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SPECIFICATION FOR
BISCUITS
(Second Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard
SPECIFICATION FOR BISCUITS
(Second Revision)

SLS 251 : 2010
(Errata sheet Incorporated)

Gr. 10

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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 BISCUITS
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FOREWORD

This Sri Lanka Standard was approved by the Sectoral Committee on Agricultural 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 2010-03-25.

The term " Biscuits" cover a large variety of sweet, savoury, filled and coated biscuits. It is difficult to classify biscuits based on chemical composition and manufacturing technologies due to overlap. However, varietal differences can be distinguished accurately by their sensory attributes. This standard mainly lays down essential requirements to which biscuits of the different types should conform.

This standard was first published in 1973 and subsequently revised in 1991. This revision has been taken up in order to accommodate wide variety of biscuits available in the market due to technological developments of the industry and also to incorporate microbiological requirements along with their test methods. The list of ingredients has been updated and regrouped.

This standard is subject to the restrictions imposed under the Sri Lanka Food Act No. 26 of 1980 and the regulations framed thereunder wherever applicable.

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 **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 specification.

In revising this specification, the assistance obtained from the relevant publications of the Bureau of Indian Standards and the Standards and Industrial Research Institute of Malaysia is gratefully acknowledged.

1 SCOPE

1.1 This specification prescribes the requirements, methods of sampling and test for biscuits.

1.2 This specification does not cover wafers.

2 REFERENCES

SLS 79 Edible common salt
SLS 98 Desiccated coconut
SLS 102 Presentation of numerical values
SLS 103 Preferred numbers
SLS 117 Ground Chillies
SLS 143 Code of practice for general principles of food hygiene
SLS 144 Wheat flour
SLS 148 Cocoa powder
SLS 179 Condensed milk
SLS 181 Raw and processed milk
SLS 191 White sugar
SLS 230 Baking powder
SLS 258 Ground coffee
SLS 265 Jams, jellies, marmalades and preserves
SLS 277 Margarine
SLS 279 Butter
SLS 326 Chocolate
SLS 340 Ghee (butter oil)
SLS 418 Tapioca flour
SLS 428 Random sampling methods
SLS 467 Code of practice for labelling of prepackaged foods
SLS 516 Microbiological test methods
- Part 1 : General guidance for enumeration of microorganisms colony count technique
- Part 2 : Enumeration of yeasts and moulds
- Part 3 : Detection and enumeration of Coliforms, faecal coliforms and *Escherichia coli*
- Part 5 : General guidance for detection of *Salmonella*
- Part 6 : General guidance for enumeration of *Staphylococcus aureus*

SLS 521 Jaggery
SLS 614 Potable water
SLS 731 Milk powder
SLS 772 Treacle
SLS 773 Cheese
SLS 793 Groundnut (peanut) kernels
SLS 851 Maize (corn)
SLS 883 Brown sugar
SLS 884 Semolina
SLS 913 Rice flour
SLS 929 Sodium bicarbonate (Food grade)
SLS 959 Chicken eggs
SLS 964 Corn flour (Maize starch)
SLS 965 Code of hygienic practice for biscuit manufacturing and bakery units
SLS1102 Bakery fats
SLS1188 Baker's yeast
Official Methods of Analysis, Association of Official Analytical Chemists (AOAC) 18 th edition, 2007.

3 DEFINITIONS

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

3.1 biscuits : Products obtained from baking dough containing wheat flour and / or any other cereal flour, fat / shortening, leavening agent and water with or without the optional ingredients.

3.2 coated biscuits : Coated biscuits are biscuits with a filling in between (see **3.5**), but coated with chocolate or caramel or other suitable enrobing materials.

3.3 cookies : Cookies are a group of biscuits which are shortest in bite compared to general /common sweet varieties. These may be further enriched by incorporation of nuts, dry fruits, chocolates, etc. This product has a high sugar and fat content as compared to the sweet variety.

