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DRAFT STANDARD FOR PUBLIC COMMENT

(වෙනස්වීමට ඉඩ ඇත. திருத்தத்திற்குட்படக்கூடியது. Liable to alteration)

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வெளியீட்டுத் திகதி
Date of Issue } 2024-12-06

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SLSI SRI LANKA STANDARDS INSTITUTION
GUARDIAN OF QUALITY

Draft Sri Lanka Standard
SPECIFICATION FOR TODDY PART 1: COCONUT TODDY
(DSLS..... : .....)

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இவ்வரைவு இலங்கைக் கட்டளையெனக் கருதப்படவோ அன்றிப் பிரயோகிக்கப்படவோ கூடாது
This draft should not be regarded or used as a Sri Lanka Standard.

අදහස් එවිය යුත්තේ : ශ්‍රී ලංකා ප්‍රමිති ආයතනය, 17, වික්ටෝරියා පෙදෙස, ඇල්විටිගල මාවත, කොළඹ 08.

Comments to be sent to: SRI LANKA STANDARDS INSTITUTION, 17, VICTORIA PLACE, ELVITIGALA MAWATHA, COLOMBO 08.

හැඳින්වීම

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Introduction

This Draft Sri Lanka Standard has been prepared by the Sri Lanka Standards Institution and is now being circulated for technical comments to all interested parties.

All comments received will be considered by the SLSI and the draft if necessary, before submission to the Council of the Institution through the relevant Divisional Committee for final approval.

The Institution would appreciate any views on this draft which should be sent before the specified date. It would also be helpful if those who find the draft generally acceptable could kindly notify us accordingly.

All Communications should be addressed to:

The Director General
Sri Lanka Standards Institution,
17, Victoria Place,
Elvitigala Mawatha,
Colombo 08.

Draft Sri Lanka Standard
SPECIFICATION FOR TODDY
PART 1: COCONUT TODDY

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 ……

Coconut toddy is a milky white drink obtained by tapping immature coconut inflorescence. The coconut sap has to undergo alcoholic fermentation. Composition of the coconut toddy depends on the age of the coconut tree, season, the time of tapping and conditions of storage.

This Standard is subject to the restrictions imposed under the Excise Ordinance and the regulations framed thereunder as well as the relevant regulations under the Consumer Affairs Authority Act.

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

In the preparation of this Standard, valuable assistance derived from the following publications is gratefully acknowledged.

IS 6749: 1972	Glossary of terms relating to alcohol (Ethyl) industry and trade
Title 27/ Chapter 1/ Section 5.22	Code of Federal Regulations, Federal Register, Government of United States
Volume 2/ Chapter 4 and 7	The Beverage Alcohol Manual, Alcohol and Tobacco Tax and Trade Bureau, U S Department of the Treasury

1 SCOPE

1.1 This Standard prescribes requirements and methods of sampling and test for coconut toddy.

1.2 This Standard does not cover sweet coconut toddy and unfermented sap.

2 REFERENCES

SLS	102	Presentation of numerical values
SLS	143	General principles of food hygiene
SLS	290	Glass liquor bottles
SLS	428	Random sampling methods

American Association of Cereal Chemists Approved Methods (AACC) 11th edition Volume 2, 2010
Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), 21st Edition, 2019
Standards Methods for the Examination of Water and Wastewater, 21st edition (2005) published by American Public Health Association, USA (APHA)

3 DEFINITIONS

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

3.1 coconut toddy: Naturally fermented sap of exudate from the partially mature inflorescence of the coconut (*Cocos nucifera* L.) palm (Sinhala: පොල්/ Pol; Tamil: தேங்காய்/ Tenkay)

3.2 sweet coconut toddy: Naturally partially fermented sap containing 0.5 to 4.9 per cent v/v exudate from the partially mature inflorescence of the coconut (*Cocos nucifera* L.) palm

3.3 unfermented sap: Unfermented sap containing less than 0.5 per cent v/v exudate from the partially mature inflorescence of the coconut (*Cocos nucifera* L.) palm

4 INGREDIENT

Sap of the inflorescence coconut

5 REQUIREMENTS

5.1 Hygiene

The product shall be processed, packaged, stored and distributed under hygienic conditions as prescribed in **SLS 143**.

