SRI LANKA STANDARD 625:1983
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SPECIFICATION FOR
ARTIFICIAL VINEGAR

BUREAU OF CEYLON STANDARDS

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SLS 625:1983

Gr. 6

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Sri Lanka.

SRI LANKA STANDARD

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FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Bureau of Ceylon Standards on 1983-12-20, after the draft, finalized by the Drafting Committee on Vinegar, had been approved by the Agricultural and Food Products Divisional Committee.

Vinegar is a natural fermented product known to be produced from suitable raw material of vegetable origin by alcoholic and acetous fermentation and is used to flavour food to acidify and to preserve food. Coconut toddy vinegar is the most popular fermented vinegar used in Sri Lanka and this commodity has been covered in CS 168 Specification for Coconut toddy vinegar. After acetic acid began to be manufactured by processes other than fermentation, dilute acetic acid of 4 to 5 per cent (m/v) strength was marketed as a substitute for fermented vinegar. The characteristic flavour and aroma of fermented vinegar imparted by the fermentation by-products is absent in the artificial commodity. Dilute acetic acid has now been accepted as a substitute for fermented vinegar in many countries.

The term *vinegar* has always been used to describe the fermented product. This is generally used with a prefix indicative of the raw material used for its production, for example: coconut toddy vinegar, fruit vinegar or malt vinegar. The term vinegar with no qualification is not sufficiently specific to indicate the nature of the product. Use of the word *vinegar* in connection with dilute acetic acid has been a subject of much controversy. It is generally accepted that the term *artificial vinegar* is sufficiently specific to indicate the nature of the product. Therefore, this term has been used in this specification.

This specification is subject to the provisions of the Food Act No. 26 of 1980 and the regulations framed thereunder.

All standard values in this specification are given in SI units.

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 analysis, shall be rounded off in accordance with CS 102. The number of significant

places retained in the rounded off value should be the same as that of the specified value in this specification.

1 SCOPE

This specification prescribes the requirements, methods of sampling and tests for artificial vinegar intended for use in food.

2 REFERENCES

CS 102 Presentation of numerical values

CS 143 General principles of food hygiene

SLS 301 Determination of copper

SLS 302 Determination of zinc

SLS 311 Determination of lead

SLS 312 Determination of arsenic

SLS 428 Random sampling methods

SLS 467 Labelling of prepackaged foods.

3 DEFINITIONS

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

3.1 vinegar: A liquid produced from suitable raw material of agricultural origin containing starch **and/or** sugars by alcoholic and acetous fermentation and containing specified amount of acetic acid derived from the fermentation process.

3.2 artificial vinegar: A substitute for vinegar and containing acetic acid which is not wholly the product of alcoholic and subsequent acetous fermentation.

4 REQUIREMENTS

4.1 Composition

Artificial vinegar shall consist of a dilute solution of acetic acid with or without added colouring matter.

4.2 Hygiene

Artificial vinegar shall be produced in premises built and maintained under hygienic conditions and in accordance with **CS 143.**

4.3 Taste and odour

Artificial vinegar shall have the characteristic taste and odour of dilute acetic acid.

4.4 Added colouring matter

Artificial vinegar shall be free from added colouring matter other than caramel.

4.5 Freedom from sedimentation

Artificial vinegar shall be free from mycodermal suspensions, vinegar eel and other sediments.

4.6 Acidity

Artificial vinegar shall comply with the following requirement for total acidity when determined in accordance with Appendix A.

The total acidity as acetic acid shall not be less than 4.0 per cent (m/V) and not more than 13.0 per cent (m/V).

4.7 Freedom from other acids

Artificial vinegar shall be free from any other acids, and shall not exceed the limit for formic acid given in Table 1.

4.8 Freedom from harmful ingredients

Artificial vinegar shall be free from any harmful ingredients injurious to health, and shall not exceed the limits for heavy metals given in Table 1.

TABLE 1 - Tolerance limits

Contaminant	Tolerance limit mg/kg	Method of test ref. to
Formic acid	100	Appendix B
Copper	10	SLS 301
Zinc	10	SLS 302
Arsenic	1	SLS 312
Lead	1	SLS 311
Iron	30	Appendix C

5 PACKAGING

Artificial vinegar shall be packed in any suitable container which does not affect the quality of the product. These containers shall be properly sealed.

6 MARKING

6.1 The following shall be marked legibly and indelibly on the label of the container.

a) The words *ARTIFICIAL VINEGAR*, in block letters of the same size, type and colour;

b) Name and address of the manufacturer;

c) Registered trade mark, if any;

d) Net volume in millilitres; and

e) Batch or code number.