3.4 crackers : Crackers are biscuits which in general show a typical flaky inner layers. These biscuits can be fermented or non-fermented types, oil – dipped or not and they may or may not be sprinkled with salt.

3.5 cream : A homogeneous mixed preparation of hydrogenated fat or bakery shortening, icing sugar, flavours and permitted food colours with or without other ingredients in small proportions.

3.6 filled biscuits : Filled biscuits are biscuits with a filling of either cream, jam, jelly, marshmallow, chocolates, caramel, figs, raisins, or the like with sweet type shells, semi-sweet type shells, cracker shells or even cookie type shells.

3.7 sandwiched biscuits : Sandwiched biscuits are biscuits having two or more plain biscuits sandwiched with filling in between. The filling may be cream, jam, jelly, marshmallow, caramel, figs, raisins or suitable filling.

3.8 savoury biscuits : Savoury biscuits are biscuits which are sprinkled with or without salt or sprayed with or without oil or with or without flavours.

3.9 semi – sweet biscuits: This type of biscuits have comparatively low level of sweetness, in general. The product is harder in texture and generally low in fat content.

3.10 specialty biscuits: This include different varieties of biscuits, such as filled biscuits, coated biscuits, cream sandwiched biscuits or biscuits with other edible inclusions. There are possibilities in each of the types to be coated with chocolate.

3.11 sweet biscuits: This is the most common variety of biscuits where fat and sugar levels are generally high. This variety in general provides a comparative shorter bite, sweet taste.

4 TYPES OF BISCUITS

On the basis of sensory attributes, the different varieties shall be of following types:

4.1 Sweet biscuits
4.2 Semi-sweet biscuits
4.3 Crackers
4.4 Cookies
4.5 Specialty biscuits
- 4.5.1 *Coated biscuits*
- 4.5.2 *Filled biscuits*
- 4.5.3 *Sandwiched biscuits*

4.6 Savoury biscuits

5 INGREDIENTS

All ingredients used shall comply with the Food Act No. 26 of 1980 and the regulations framed thereunder.

5.1 Basic ingredients

The following ingredients shall be used in the preparation of biscuit dough.

5.1.1 *Wheat flour*, conforming to **SLS 144** and / or any other cereal flour

5.1.2 *Fat or shortening*

Bakery shortenings, conforming to **SLS1102**
Refined edible vegetable oils
Margarine, conforming to **SLS 277**
Butter, conforming to **SLS 279**
Butter oil (Ghee), conforming to **SLS 340** or their blends

5.1.3 *Leavening agents*

Baking powder, conforming to **SLS 320**
Sodium bicarbonate (Baking soda) food grade, conforming to **SLS 929**
Ammonium carbonate
Ammonium bicarbonate
Baker's yeast, conforming to **SLS 1188**

5.1.4 *Potable water*, conforming to **SLS 614**

5.2 Optional ingredients

In addition to the ingredients given in **5.1**, one or more of the following ingredients may be used.

5.2.1 *Cereals and cereal products*

Whole wheat meal
Semolina, conforming to **SLS 884**
Wheat bran, edible
Wheat germ
Maize germ (corn germ), conforming to **SLS 851**
Oat flour, edible
Rice flour, conforming to **SLS 913**
Malt flour
Any other edible cereal product

5.2.2 *Legume and oil seed products*

Soya bean flour, conforming to **SLS 1011**
Groundnut (pea nut), conforming to **SLS 793**
Other oil seed flours
Green gram flour

5.2.3 *Edible starches*

Maize starch, conforming to **SLS 964**
Tapioca starch, edible
Rice starch, edible
Any other edible starch

5.2.4 *Milk and milk products*

Casein edible
Milk powder, conforming to **SLS 731**
Butter (with and without salt) , conforming to **SLS 279**
Liquid milk**.** conforming to **SLS 181**
Condensed milk, conforming to **SLS 179**
Cheese, conforming to **SLS 773**
Whey solids
Dairy cream