5.2 Taste, aroma and colour

The product shall have the characteristic taste, aroma and colour to the coconut toddy.

5.3 Foreign matter

Coconut toddy shall be free from foreign matter and adulterants.

5.4 Ethyl alcohol content

The Ethyl alcohol content in coconut toddy shall be in the range of 5.0 per cent to 8.0 per cent by volume, when determined according to the method prescribed in Appendix **B**. The tolerance limits for Ethyl alcohol content shall be ± 0.2 per cent of the declared strength.

5.5 Other requirements

The product shall conform to the requirements specified in Table **1**, when tested according to the method prescribed in Column **4** of the table.

Table 1 – Requirements for coconut toddy

Sl No (1)	Characteristic (2)	Requirement (3)	Method of test (4)
i)	Total solids, per cent by mass, max.	6.0	Appendix **C**
ii)	Total acids as Acetic acid, per cent by mass, max.	0.6	Appendix **D**
iii)	Conductivity, mS/ cm	4.0 – 7.0	**APHA 2510 B**
iv)	Turbidity, NTU, max.	2000	**APHA 2130 B**
v)	Total ash, per cent mass by volume, max.	0.5	Appendix **E**
vi)	Sulphated ash, per cent mass by volume	0.4 - 0.6	Appendix **F**
vii)	Sucrose, per cent mass by volume, max.	0.2	**AACC Method 80-04: 2010** (HPLC/ RI Detection)
viii)	Fructose, per cent mass by volume, max.	2.0	**AACC Method 80-04: 2010** (HPLC/ RI Detection)
ix)	Glucose, per cent mass by volume, max.	2.0	**AACC Method 80-04: 2010** (HPLC/ RI Detection)
x)	Original extract, mass by volume, min.	15.0	Appendix **G**

7 CONTAMINANTS

7.1 Potentially toxic elements

The product shall not exceed the limits given in Table **2**, when tested according to the methods given in Column **4** of the table.

TABLE 2 – Limits for potentially toxic elements

Sl No (1)	Potentially toxic element (2)	Limit (3)	Method of test (4)
i)	Arsenic, as As, mg/ kg, max.	0.10	**AOAC 2013.06**
ii)	Mercury, as Hg, mg/ kg, max.	0.10	**AOAC 2013.06**
iii)	Lead, as Pb, mg/ kg, max.	0.10	**AOAC 2013.06**
iv)	Cadmium, as Cd, mg/ kg, max.	0.01	**AOAC 2013.06**

7.2 Methyl alcohol content

The limit of Methyl alcohol shall not exceed 2 mg/ L of absolute alcohol when tested according to the method prescribed in **AOAC 972.11**.

7.3 Microbiological limits

The product shall conform to the limits given in Table **3**, when tested in accordance with the methods prescribed in Column **4** of the table.

TABLE 3 - Microbiological limits

Sl No	Organism	Limit	Method of Test
(1)	(2)	(3)	(4)
i)	*Escherichia coli*, (MPN), per g, max.	Absent	**SLS 516: Part 12**
ii)	*Salmonella* spp., in 25 g	Absent	**SLS 516: Part 5**

8 PACKAGING

8.1 The product shall be filled in glass bottles conforming to **SLS 290** or neutral or non-reactive suitable food grade containers. The bottles/ containers shall be closed with a metal closure with any other suitable food grade closure.

8.2 All containers shall be clean and free from chips, cracks and any other defects and appropriately sealed. All glass bottles shall be subjected to cleansing and sanitizing process before filling.

8.3 The bottles or containers shall be packed in wooden cases, wooden crates, plastic crates, metal crates, corrugated fiber boxes or any package as agreed to between the purchaser and the supplier.

9 MARKING AND/ OR LABELLING

The following shall be marked or labelled legibly and indelibly on each bottle/ container.

a) Common name of the product as “Coconut toddy”;
b) Name and address of the manufacturer and/ or distributor;
c) Brand name or trade mark, if any;
d) Alcohol content per cent (v/ v);
e) Batch number or code number or a decipherable code marking;
f) Net content in “mL”, “cL” or “L”;
g) Date of packaging;
h) Date of expiry; and
j) Country of origin.