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

6.3 The containers may also be marked with the Certification Mark of the Bureau of Ceylon Standards illustrated below on permission being granted for such marking by the Bureau of Ceylon Standards.

NOTE - The use of the Bureau of Ceylon Standards Certification Mark (SLS mark) is governed by the provisions of the Bureau of Ceylon Standards Act and the regulations framed thereunder. The SLS mark on products covered by a Sri Lanka Standard is an assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control, which is devised and supervised by the Bureau and operated by the producer. SLS marked products are also continuously checked by the Bureau for conformity to that standard as a further safeguard. Details of conditions under which a permit for the use of the Certification Mark may be granted to manufacturers or processors may be obtained from the Bureau of Ceylon Standards.

7 SAMPLING

7.1 Lot

All containers, containing artificial vinegar from a single batch of manufacture shall constitute a lot.

7.2 Scale of sampling

7.2.1 Each lot shall be examined separately for the requirements of this specification.

7.2.2 The number of containers to be drawn from a lot, for sampling shall be as given in Table 2.

TABLE 2 - Scale of sampling

No. of containers in the lot	No. of containers to be selected
Up to 25	3
26 to 100	5
101 to 500	7
501 to 1000	9
1001 to 5000	11
5001 and above	13

7.2.3 The containers shall be selected at random. In order to ensure randomness of selection, random number tables as specified in **SLS 428** shall be used.

7.3 Number of tests

7.3.1 Each of the containers selected as in **7.2** shall be examined for the packaging and marking requirements given in **5** and **6**; and for taste and freedom from sedimentation requirements given in **4.3** and **4.5**.

7.3.2 Mix thoroughly the contents of the container selected as in **7.2**. From each of the containers selected, take equal amounts using appropriate sampling instrument to make up about 600 ml and mix thoroughly to constitute the composite sample. Transfer the sample to container provided with an airtight lid and close the container. The composite sample shall be analysed for the requirements given in 4.

8 METHODS OF TEST

Tests for the requirements laid down in 4 shall be carried out as indicated in Table 1 and as prescribed in the Appendices of this specification.

9 CONFORMITY TO STANDARD

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

9.1 Each container examined as in 7.3.1 satisfies the relevant requirements.

9.2 The composite sample tested as in 7.3.2 satisfies the relevant requirements.

APPENDIX A

DETERMINATION OF TOTAL ACIDITY

A.1 PROCEDURE

Dilute 10 ml of sample with water in a porcelain basin, add phenolphthalein and titrate with N/2 sodium hydroxide.

A.2 CALCULATION

Total acidity, as acetic acid, per cent (m/v) = V x 0.3

where

V = volume, in ml, of N/2 sodium hydroxide required for the titration.

APPENDIX B

DETERMINATION OF FORMIC ACID

B.1 PRINCIPLE OF THE METHOD

Formic acid present in the sample is reduced to formaldehyde by treating with magnesium ribbon. Chromotropic acid is added to the solution and the violet colour which develops is compared with standard solutions similarly treated.

B.2 REAGENTS

Chromotropic acid reagent, Dissolve 0.1 g of pure chromotropic acid (1,8 *di-hydroxynapthalene* 3,6 *disulfonic acid*) in 10 ml of water and filter. To the whole of the filtrate add 90 ml of concentrated *sulphuric acid* and mix.

B.3 PROCEDURE

B.3.1 Take 60 ml of the vinegar sample and distill from a flask fitted with a small tap funnel. When 45 ml of distillate has come over, add 15 ml of water to the flask through the funnel and distill a further 15 ml to give a total volume of 60 ml of distillate.

B.3.2 To 5 ml of the distillate in a 50-ml Nessler tube add a piece of clean magnesium ribbon and two drops of concentrated hydrochloric acid. When the reaction is complete (takes about 30 minutes) add 5 ml of chromotropic acid reagent along the sides of the test tube. Place the tube in a boiling water bath for 30 minutes, cool and dilute to 50 ml (or other convenient volume). Compare the violet colour developed with standard solutions of formic acid similarly treated (B.3.3).

B.3.3 Prepare standard solutions of formic acid ranging from 50 to 150 mg/kg. Take 5 ml each of the standard solutions and treat them as in B.3.2.

B.3.4 Determine the formic acid content in the sample by comparison of the colour developed in standard solutions. Alternatively, the transmission of the violet solution could be measured at 570 µm against a reagent blank and the amount of formic acid could be read from a standard-curve.

