcohol, per cent by volume, max.	01	Appendix **E**

5 PACKAGING

The product shall be filled in suitable clean containers of food grade quality which does not affect the quality of the product. The containers shall be properly sealed.

6 MARKING

6.1 Each container shall be marked or labelled legibly and indelibly with the following:

a) Name of the product as COCONUT TODDY VINEGAR or COCONUT WATER VINEGAR
b) Brand name/trade mark, if any;
c) Net contents, in millilitres or in litres;
d) Name and address of the manufacturer and/or distributor (including the country of origin);
e) Batch/code number; and
f) Date of manufacture.

6.2 Marking and labelling shall also be in accordance with **SLS 467.**

NOTE

Attention is drawn to the certification facilities offered by the Sri Lanka Standards Institution. See the inside back cover of this standard.

7 METHODS OF TEST

Tests shall be carried out as given in Appendices **B** to **E** of this specification.

APPENDIX A
COMPLIANCE OF A LOT

The sampling scheme given in this Appendix should 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 schemes of sampling and inspection should be adopted.

A.1 LOT

In any consignment all the containers of coconut vinegar belonging to one batch of supply or manufacture shall constitute a lot.

A.2 SCALE OF SAMPLING

A.2.1 Samples shall be tested from each lot for ascertaining conformity to the requirements of this specification.

A.2.2 The number of containers to be selected from a lot shall be in accordance with Table **2**.

TABLE 2 - Scale of sampling

Number of containers in the lot (1)	**Number of containers to be selected (2)**
Up to 25	01
26 to 100	05
101 to 500	07
501 to 1 000	09
1 001 and 5 000	11
5 001 and above	13

A.2.3 The containers shall be selected at random. In order to ensure randomness of selection random numbers as given in **SLS 428** shall be used.

A.3 NUMBER OF TESTS

A.3.1 Each container selected as in **A.2.2** shall be inspected for packaging and marking requirements.

A.3.2 Each container inspected as in **A.3.1** shall be tested for the requirements given in **4.2** to **4.5.**

A.3.3 A composite sample shall be prepared by taking approximately equal quantities of coconut vinegar from each container tested as in **A.3.2** and the composite sample thus prepared shall be tested for the requirements given in **4.6.**

A.4 CRITERIA FOR CONFORMITY

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

A.4.1 Each container inspected as in **A.3.1** satisfies the relevant requirements.

A.4.2 Each container tested as in **A.3.2** satisfies the relevant requirements.

A.4.3 The composite sample tested as in **A.3.3** satisfies the relevant requirements.

APPENDIX B
DETERMINATION OF TOTAL ACIDITY

B.1 REAGENTS

B.1.1 Sodium hydroxide, c(NaOH) = 0.5 mol/l, standardized.

B.1.2 Phenolphthalein,

B.2 PROCEDURE

Take 10 ml of well mixed sample in a porcelain basin and dilute with water. Add few drops of phenolphthalein **(B.1.2).** Titrate with sodium hydroxide **(B.1.1).**

B.3 CALCULATION

Total acidity, as acetic acid, g per 100 ml = 0.3V

where,

V is the volume, in ml, of sodium hydroxide required for the titration.

APPENDIX C
DETERMINATION OF TOTAL SOLIDS

C.1 APPARATUS

C.1.1 Dishes, platinum or stainless steel

C.1.2 Oven, maintained at 100 ± 5 °C.

C.2 PROCEDURE

Weigh a dried dish **(C.1.1)** to the nearest milligram. Transfer 25 ml of the clear sample (filtered if necessary) into the weighed dish. Evaporate to dryness. Add 10 ml of water and evaporate. Add two more 10-ml portions of water and evaporate to dryness. Dry in the oven **(C.1.2)** for 3 hours. Cool in a desiccator and weigh.

C.3 CALCULATION

Total solids, g per 100 ml $= 4\ (m_2 - m_1)$

where

m_1 is the mass, in g, of the dish; and
m_2 is the mass, in g, of the dish with residue.

