SRI LANKA STANDARD 347: 2008
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METHOD FOR

DETERMINATION OF TITRATABLE ACIDITY IN FRUIT AND VEGETABLE PRODUCTS

(FIRST REVISION)

SRI LANKA STANDARDS INSTITUTION

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SLS 347 : 2008

Gr. 4

SRI LANKA STANDARDS INSTITUTION
17, Victoria Place
Elvitigala Mawatha
Colombo 08
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
METHOD FOR DETERMINATION OF TITRATABLE ACIDITY IN FRUIT AND VEGETABLE PRODUCTS
(FIRST REVISION)

FOREWORD

This Sri Lanka 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 2008-02-27.

This standard was first published in 1975, which has been derived from the International Organization for standardization Recommendation, R 750. This revision has been undertaken to up-date the standard to be in line with the latest ISO standard for fruit and vegetable products.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with **SLS 102** (Presentation of numerical values).

In the preparation of this standard, the valuable assistance derived from the following publication is gratefully acknowledged:
ISO 750 : 1998 Fruit and vegetable products-Determination of titratable acidity.

1 SCOPE

1.1 This standard specifies two methods for the determination of the titratable acidity of fruit and vegetable products :

- a potentiometric reference method ;
- a routine method using a coloured indicator.

1.2 By convention, the latter method does not apply to wines.

1.3 In the case of some coloured products, it may be difficult to determine the endpoint of the titration in the latter method and the former method shall preferably be used.

2 PRINCIPLE

2.1 Potentiometric method

Potentiometric titration with a standard volumetric solution of sodium hydroxide.

2.2 Routine method

Titration with a standard volumetric solution of sodium hydroxide in the presence of phenolphthalein as indicator.

3 REAGENTS

Use only reagents of recognized analytical grade, and distilled or demineralized water or water of equivalent purity.

3.1 *Sodium hydroxide***,** standard volumetric solution, c(NaOH) = 0.1mol/l

3.2 *Buffer solutions***,** of known pH

3.3 *Phenolphthalein***,** 10 g/l solution in 95 % (*V/V*) ethanol

4 APPARATUS

Usual laboratory apparatus and, in particular, the following.

4.1 *Homogenizer* or *mortar and pestle*

4.2 *Pipettes***,** to deliver 25 ml, 50 ml or 100 ml

4.3 *Conical flask*, capable of being fitted with the reflux condenser (**4.7**)

4.4 *Volumetric flask*, of capacity 250 ml

4.5 *Beaker***,** of capacity 250 ml, together with a magnetic or mechanical stirrer

4.6 *Burette*, of capacity 50 ml

4.7 *Reflux condenser*

4.8 *Analytical balance*, capable of weighing to the nearest 0.01 g

4.9 *pH - meter***,** accurate to at least 0.05 pH units

4.10 *Water bath*

5 SAMPLING

It is important the laboratory receive a sample which is truly representative and has not been damaged or changed during transport or storage.

Sampling is not part of the method specified in this standard.

6 PREPARATION OF TEST SAMPLE

6.1 Liquid products

Liquid products include products from which the liquid is easily separable (e.g. juices, canned fruit syrups, pickling liquids, brines, liquids from fermented products).

Take part of the previously mixed laboratory sample and filter it through cotton wool, filter paper or cloth. Transfer, by means of the pipette (**4.2**), 25 ml of the filtrate (see note) into the volumetric flask (**4.4**). Dilute to the mark with water and mix thoroughly.

It is necessary to remove carbon dioxide from carbonated liquid products by shaking under reduced pressure for 3 min to 4 min.

NOTE : *It is also possible to take a sample by mass, weighing, to the nearest 0.01 g, at least 25 g of the laboratory sample.*

6.2 Other products

Remove any stalks, stones, hard seed-cavity walls and, whenever possible, pips (after thawing in the case of frozen or deep-frozen products). Mix the sample thoroughly.

Allow frozen or deep-frozen products to thaw in a closed vessel and add the liquid formed during this process to the products before mixing or blending.

In the case of dehydrated or dried products, cut a part of the laboratory sample into small pieces.

Homogenize the product or grind it in the mortar (**4.1**).

Weigh, to the nearest 0.01 g, at least 25 g of the laboratory sample and transfer it to the conical flask (**4.3**) with 50 ml of hot water. Mix well until homogeneity is obtained.