10 METHODS OF TEST

Tests shall be carried out as given in Appendix **B** to **G** of this Standard, Part **5** and **12** of **SLS 516**, American Association of Cereal Chemists Approved Methods (**AACC**) 11th edition volume 2, 2010, Official methods of Analysis, Association of Official Analytical Chemists (**AOAC**) official methods of analysis 21st edition 2019 and Standards Methods for the Examination of Water and Wastewater 21st edition (2005) published by American Public Health Association USA (**APHA**).

11 CRITERIA FOR CONFORMITY

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

11.1 All the bottles or containers examined as in **A.5.1** satisfy packaging and marking and/ or labelling requirements.

11.2 The volume of each bottle or container measured as in **A.5.2** does not vary by more than 1 per cent of declared volume and the total volume of 12 bottles does not vary by more than ± 0.3 per cent of the total declared volume.

11.3 The test results on individual samples tested as in **A.5.3** satisfy the relevant requirements.

11.4 The composite sample tested as in **A.5.4** satisfies the relevant requirements.

11.5 In-case of samples drawn from bulk containers or vats and tested as in **A.5.5** satisfy all the relevant requirements of this Standard.

APPENDIX A
SAMPLING

A.1 LOT

In any consignment all the bottles or containers of the same size containing coconut toddy of the same type from one batch of manufacture shall constitute a lot.

A.2 GENERAL REQUIREMENTS

In drawing, preparing, handling and storing samples, the following precautions and directions shall be observed.

A.2.1 Samples shall be taken in a protected place not exposed to damp air, dust and soot.

A.2.2 The sampling instruments used shall be clean and dry.

A.2.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from extraneous contamination.

A.2.4 The sample shall be marked with the following information.

a) Sample number or other identification marks;
b) Name of the product;
c) Batch or code number;
d) Year of bottling;
e) Date of sampling;
f) Place of sampling;
g) Name and signature of the person drawing the sample; and
h) Signature of the person or his representative on whose premises the sample was taken.

A.2.5 Samples shall be stored in a cool, dark and dry place.

A.3 SAMPLING INSTRUMENTS

A.3.1 The following forms of sampling instrument may be used.

a) Weighed sampling can; and
b) Sampling tube.

A.3.2 All the material used for fabricating the sampling instrument shall be such as not to contaminate or chemically affect the sample or the material being sampled.

A.3.3 Samples for microbiological analysis shall be drawn aseptically by using sterile sampling instruments.

A.4 SCALE OF SAMPLING

A.4.1 Sampling from bulk container or vat

A.4.1.1 One sample shall be taken from each bulk container or vat using an appropriate sampling instrument and transferred to the sample container.

A.4.1.2 Each sample container shall be sealed air-tight with a suitable stopper after filling.

A.4.1.3 Before drawing the sample, the material shall be thoroughly mixed by stirring.

A.4.1.4 Samples shall be placed below 4 °C in suitable clean, dry, air-tight glass containers and shall be brought to the testing laboratory within 12 hours of sampling.

A.4.1.5 The sample containers shall be of such a size that sufficient head space is left to allow for expansion of the liquid after pouring in the sample.

A.4.1.6 Each sample shall be individually tested for all the relevant requirements of this Standard.

A.4.2 Sampling from retail bottles or containers

A.4.2.1 The samples shall be selected and tested from each lot separately for ascertaining their conformity to the requirements of this Standard.

A.4.2.2 The number of bottles or containers to be selected from a lot shall be in accordance with Table 3.

TABLE 3 - Scale of sampling

Number of bottles or containers in the lot (1)	Number of bottles or containers to be selected (2)
up to 1 000	8
1 001 to 3 000	10
3 001 to 10 000	13
10 001 and above	15

A.4.2.3 In addition to the bottles or containers drawn as in **A.5.1.2** another 12 bottles or containers shall be drawn from each lot to determine the volume of the contents of the bottles or containers.