APPENDIX D
DETERMINATION OF PERMANGANATE OXIDATION VALUE ALKALINE OXIDATION VALUE AND IODINE VALUE

D.1 PREPARATION OF SAMPLE FOR ANALYSIS

Distil 60 ml of the sample from a 350-ml flask fitted with a small tap funnel. When 45 ml of distillate has come over, add 15 ml of water to the flask via the funnel and distil further 15 ml to give a total volume of 60 ml distillate.

D.2 DETERMINATION OF PERMANGANATE OXIDATION VALUE

Permanganate oxidation value is the number of millilitres of 0.02 mol/l potassium permanganate used by 100 ml of sample in 30 minutes under standard conditions.

D.2.1 Procedure

Add 5 ml of distillate to a 250-ml glass-stoppered bottle. Add 10 ml of 25 per cent sulfuric acid and exactly 15 ml of 0.02 mol/l potassium permanganate. Allow to stand for 30 minutes. Add 5 ml of 10 per cent potassium iodide solution. Titrate the liberated iodine with 0.02 mol/l sodium thiosulfate using starch near the end point. Carry out a blank simultaneously.

D.2.2 Calculation

Permanganate oxidation value = $40\ (V_2 - V_1)$

where,

V_1 is the volume, in ml, of sodium thiosulfate solution used in the titration; and
V_2 is the volume, in ml, of sodium thiosulfate solution used in the blank.

D.3 DETERMINATION OF ALKALINE OXIDATION VALUE

Alkaline oxidation value is the number of parts by mass of oxygen required to oxidise 1 00 000 parts of sample under standard conditions.

D.3.1 Procedure

Add 2 ml of distillate to a 250-ml glass-stoppered bottle. Add 100 ml of distilled water, 10 ml of 10 per cent sodium hydroxide and exactly 10 ml of 0.02 mol/l potassium permanganate. Allow to stand for 30 minutes. Acidify with 10 ml of 25 per cent sulfuric acid. Add 0.5 g of potassium iodide and titrate the liberated iodine with 0.02 mol/l sodium thiosulfate using starch near the end point. Carry out a blank simultaneously.

D.3.2 Calculation

Alkaline oxidation value $= 8 (V_4 - V_3)$

where,

V_3 is the volume, in ml, of sodium thiosulfate solution used in the titration; and
V_4 is the volume, in ml, of sodium thiosulfate solution used in the blank.

D.4 DETERMINATION OF IODINE VALUE

Iodine value is the number of millilitres of 0.01 mol/l iodine absorbed by 100 ml of sample under standard conditions.

D.4.1 Procedure

Add 5 ml of distillate to a 250-ml glass-stoppered bottle. Make just neutral to litmus with 10 mol/l potassium hydroxide. Add 10 ml of 1 mol/l of potassium hydorxide and exactly 10 ml of 0.1 mol/l iodine. Allow to stand in the dark for 15 minutes. Add 10 ml of 25 per cent sulfuric acid and titrate the liberated iodine with 0.02 mol/l sodium thiosulfate using starch near the end point. Carry out a blank simultaneously.

D.4.2 Calculation

Iodine value $= 40 (V_6 - V_5)$

where,

V_5 is the volume, in ml, of sodium thiosulfate solution used in the titration; and
V_6 is the volume, in ml, of sodium thiosulfate solution used in the blank.

APPENDIX E
DETERMINATION OF RESIDUAL ETHYL ALCOHOL CONTENT

E.1 APPARATUS

E.1.1 Standard flask 100-ml, calibrated at 26 °C.

E.1.2 Digestion apparatus, 500-ml flask connected through a bulb to vertically assembled Liebig condenser with jacket about or more than 400 mm long, internal diameter of the inner tube 9± 1 mm, with an adapter. Joints may be natural rubber.

E.2 DETERMINATION

Fill dry and clean standard flask **(E.1.1)** with the sample. Adjust to volume at 26 °C. Transfer to digestion flask (just previously rinsed with cold water) containing few glass beads. Rinse the standard flask three times using a total of 25 ml of cold water, adding rinse water to the flask. Neutralize with 50 per cent sodium hydroxide to phenolpthalein.