5.2.5 *Sugars*

White sugar, conforming to **SLS 191**
Brown sugar, conforming to **SLS 883**
Liquid glucose
Dextrose monohydrate
Jaggery, conforming to **SLS 521**
Treacle, conforming to **SLS 772**
Molasses (edible), cane
Lactose
Malt extract
Invert syrup/Golden syrup/Honey
Any other permitted sugar product

5.2.6 *Nuts /Fruits, fruit products and edible seeds*

Desiccated coconut, conforming to **SLS 98**
Dry fruits
Edible nuts
Pectin
Jam, conforming to **SLS 265**
Any other preserved fruit or fruit products

5.2.7 *Spices*

Ginger powder
Chillie powder, conforming to SLS **117**
Black pepper, conforming to SLS **105**
Any other edible spices or aromatic herbs

5.2.8 *Miscellaneous*

Ground coffee (Coffee powder), conforming to **SLS 258**
Cocoa powder, conforming to **SLS 148**
Chocolate, conforming to **SLS 326**
Edible vegetables/vegetable products
Edible common salt, conforming to **SLS 79**
Soluble starch phosphate
Caramel
Eggs, conforming to **SLS 959**
Egg products
Protein isolates and concentrates
Tapioca flour, conforming to **SLS 418**

5.2.9 *Flavouring substances*

5.2.10 *Colouring substances*

5.2.11 *Antioxidants*

5.2.12 *Emulsifying and stabilizing agents*

Lecithin
Glycerol monostearate
Hydroxypropyl methyl cellulose
Sucrose esters of fatty acids
} Limited by GMP

Diacetyl tartaric acid esters of mono and di glycerides - Maximum 1,000 mg/kg
Sucroglycerides - Maximum10,000 mg/kg

5.2.13 *Dough conditioners*

Sodium bisulphate
Sodium metabisulphite
} Limited by GMP

5.2.14 *Flour improvers*

Bacterial amylases
Amylases } Limited by GMP
Other enzymes

5.2.15 *Flour treatment agents*

Benzoyl peroxide – Maximum 40 mg/kg
Ascorbic acid – Limited by GMP

5.2.16 *Vitamins and minerals*

5.2.17 *Acidity regulators*

Acetic acid
Lactic acid
Citric acid
Malic acid
Tartaric acid } Limited by GMP
Sodium fumarate
Potassium malate
Sodium hydroxide

6 REQUIREMENTS

6.1 General requirements

6.1.1 The product shall be manufactured, packaged, stored and distributed under the hygienic conditions prescribed in **SLS 143** and **SLS 965.**

6.1.2 The product shall have a texture characteristic of fresh, crispy, well-baked biscuits of different types. It shall be free from dampness caused by absorption of moisture.

6.1.3 The product shall have an agreeable flavour typical of well-baked biscuits of different types and shall be free from any soapy or objectionable taste.

6.1.4 The product shall be free from fungal growth, insect infestation , rancid taste and odour.

6.1.5 The product shall also be free from any harmful or injurious foreign matter.

NOTE **:** *The appearance, taste, odour and rancid flavours shall be determined by organoleptic tests.*

6.2 Chemical requirements

6.2.1 All types of biscuits shall comply with the requirements given in Table **1**, when tested according to the methods given in Column **4** of the Table.

Table 1 - Chemical requirements for biscuits

SI No. (1)	Characteristic (2)	Requirement (3)	Method of Test (4)
i)	Moisture, per cent by mass, max.	* 4.0	Appendix B
ii)	Acid insoluble ash (on dry basis), per cent by mass, max.	0.05	Appendix C
iii)	Acidity of extracted fat (as oleic acid), per cent by mass, max.	1.0	Appendix D

** In the case of cookies, maximum of 6.0 per cent by mass may be allowed.*

6.3 Microbiological limits

6.3.1 Sandwiched, filled and /or coated Biscuits shall comply with the microbiological limits given in Table **2,** when tested according to the methods given in Column **7** of the Table.