A.4.2.4 The bottles or containers shall be selected at random, in order to ensure randomness of selection, random number tables as given in **SLS 428** shall be used.

A.4.2.5 If a reference sample is required, the scale of sampling shall be correspondingly increased and one third of the sample retained by the purchaser, one third by the testing authority (or referee) for future reference and one third handed over to the supplier.

A.5 NUMBER OF TESTS

A.5.1 All the bottles or containers in the sample selected as in Clause **A.4.2.2** shall be examined for packaging and marking and/ or labelling requirements.

A.5.2 The volume of the contents of 12 bottles or containers selected as in Clause **A.4.2.3** shall be measured. (This may be done at the place of sampling). The volume shall be measured at 27 ± 2 °C.

A.5.3 After examining as in Clause **A.5.1**, each bottle or container shall be individually tested for the requirements given in Clauses **5.2**, **5.3**, **5.4** and **5.5**.

A.5.4 After testing as in **A.5. 3**, an equal quantity of material shall be drawn from each bottle or container and mixed together to form a composite sample. Test for potentially toxic elements given in Clause **7** shall be done on this composite sample.

A.5.5 Each sample as selected in **A.4.1.1** from bulk containers or vats shall be individually tested for all the relevant requirements of this Standard.

APPENDIX B
DETERMINATION OF ETHANOL CONTENT

B.1 METHOD 1 – GAS CHROMATOGRAPHY METHOD (REFERENCE METHOD)

B.1.1 Principle

Ethanol is analyzed by Gas Chromatography – Flame ionization or suitable detector, on a capillary column, under specified conditions.

B.1.2 Apparatus

B.1.2.1 *Volumetric flask* - 10 mL

B.1.2.2 *Micro pipette* – 1000 µL

B.1.2.3 *Centrifuge*

B.1.2.4 *Gas Chromatograph*, recorder and integrator with an injector for capillary columns facility, flame ionization or suitable detector and a temperature program. Column shall be made of an inert material such as glass, stainless steel, silica or fused silica (Column shall be HP-wax or DB–wax or equivalent) and the internal diameter shall be 0.2 mm - 0.5 mm and length shall be 15 m -100 m. Suitable stationary phase such as polyethylene glycol or equivalent shall be used.

B.1.3 Reagents

B.1.3.1 *Absolute Ethanol*, AR grade, with known purity > 99.9%

B.1.3.2 *Internal standard (n-propanol)*, AR grade, with known purity > 99.9%

B.1.3.3 *Distilled water*

B.1.3.4 *Carrier gas*, Helium, Nitrogen, Hydrogen according to the type of detector, purity ≥ 99.9995%

B.1.3.5 *Auxiliary gases*, any gases suitable for the detector used. For a flame ionization detector Hydrogen and dry air of suitable purity

B.1.4 Procedure

B.1.4.1 Preparation of standard and internal standard solutions

B.1.4.1.1 Standard solution, Take 1.0 mL alcohol (B.3.1) as the standard solution and 0.5 mL of an internal standard (B.3.3) into a 10 mL volumetric flask. (Final concentrations are 10 percent for alcohol and 5 percent for n-propanol). Top up with distilled water to the mark. Freshly prepare the duplicate solution. Transfer into GC vials and inject 0.1 µL - 0.4 µL of clear standards to Gas Chromatograph based on intensity of the peak in chromatogram.

B.1.4.2 Sample preparation

Gently shake (do not shake up and down) the container before opening. Open the container and withdraw the required portion of sample and filter if necessary by using filter paper into a screw capped glass or plastic bottle. From the sample portion withdraw 1.0 mL of sample and add 0.5 mL of internal standard (n-propanol) into a 10.0 ml of volumetric flask. Top up to the 10.0 mL mark with distilled water. Mix very gently. If sample is turbid then centrifuge the solution at 5000 - 6000 rpm for 10 - 15 minutes to have a clear solution. Filter with suitable 0.45 µm syringe filter into the vials and inject 0.1 µL - 0.4 µL of clear samples to Gas Chromatograph. Use same injection volume used for standards.