Place wet standard flask so that adapter extends just into the bulb. Surround the standard flask with ice or ice-water. Complete connections and pass through condenser a rapid stream of water kept below 25 °C at the outlet.

Distil approximately 96 ml at a uniform rate in about 30 minutes. Remove and stopper the standard flask. Mix distillate by swiriling. Wash down any drops above graduation mark with water. Immerse in a water bath at 26 ± 2 °C for 30 minutes.

Carefully dilute to volume with the aid of a capillary tube, by adding water previously boiled and cooled to 26 °C. Determine specific gravity of the distilate at 26 °C. Obtain corresponding alcohol percentage (V/V) at 15.56 °C using Table **3.**

TABLE 3 - Percentage (V/V) of ethyl alcohol at 15.56 °C corresponding to specific gravity at various temperatures (°C)

Specific gravity	24/24	25/25	26/26	28/28	30/30
1.0000	0.00	0.00	0.00	0.00	0.00
0.9999	.07	.07	.07	.07	.07
98	.13	.13	.13	.13	.13
97	.20	.20	.20	.20	.20
96	.26	.26	.26	.26	.26
95	.33	.33	.33	.33	.33
94	.40	.40	.40	.40	.40
93	.46	.46	.46	.46	.46
92	.53	.53	.53	.53	.53
91	.60	.60	.60	.60	.60
90	.66	.66	.66	.66	.66
89	.73	.73	.73	.73	.73
88	.80	.80	.80	.79	.79
87	.87	.87	.87	.86	.86
86	.93	.93	.93	.93	.93
85	1.00	1.0	1.00	.99	.99
84	.07	.07	.07	1.06	1.06
83	.13	.13	.13	.13	.13
82	.20	.20	.20	.20	.19
81	.27	.27	.27	.26	.26

E.3 CALCULATION

$$\text{Residual ethyl alcohol, per cent by volume, at 15.56 °C} = \frac{d\ m}{m_o}$$

where,

d is the per cent, by volume, of ethyl alcohol in the distillate at 15.56 °C;
m is the mass, in g, of 100 ml of water at 15.56 °C; and
m_o is the mass, in g, of 50 ml of water at 15.56 °C.

AMENDMENT NO : 1 TO SLS 168 : 1999
SPECIFICATION FOR COCONUT VINEGAR
(SECOND REVISION)

EXPLANATORY NOTE

This amendment to be issued on the recommendation made by the Sectoral Committee on Food and Agriculture Technology and in addition it is necessitated to be inline with the Food (Labelling and Advertising) Regulation, No 1376/9, 2005.
In this amendment it is subject to change the name of the product to read as "COCONUT VINEGAR" with an additional requirement as bellow;

The statement "manufactured from coconut toddy" or "manufactured from coconut water", and in terms of the rest of the marking requirements to be amended inline with the above Regulation including the "Date of expiry".

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Clause 6 Marking

Substitute the existing sub clause 6.1 with the following :

a) Name of the product ; as COCONUT VINEGAR ;
b) Brand name or trade name, if any ;
c) Net contents, in "ml" or "l" ;
d) The statement "manufactured from coconut toddy" or "manufactured from coconut water" ;
e) Name and address of the manufacturer and packer or distributor in Sri Lanka ;
f) Batch number or code number or a decipherable code marking ;
g) Date of manufacture ;
h) Date of expiry ; and
j) Country of origin, in case of imported products.

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AMD 391

AMENDMENT NO : 02 TO SLS 168 : 1999
SPECIFICATION FOR COCONUT VINEGAR (SECOND REVISION)

EXPLANATORY NOTE

It was felt that the calculation part of the method given under Appendix E is not compatible with the procedure and it may cause to confuse the user. Furthermore the calibration temperature of the given method has been restricted to 26^{o}C which requires the laboratory to be conditioned.

Therefore an AOAC method which is more comprehensive and flexible with respect the calibration temperature is adopted to replace the method given under Appendix E by the issue of this amendment.

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Table 1 – Requirements for coconut vinegar

Column (4), SI. No. vi

Delete “Appendix E”, Replace with “AOAC 930.35”.

SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.

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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