Table 2 – Microbiological limits

SI. No. (1)	Test Organism (2)	n (3)	c (4)	Limit m (5)	Limit M (6)	Method of Test (7)
i)	Aerobic Plate Count	5	2	10^3	10^4	Appendix E
ii)	Yeast and Mould count, per g	5	2	10^2	10^3	
iii)	Coliforms, per g (MPN)	5	2	10	10^2	
iv)	*E.coli*, per g (MPN)	5	0	0	-	
v)	*Staphylococcus aureus*, per g	5	2	10	10^2	
vi)	*Salmonella*, per 25 g	10	0	0	-	

where,

n is the number of samples to be tested;
c is the maximum allowable number of samples yielding values between *m* and *M*;
m is the limit below which a count is acceptable for any sample; and
M is the limit above which a count is unacceptable for any sample.

6.4 Heavy Metals

All types of biscuits shall comply with the limits for heavy metals given in Table **3,** when tested according to the methods given in Column **4** of the Table.

Table 3 - Limits for heavy metals

Sl No. (1)	Heavy metal (2)	Limit (3)	Method of test (4)
i)	Arsenic, as As, mg/kg, max.	1.0	Appendix F
ii)	Lead, as Pb, mg/kg, max.	2.0	

7 PACKAGING

7.1 Biscuits shall be packaged in clean, food grade, flexible laminates, sound containers made of tin plate, cardboard, paper or any other food grade packaging material in such a way as to protect them from breakage, contamination, absorption of moisture and seepage of fat from the biscuits into the packaging materials and shall not impart any objectionable odour and taste to the biscuits.

7.2 The biscuits shall not come in direct contact with the packaging materials other than grease proof or cellulose film, aluminum foil laminates, food grade plastics or any other non-toxic packaging material which may be covered with a moisture-proof film, waxed paper or moisture-proof laminates. The inner layer coming in contact with the biscuits shall be of food-grade quality, or coated paper. The biscuits in tins shall not come into direct contact with unlacquered metal walls.

8 MARKING AND / OR LABELLING

8.1 The following shall be marked or labelled legibly and indelibly on each container destined for the final consumer.

a) Name of the product (see Clause 4) or common name ;
b) Brand name or trade mark, if any ;
c) Name and address of the manufacturer and packer or distributor in Sri Lanka ,
d) Net weight, in ‘g’ or in ‘kg’;
e) Batch number or code number or a decipherable code marking ;
f) Date of manufacture ;
g) Date of expiry ;
j) List of ingredients in descending order of proportion ;
k) The statement with respect to addition of permitted colours and flavours;
l) Any permitted food additive’s class and name or INS number; and
m) Country of origin, in case of imported products.

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

9 SAMPLING

Representative samples of the product for ascertaining conformity to the requirements of this specification shall be drawn as prescribed in Appendix **A**.

10 METHODS OF TEST

10.1 Preparation of the test sample

10.1.1 The biscuits are highly hygroscopic. Preparation of the test sample shall be done as quickly as possible, preferably in a dry place.

10.1.2 Sandwiched, coated and filled biscuits shall be ground with the cream coating and /or filling for microbiological tests, tests for heavy metals and tests given in Table **1** except for determination of moisture content.

10.1.3 Sandwiched, coated and filled biscuits shall be ground, after removing the cream coating and/or filling as far as possible by gently scraping for determination of moisture content given in Table **1**.

10.2 Tests shall be carried out as prescribed in Appendices **B** to **F** of this specification.

10.3 Reagents

All reagents used shall be of recognized analytical quality and wherever water is mentioned distilled or de-ionized water shall be used.

11 CRITERIA FOR CONFORMITY

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

11.1 Each container/package examined as in **A.6.1** satisfies the packaging and marking requirements.

11.2 The biscuits of each container /package tested as in **A.6.2** satisfy the requirements given in **6.1.2** to **6.1.5.**

11.3 The values of the expression ($\overline{x}$ + 0.5s) calculated using the test results on moisture content is less than or equal to the value given in this specification.