APPENDIX C

DETERMINATION OF IRON CONTENT

C.1 PRINCIPLE

Decomposition of the organic matter followed by reduction of ferric ion to ferrous ion by hydroxylammonium chloride. Formation, in a buffered medium of the stable ferrous-1,10 phenanthroline complex. Spectrophotometric measurement of the red-coloured complex at a wavelength of 508 nm.

C.2 APPARATUS

Spectrophotometer suitable for measurements at a wavelength of 508 nm.

C.3 REAGENTS

C.3.1 *Sulphuric acid,* ρ_{20} = 1.84 g/ml.

C.3.2 *Hydrochloric acid,* ρ_{20} = 1.18 g/ml.

C.3.3 *Hydroxylammonium chloride ($NH_2OH.HCl$), 200 g/l solution.*

C.3.4 *Buffer solution 1 : Sodium acetate trihydrate, 450 g/l solution.*

C.3.5 *Buffer solution 2 : Sodium acetate trihydrate, 272 g/l solution.*

C.3.6 *1,10 phenanthroline 10 g/l solution,* dissolve 1 g of 1, 10 phenanthroline in 80 ml of water at 80 °C and a minimum volume of the hydrochloric acid (C.3.2) diluted with an equal volume of water, in a 100-ml volumetric flask.

C.3.7 *Iron, 0.020 g/l standard solution,* weigh to the nearest 0.001 g about 7.024 g of ammonium iron (II) sulphate hexahydrate $(NH_4)_2Fe(SO_4)_2.6H_2O$. Dissolve in water and add 2 drops of concentrated hydrochloric acid. Transfer quantitatively to a 500-ml volumetric flask, dilute to the mark with water and mix. Using a pipette, transfer 10 ml of solution to a 1000-ml volumetric flask. Dilute to the mark with water and mix.

C.4 PROCEDURE

C.4.1 Preparation of test solution

Evaporate about 50 g of the sample, weighed to the nearest milligram, to dryness and incinerate residue at 525 ± 25 °C. Moisten the ash with 5 ml of concentrated sulphuric acid and carefully add 10 ml of water. Heat on a boiling water bath for a few minutes until the ash is dissolved. Transfer the cooled solution quantitatively into a 100-ml volumetric flask and dilute to the mark with water.

C.4.2 Preliminary test

Carry out a preliminary test to determine the volume of buffer Solution 1 to be added. According to the expected iron content, take using a pipette a volume V_1 ml of the test solution obtained as in C.4.1.

Transfer to a 50-ml beaker, if necessary make up the volume to 20 ml with water, and then add 5 ml of the hydroxylammonium chloride solution.

Transfer to the beaker the volume of buffer Solution 1 required to obtain a reading on the pH meter between 3.5 and 4.5. Let V_2 ml be the volume of the buffer solution added.

C.4.3 Determination

According to the expected iron content, take a volume V_1 ml of the test solution and transfer to a 50-ml volumetric flask. If necessary, make up the volume to 20 ml with water.

Add 5 ml of the hydroxylammonium chloride and V_2 ml of the buffer solution 1 in order to obtain a pH between 3.5 and 4.5.

Add 2 ml of the 1, 10 phenanthroline solution, dilute to the mark with water and mix. Allow to stand for 5 minutes and measure absorbance at a wavelength of 508 nm. If the colouration is too strong, begin again taking a smaller volume than V_1. Carry out two determinations with the same test solution.

Carry out a blank test following the same procedure and using the same quantities of all the reagents as used for the determination but omitting the test portion.

C.4.4 Calibration curve

Into a series of seven 100-ml volumetric flasks, introduce respectively 0, 5, 10, 20, 30, 40 and 50 ml of the standard iron solution **(C.3.7)** and 2 ml of the hydrochloric acid. Dilute to the mark and mix. Then into a series of seven 50-ml one-mark volumetric flasks, introduce 20 ml of each of the diluted standard iron solutions, corresponding respectively to 0, 20, 40, 80, 120, 160 and 200 µg of iron. Add 5 ml of the hydroxylammonium chloride solution, and shake. Add 3.5 ml of the buffer solution 2 and shake. Add 2 ml of the 1, 10 phenanthroline solution. Dilute to the mark and mix. Allow to stand for 5 minutes and measure the absorbance at a wavelength of 508 nm. Subtract from the values found the absorbance corresponding to the blank test. Plot the calibration curve showing the number of micrograms of iron as a function of the absorbance.

C.5 CALCULATION

From the calibration curve calculate the iron content of the test sample corresponding to its absorbance. Using this value calculate the iron content of the product expressed as mg/kg.

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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