B.1.4.3 Chromatographic Analysis

Carry out the chromatographic procedure at suitable conditions, maintain inlet and detector end at 220 ^{0}C (or suitable temperature condition) and maintain oven temperature at 40 ^{0}C or suitable isothermal temperature to resolve Ethanol from other alcohols.

B.1.5 Calculation

B.1.5.1 Calculation of Response Factors (R_F) – Ethanol

Inject 0.1 µL - 0.4 µL to Gas Chromatograph from the duplicate solutions prepared under **B.4.1.1** and **B.4.1.2** and calculate the R_F value for Ethanol (R_F) as follows;

NOTE

Calculate the mean value of duplicate values and record as R_F values for standard.

R_F value for Ethanol (R_F);

R_F value for Ethanol (R_F); $R_{F1} = \frac{A_I \times V_e}{Ae \times V_I}$

where,
A_I is the peak area of internal standard in reference standard solutions
A_e is the peak area of ethanol in standard solution 1;
V_e is the volume, in milliliters, of ethanol in standard solution 1; and
V_I is the volume, in milliliters, of internal standard in standard solutions.

B.1.5.2 Calculation of ethanol

Inject 0.1 µL - 0.4 µL to Gas Chromatograph from the duplicate solutions prepared under **B.4.2.1** and calculate the Ethanol as follows;

$$\text{Ethanol content } (\%_{v/v}) = \frac{A_e \times R_{F1} \times V_I \times 100}{A_1 \times V_e}$$

B.2 METHOD 2 – PYCNOMETER METHOD (ROUTINE METHOD)

B.2.1 Apparatus

B.2.1.1 Assemble the distillation setup as shown in Figure **1**. The delivery end of the condenser is attached to a glass tube with a bulb by means of a ground glass joint. The lower part of this tube should reach the bottom of the receiver and dip into the minimum quantity of distilled.

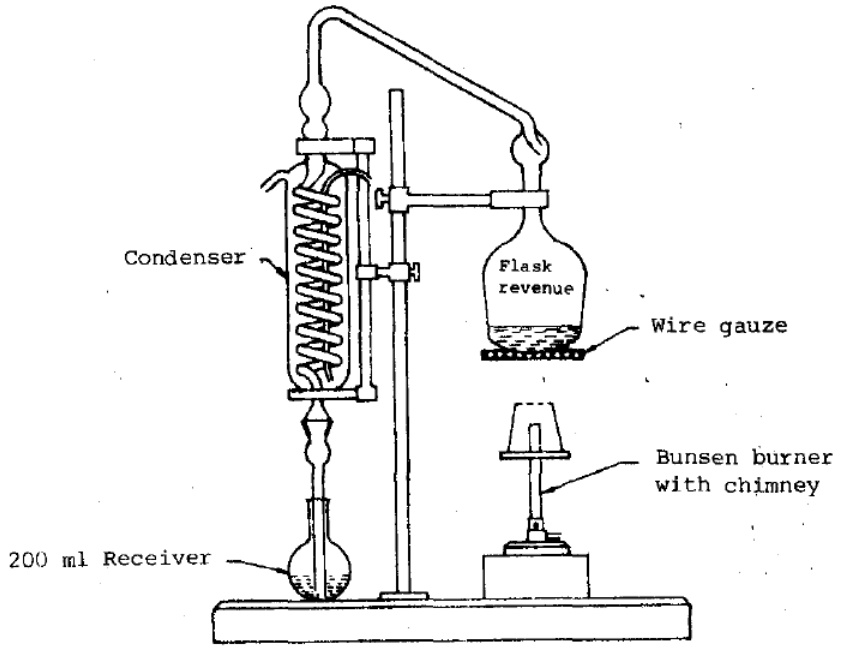

FIGURE 1 – Distillation Assemble

B.2.1.2 *Pycnometer* (specific gravity bottle), 25-ml or 50-ml

B.2.1.3 *Thermometer* 0 ℃ to 50 ℃

B.2.1.4 *Standard volumetric flask*, 200-ml

B.2.2 Procedure

B.2.2.1 Take, 200 ml of sample in a 500-ml distillation flask containing about 25 ml of water and a few pieces of pumice stone. Complete the distillation in about 35 minutes and collect the distillate in a 200-ml standard volumetric flask till the volume on the flask nears the mark. Allow the distillate to come to room temperature and make up the volume to 200 ml and mix thoroughly.