NOTES :

Mean ($\overline{x}$) = The sum of values of the observations divided by the number of observations.

Standard deviation (s) = The positive square root of the quotient obtained by dividing the sum of squares of the deviations of the observations from their mean by one less than the number of observations.

11.4 The test results of the composite sample tested as in **A.6.3** satisfy the requirements given in **6.2** and **6.4** except for moisture content.

11.5 Test results on samples tested as in **A.6.4** satisfy the microbiological limits given in **6.3**.

APPENDIX A
SAMPLING

A.1 LOT

In any consignment, all the containers/packages of the same size and containing biscuits of one type, belonging to one batch of manufacture or supply shall constitute a lot.

NOTE : *When different types of biscuits are packed in a single container / package, all such containers / packages of the same size, supplied by a manufacturer may be considered as a lot.*

A.2 GENERAL REQUIREMENTS OF SAMPLING

In drawing, preparing, sorting and handling samples, following precautions and directions shall be taken:

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

A.2.2 The sampling instruments shall be clean and dry when used. When drawing samples for microbiological examination, the sampling instruments shall be sterilized.

A.2.3 The samples shall be protected against adventitious contamination.

A.2.4 The samples shall be placed in clean and dry containers. The size of the sample containers shall be of such size that they are almost completely filled by the sample. When drawing samples for microbiological examinations the sample containers shall be sterilized.

A.2.5 The sample containers shall be sealed air tight after filling and marked with the necessary details of sampling.

A.2.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the room temperature.

A.3 SCALE OF SAMPLING

A.3.1 Samples shall be tested from each lot for ascertaining its conformity to the requirements of this specification.

A.3.2 The number of containers / packages to be selected from a lot shall be in accordance with Column 2 of Table **4**.

Table 4 – Scale of sampling

No. of containers/packages in the lot (1)	No. of containers/packages to be selected (2)
Up to 50	3
51 to 150	4
151 to 300	5
301 to 500	7
501 to 1 000	10

A.3.3 In the case of sampling for a lot of sandwiched, filled and / or coated biscuits, a sample of ten containers / packages shall be selected from the lot in addition to the samples selected as in **A.3.2**.

A.3.4 If a lot consist of more than 1000 containers / packages such a lot shall be divided into two or more parts equally as far as possible, in such a way that each part contains 1000 or less containers / packages. Each part thus obtained shall constitute a separate lot.

A.3.5 The containers/packages 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 REFERENCE SAMPLE

If a reference sample is required, the number of containers / packages to be selected from a lot shall be three times the number given in Column **2** of Table **4** (see Note). The containers /packages so selected shall be divided into three equal parts. One of these parts shall be marked for the purchaser, one for the supplier and the third for reference.

NOTE : *In case of microbiological requirements a reference sample is not required.*

A.5 PREPARATION OF COMPOSITE SAMPLES

Approximately equal quantities of biscuits shall be drawn from each container/package selected as in **A.3.2** and mixed together to form a composite sample of about 300 g.

A.6 NUMBER OF TESTS

A.6.1 Each container / package selected as in **A.3.2** shall be examined for packaging and marking requirements.

A.6.2 A sufficient quantity of biscuits from each container / package selected as in **A.3.2** shall be individually tested for the requirements given in **6.1.2** to **6.1.5** and the moisture content.

A.6.3 The composite sample prepared as in **A.5** shall be tested for the requirements given in **6.2** and **6.4,** except for the moisture content.