Fit the reflux condenser (**4.7**) to the conical flask and heat the contents on a boiling water bath for 30 min.

Cool, quantitatively transfer the contents of the conical flask to a volumetric flask (**4.4**) and dilute to the mark with water. Mix well and filter.

7 PROCEDURE

NOTE : *If it is required to check whether the repeatability requirement (clause **9)** is met, carry out two determinations in accordance with **7.1.2** and **7.1.3,** or **7.2.1** and **7.2.2**.*

7.1 Potentiometric method (Reference method)

7.1.1 *Calibration of the pH meter*

Check that the pH meter (**4.9**) is functioning correctly using the buffer solutions (**3.2**).

7.1.2 *Test portion*

Transfer, by means of the pipette (**4.2**), 25 ml, 50 ml or 100 ml of the diluted test sample (see clause **6**), according to the expected acidity, to the beaker with its stirrer (**4.5**).

7.1.3 *Determination*

Start the stirrer and add quickly, from the burette (**4.6**), the sodium hydroxide solution (**3.1**) until the pH is 7 ± 0.2. Then, slowly add more until the pH is 8.1 ± 0.2.

7.2 Method using a coloured indicator (Routine method)

7.2.1 *Test portion*

Transfer, by means of the pipette (**4.2**), 25 ml, 50 ml or 100 ml of the diluted test sample (see clause **6**), according to the expected acidity, to a beaker with its stirrer (**4.5**).

7.2.2 *Determination*

Add 0.25 ml to 0.5 ml of the phenolphthalein solution (**3.3**) and, with shaking, titrate, using the burette (**4.6**), with the sodium hydroxide solution (**3.1**) until a pink colour, persisting for 30 s, is obtained.

8 EXPRESSION OF RESULTS

8.1 Method of calculation for laboratory samples taken by volume

The titratable acidity, expressed in millimoles of H^+ per 100 ml of product, taking into account the dilution carried out in clause **6** is given as follows :

$$\frac{250}{V} x \; V_1 \; x \; c \; x \; \frac{100}{V_0} = \frac{1000 \quad V_1 \quad c}{V_0}$$

where,

V is the volume, in millilitres, of the test sample, i.e. 25 ml ;
V_0 is the volume, in millilitres, of the test portion (**7.1.2** or **7.2.1**) ;
V_1 is the volume, in milliliters, of the sodium hydroxide solution (**3.1**) used for the determination (**7.1.3** or **7.2.2**).
c is the exact concentration, in moles per litre, of the sodium hydroxide solution (**3.1**).

Report the result to one decimal place.

8.2 Method of calculation for laboratory samples taken by mass

The titratable acidity, expressed in millimoles of H^+ per 100 g of product, taking into account the dilution carried out in clause **6**, is given as follows :

$$\frac{250}{m} \; x \; V_1 \; x \; c \; x \; \frac{100}{V_0}$$

where,

V_0 V_1 and c have the same meanings as in **8.1** ;
m is the mass, in grams, of the test sample (see **6.1** and its note, or **6.2**).

Report the result to one decimal place.

8.3 Other methods of expression

It is also possible to express the titratable acidity conventionally in grams of acid per 100 g or per 100 ml of product, as appropriate, by multiplying the formula (**8.1** or **8.2**) by a factor appropriate to the acid (see Table **1**).

TABLE 1

Acid (1)	Factor (2)
Malic acid	0.067
Oxalic acid	0.045
Citric acid monohydrate	0.070
Tartaric acid	0.075
Sulfuric acid	0.049
Acetic acid	0.060
Lactic acid	0.090
Citric acid	0.064

9 REPEATABILITY

The absolute difference between two independent single test results, obtained using the same method on identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, will in not more than 5 % of cases be greater than 2 % of the arithmetic mean of the two results.

10 TEST REPORT

The test report shall specify :

- all information necessary for the complete identification of the sample ;
- the sampling method used, if known ;
- the test method used, together with reference to this standard ;
- all operating details not specified in this standard, or regarded as optional, together with details of any incidents which may have influenced the test result (s) ;
- the test result (s) obtained ;
- if the repeatability has been checked, the final quoted result obtained.

SRI LANKA STANDARDS INSTITUTION

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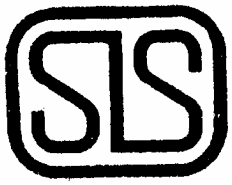

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