B.2.2.2 Determine the specific gravity of the distillate at 27 ± 2 ℃ with the help of the pycnometer. Obtain percentage of alcohol by volume from the tables (**52.003**) of **AOAC** (Association of Official Analytical Chemists) official methods of analysis, 21st edition, 2019.

B.3 METHOD 3 – ALCOLIZER METHOD (ROUTINE METHOD)

B.3.1 Apparatus

B.3.1.1 Alcolizer

B.3.1.2 Sample tubes 15 ml (glass)

B.3.2 Procedure

B.3.2.1 Open the corresponding sample file (previously created). Select the method (previously store in machine). Place five or six sample tubes filled with distilled water in the auto sampler. Carry out the rinsing procedure. After finishing the rinsing procedure carry out the water check with three tubes of distilled water. If water check pass, then analysis can be started. Otherwise repeat same procedure until that test pass. Analysis can be carried out using sample as it is. Fill three sample tubes with the sample to be determined alcohol content as ethyl alcohol. After finish sample aspiration process the density meter gives the alcohol strength as volume by volume, alcohol strength of the unknown sample can be obtained.

B.3.2.2 Aspiration procedure:
Immerse the needle in the sample tube with adequate amount of sample (15 mL). Place the pump lever in the vertical position and pump the sample into the measuring cell. Avoid air bubbles in the suction process. At the end of the filling, take the constant value display on the screen as the percentage of alcohol as volume by volume.

B.4 METHOD 4 – EBULLIOMETER METHOD (ROUTINE METHOD)

B.4.1 Apparatus

B.4.1.1 Ebulliometer
B.4.1.2 Bunsen burner or sprit lamp

B.4.2 Reagents

B.4.2.1 Distilled water

B.4.3 Procedure

Add distilled water up to the water level marked in the sample tube. Pour water into the boiling compartment of the meter and allow it to boil. Read the temperature once the Mercury level of the thermometer becomes stationary. Set the zero position on the scale according to the water boiling temperature. Fill the sample up to the sample level marked in sample tube. Pour the sample into the boiling compartment of the meter and allow it to boil. Read the temperature once the Mercury level of the thermometer becomes stationary.

Read the alcohol strength (v/v) using the above scale.

B.5 METHOD 5 – DENSITY METER METHOD (ROUTINE METHOD)

B.5.1 Apparatus

B.5.1.1 *Density meter* DMA 4100M
The hardware of the instrument is mainly composed with Xsample 22 sample filling unit and Xsample 52 sample handling unit acting as the supportive hardware units for the alcohol determination process.

B.5.1.2 *Waste vessel*

B.5.1.3 *Sample vessel*

B.5.2 Procedure

B.5.2.1 Assemble the apparatus.

B.5.2.2 First, immerse the needle in the sample vessel with adequate amount of sample. Place the pump lever in the vertical position and pump the sample into the measuring cell. Avoid air bubbles in the suction process. At the end of the filling, take the constant value displayed on the screen as the percentage value of ethyl alcohol.

NOTE
In-case of any dispute, the reference method should consider for decision making activities.

APPENDIX C
DETERMINATION OF TOTAL SOLIDS

C.1 PROCEDURE

Evaporate 25.0 ml of the sample in a dried, tared dish on a water bath. Dry the dish in an air-oven at 103 ± 2℃ for 2 hours. Cool in a desiccator and weigh the dish. Repeat till constant mass is obtained. Calculate the total solids as per cent (m/ v). Express the results to one decimal place.

C.2 CALCULATION

$$\text{Total solids, expressed as per cent mass by volume} = m \times \frac{100}{25}$$

where,
m is the mass, in grams, of the residue.