A.6.4 Contents of each container / package (sandwiched, filled and / or coated biscuits only) selected as in **A.3.3** shall be tested separately for microbiological requirements given in **6.3.**

APPENDIX B
DETERMINATION OF MOISTURE

B.1 APPARATUS

B.1.1 *Moisture dish,* made of stainless steel, silica, glass or aluminium

B.1.2 *Oven,* maintained at 105 ± 1 ^{o}C

B.2 PROCEDURE

Weigh, to the nearest milligram, about 5 g of the powdered sample **(10.1.3)** in the moisture dish, previously dried in the oven and weighed. Place the dish in the oven **(B.1.2)** for 4 hours. Cool in a desiccator and weigh. Repeat the process of drying, cooling and weighing at 30-minute intervals until the difference between the two consecutive weighings does not exceed one milligram. Record the lowest mass.

B.3 CALCULATION

$$Moisture,\ per\ cent\ by\ mass\ = \frac{(m_1 - m_2)}{(m_1 - m_0)}\ x\ 100$$

where,

m_1 is the mass, in g, of the dish with the sample before drying ;
m_2 is the mass, in g, of the dish with the sample after drying; and
m_0 is the mass, in g, of the empty dish.

APPENDIX C
DETERMINATION OF ACID INSOLUBLE ASH

C.1 APPARATUS

C.1.1 *Dish*, made of silica or porcelain

C.1.2 *Muffle furnace*, maintained at 600 $\pm$ 20 ^{o}C

C.1.3 *Water bath*

C.1.4 *Oven*, maintained at 105 $\pm$ 1 ^{o}C

C.1.5 *Desiccator*

C.2 REAGENTS

C.2.1 *Dilute hydrochloric acid*, approximately 5 mol/l solution

C.2.2 *Silver nitrate*, approximately 17 g / l solution

C.3 PROCEDURE

C.3.1 Carry out the determination of the moisture percentage of the powdered sample **(10.1.2)** by the method described in Appendix **B** for sandwiched, coated and filled biscuits with the filling and / or coating.

C.3.2 Weigh, to the nearest milligram, about 20 g of the sample in the dish (**C.1.1**). Heat the dish with the sample over a hot plate or a flame until the contents of the dish are charred. Ash in the muffle furnace at 600 $\pm$ 20 ^{o}C until a light grey ash is obtained. Allow it to cool to room temperature. Add 25 ml of hydrochloric acid (**C.2.1**) cover with a watch glass and heat in the water bath for 10 minutes. Mix the contents with a glass rod and filter through an ashless filter paper (Whatman No. 42 or equivalent). Wash the filter paper with water until washings are free from acid as confirmed by the silver nitrate solution. Return the washed filter paper to the dish and ash in the muffle furnace **(C.1.2)**.

C.3.3 Cool the dish in a desiccator **(C.1.5)** and weigh. Repeat the process of heating, cooling and weighing at 30-minute intervals until the difference between two successive weighings does not exceed 1 milligram.

C.4 CALCULATION

$$Acid\ \ inso\,\text{lub}\,le\ \ ash,\ \ per\ \ cent\ \ by\ \ mass,\ (on\ \ dry\ \ basis) = \frac{(m_1 - m_0)}{(m_2 - m_0)}\ \ x\frac{10000}{(100 - M)}$$

where,

m_0 is the mass, in g, of empty dish;
m_1 is the mass, in g, of the dish containing ash;
m_2 is the mass, in g, of the dish containing the sample; and
M is the percentage of moisture

APPENDIX D
DETERMINATION OF ACIDITY OF EXTRACTED FAT

D.2 APPARATUS

D.2.1 *Soxhlet apparatus* with a 250-ml flat bottom flask

D.2 REAGENTS

D.2.1 *Petroleum ether*, boiling range 40 ^{o}C to 60 ^{o}C

D.2.2 *Diethyl ether* and *95 per cent (v/v) ethanol*, 1 + 1 (v/v) mixture

Neutralize exactly, just before use, by adding the sodium hydroxide solution **(D.2.3)** in the presence of 0.3 ml of the phenolphthalein solution **(D.2.4)** per 100 ml of mixture

D.2.3 *Sodium hydroxide* solution, standardized, c (NaOH) = 0.05 mol/l

D.2.4 Phenolphthalein, 10 g/ l solution in 95 to 96 per cent (v/v) ethanol

D.3 PROCEDURE

D.3.1 Weigh, approximately 20 g to 30 g of powdered biscuit and transfer to the thimble. Plug it from the top with extracted cotton or filter paper. Dry the thimble with the contents for 15 minutes to 30 minutes in an oven at 100 ± 5 ^{o}C. Extract the fat to the Soxhlet apparatus for 3 hours to 4 hours with petroleum ether using a tared flask. Evaporate off the solvent in a water bath. Remove the traces of the residual solvent by keeping the flask in the hot air oven at 100 ± 5 ^{o}C for about 30 minutes. Cool and weigh the flask with the extracted fat.

D.3.2 Measure 50 ml to 150 ml of the previously neutralized diethyl ether and ethanol mixture (**D.2.2**) and add to the flask containing fat and titrate with the sodium hydroxide solution from a 10-ml micro burette to a distinct pink.

D.3.3 If the solution becomes turbid during titration, add a sufficient quantity of the mixed solvent **(D.2.2)** to give a clear solution.

D.4 CALCULATION

$$\text{Acidity of extracted fat (as oleic acid), per cent by mass} = \frac{28.2 \times V \times c}{m_1 - m_0}$$

where,

V is the volume, in ml, of sodium hydroxide solution required for the titration ;
c is the concentration, in mol/l, of the sodium hydroxide solution ;
m_1 is the mass, in g, of flask containing fat ; and
m_0 is the mass, in g, of the empty flask.

APPENDIX E
MICROBIOLOGICAL EXAMINATION

E.1 AEROBIC PLATE COUNT

Determination of aerobic plate count shall be carried out as described in **SLS 516: Part 1**.

E.2 ENUMERATION OF COLIFORMS AND *E.coli*

Proceed as described in **SLS 516:Part 3.** Incubate at 30 ± 1 ^{o}C for 48 ± 2 h for Coliforms and *E.coli.*

E.3 DETECTION OF *Salmonella*

Proceed as described in **SLS 516:Part 5** using the following procedure, for pre-enrichment.

E.4 MEDIA AND SOLUTIONS

E.4.1 Brilliant green solution, 1 per cent

Brilliant green dye 1 g
Distilled water 100 ml

Dissolve brilliant green in sterile distilled water.

E.4.2 Reconstituted non-fat dry milk

Non-fat dry milk 100 g
Distilled water 1000 ml

Suspend non-fat dry milk in distilled water and dissolve by swirling.
Sterilize at 121 ± 1 ^{o}C for 15 minutes.

E.4.3 Pre-enrichment

Aseptically weigh 25 g of sample into a sterile blender jar. Add 225 ml of reconstituted non-fat dry milk (**B.4.2)** and blend for 2 minutes. Decant blended homogenate into a sterile 500-ml screw cap container. Determine the pH with a test paper. Adjust if necessary to 6.8 ± 0.2. Add 0.45 ml of brilliant green solution (**B.4.1)** and mix well. Loosen cap and incubate at 37 ^{o}C for 18 hours to 24 hours.

E.5 ENUMERATION OF YEASTS AND MOULDS

Enumeration of yeasts and moulds shall be carried out as described in **SLS 516:Part 2.**

E.6 ENUMERATION OF *Staphylococcus aureus*

Enumeration of *Staphylococcus aureus* shall be carried out as described in **SLS 516:Part 6.**

APPENDIX F
DETERMINATION OF HEAVY METALS

Determination of heavy metals shall be carried out according to the methods given in the Official Methods of Analysis of the AOAC (Association of Official Analytical Chemists) 18 th edition 2007.

TABLE 5 – Methods of analysis of heavy metals

SI No. **(1)**	**Heavy metal** **(2)**	**Method of Analysis** **(3)**
i)	Arsenic	986.15
ii)	Lead	972.23

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

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.

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