APPENDIX D
DETERMINATION OF TOTAL ACIDITY

D.1 REAGENTS

D.1.1 *Sodium hydroxide*, standard volumetric, 0.1 mol/ 1

D.1.2 *Phenolphthalein indicator*, l per cent (v/ v)

NOTES

1. *Phenolphthalein is classified as a carcinogenic, mutagenic or toxic for reproduction (CMR) substance whereas thymolphthalein and alkali blue are not.*
2. *A laboratory test should be done in order to compare the three colour indicators.*

D.2 PROCEDURE

Take, 10 ml of the sample and titrate against Sodium hydroxide solution using Phenolphthalein as indicator.

D.3 CALCULATION

Calculation on the basis that 1 ml of 1 mol/ 1 Sodium hydroxide solution is equivalent to 0.06009 g of Acetic acid.

Total acidity expressed as Acetic acid, per cent mass by volume } $= v \times c \times 0.6$

where,
v is the volume, in ml, of standard Sodium hydroxide used for titration; and
c is the concentration, in mol/ 1, of the Sodium hyroxide solution.

APPENDIX E
DETERMINATION OF TOTAL ASH

E.1 APPARATUS

E.1.1 *Dish*, of capacity 50 to 100 ml, made of Platinum, silica or porcelain

E.1.2 *Furnace*, capable of being controlled at 525 ± 25 °C

E.1.3 *Steam bath*

E.1.4 *Hot-plate*

E.1.5 *Desiccator*, containing an efficient desiccant.

E.1.6 *Analytical balance*

E.2 PROCEDURE

E.2.1 *Preparation of the dish*

Heat the dish for 1 h in the furnace at 525 ± 25 °C. Cool in the desiccator. After cooling, weigh to the nearest 0.001 g.

E.2.2 *Determination*

Weigh, to the nearest 0,001 g, about 10 ml of the sample into the prepared dish. Dry the test portion in the dish on the water bath until the moisture is expelled. Transfer the dish to the furnace and heat at 525 ± 25 °C until the ash is visibly free from carbon particles. Allow to cool in the desiccator and weigh. Heat again in the furnace for 30 min, cool and weigh. Repeat these operations, if necessary, until the difference between two successive weighing does not exceed 0.001 g.

E.3 CALCULATION

Total ash, percentage, weight by volume $= (m_1 - m_0) \times 10$

where,
m_0 is the mass, in grams, of the empty dish; and
m_1 is the mass, in grams, of the dish and ash.

APPENDIX F
DETERMINATION OF SULPHATED ASH

F.1 APPARATUS

F.1.1 *Dish*, of capacity 50 to 100 ml, made of Platinum, silica or porcelain

F.1.2 *Furnace*, capable of being controlled at 525 ± 25 °C

F.1.3 *Steam bath*

F.1.4 *Hot-plate*

F.1.5 *Desiccator*, containing an efficient desiccant

F.1.6 *Analytical balance*

F.1.7 *Ash less filter paper*

F.2 REAGENTS

F.2.1 *Concentrated Sulphuric acid*

F.3 PROCEDURE

F.3.1 *Preparation of the dish*

Heat the dish for 1 hour in the furnace at 525 ± 25 °C. Cool in the desiccator. After cooling, weigh to the nearest 0.001 g.

F.3.2 *Determination*

Weigh, to the nearest 0.001 g, about 10 ml of the sample and 5 drops of conc. H_2SO_4 into the prepared dish. Dry the test portion in the dish on the water bath until the moisture is expelled. Cover the dish with ash less filter paper and ignite. Transfer the dish to the furnace and heat at 525 ± 25 °C until the ash is visibly free from carbon particles. Allow to cool in the desiccator and weigh. Heat again in the furnace for 30 min, cool and weigh. Repeat these operations, if necessary, until the difference between two successive weighing does not exceed 0.001 g.

F.4 CALCULATION

Total ash, percentage weight by volume = $(m_1 - m_0) \times 10$

where,
m_0 is the mass, in grams, of the empty dish;
m_1 is the mass, in grams, of the dish and sulphated ash;

APPENDIX G
CALCULATION OF ORIGINAL EXTRACT

Original extract = (Total solids percentage w/v) + (2 x alcohol percentage w/v) + (1.5 x Total acidity percentage w/v)

Converting “alcohol percentage v/v” to “alcohol percentage w/v”
Alcohol percentage w/v = 0.8 x alcohol percentage v/v
