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Draft Sri Lanka Standard
SPECIFICATION FOR WHEAT BREAD
(THIRD REVISION) (DSLS 141:.....)

නිරිඟු පාන් සඳහා වන
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මෙම කෙටුම්පත ශ්‍රී ලංකා ප්‍රමිතියක් ලෙස නොසැලකිය යුතු මෙන් ම භාවිතා නොකළ යුතු ද වේ.
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This draft should not be regarded or used as a Sri Lanka Standard.

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

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XX

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 WHEAT BREAD
(Third Revision)

DSLS 141:

Gr. 9

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SRI LANKA STANDARDS INSTITUTION
17, Victoria Place
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Sri Lanka

Draft Sri Lanka Standard
SPECIFICATION FOR WHEAT BREAD
(Third Revision)

FOREWORD

This 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

This Standard was first published in 1972 and subsequently revised in 1981 and 1992. In this third revision, different bread types and styles have been introduced, ingredient list has been revised and amended, maximum tolerable limits for microbiological parameters and potentially toxic elements have been introduced.

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

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.

1 SCOPE

1.1 This Standard prescribes the requirements and methods of sampling and test for wheat bread.

1.2 This Standard covers wheat bread manufactured from wheat flour extracted at 70 percent extraction rate and above.

1.3 This Standard does not cover bread made from composite flour, which exceeds 2 percent by mass of the wheat flour.

2 REFERENCES

- SLS 79 Edible iodized/ non-iodized salt (granular form)
- SLS 80 Edible iodized salt (powdered form)
- SLS 102 Rules for rounding off numerical values
- SLS 143 General principles of food hygiene
- SLS 144 Wheat flour
- SLS 179 Condensed milk
- SLS 181 Milk, raw and processed
- SLS 191 White sugar
- SLS 418 Tapioca flour
- SLS 428 Random sampling methods
- SLS 516 Methods of test for microbiology of food and animal feeding stuffs

Part 2: Horizontal method for the enumeration of yeasts and moulds
 Section 2: Colony count technique in products with water activity less than or equal to 0.95
 Part 3: Horizontal method for the detection and enumeration of coliforms
 Section 1: Most probable number technique
 Part 5: Horizontal method for the detection of *Salmonella* spp.
 Part 12: Horizontal method for the detection and enumeration of presumptive *Escherichia coli* (Most probable number technique)

SLS	614	Potable water
SLS	625	Artificial vinegar
SLS	731	Milk powder
SLS	816	Method for checking net contents of prepackaged goods
SLS	883	Brown sugar
SLS	913	Rice flour
SLS	962	Methods of test for aflatoxin in food Part 1: Determination of aflatoxin B ₁ and the total content of aflatoxins B ₁ , B ₂ , G ₁ and G ₂ in cereals, nuts and derived products – high-performance liquid chromatographic method
SLS	964	Corn flour
SLS	965	Code of hygienic practice for biscuit manufacturing and bakery units
SLS	1011	Soya flour
SLS	1102	Bakery fats
SLS	1362	Methods of test for agricultural food products Part 1: Determination of crude fibre content – General method
SLS	1427	Fat spread and blended fat spread

3 DEFINITIONS

For the purpose of this Standard the following definition shall apply:

3.1 wheat bread: Product obtained by baking a yeast leavened dough prepared from wheat flour and water with or without the addition of optional ingredients and permitted additives.

3.2 white bread: Bread prepared using the wheat flour extracted at the minimum 70 percent extraction rate.

3.3 bran bread (whole meal/ whole wheat/ whole grain): Bread prepared using the wheat flour extracted at the minimum 80 percent extraction rate or bread prepared using wheat flour incorporated with minimum of 10 percent wheat bran and/ or cracked wheat and/ or whole wheat.

4 PRESENTATION

4.1 Types

4.1.1 *White bread*

4.1.2 *Whole meal/ whole wheat/ whole grain bread*

4.2 Styles

4.2.1 *Top-crust (unsliced/ sliced)*

4.2.2 *Roasted bread (Sinhala: රෝස්ට් ආන්; Tamil: ரோஸ்ட் பாண்)*

4.2.3 *Sandwich bread*

4.2.4 *Double roasted bread/ (Sinhala: තැටි ආන්; Tamil: வட்டு ரொட்டி)*

5 INGREDIENTS

5.1 Basic ingredients

5.1.1 *Wheat flour*, conforming to SLS 144, (extracted at 70 percent extraction rate or above)

5.1.2 *Yeast*, active dry, instant dry or compressed (*Saccharomyces cerevisiae*)

5.1.3 *Edible common salt*, conforming to SLS 79 or SLS 80

5.1.4 *Water*, conforming to SLS 614

5.2 Optional ingredients

5.2.1 *Sugar*, conforming to SLS 191 or SLS 883

5.2.2 *Milk and milk products*, singly or in combination

5.2.2.1 *Fresh milk*, conforming to SLS 181

5.2.2.2 *Condensed milk*, conforming to SLS 179

5.2.2.3 *Milk powder*, conforming to SLS 731

5.2.3 *Gluten*, not exceeding 2 per cent by mass of the wheat flour

5.2.4 *Malt products*, not exceeding 2 per cent by mass of the wheat flour

5.2.5 *Edible oils and fats*, not exceeding 2 per cent by mass of the wheat flour

5.2.6 *Soya flour*, conforming to SLS 1011, not exceeding 1 percent by mass of the wheat flour

5.2.7 *Edible flours/ starches*, singly or in combination, not exceeding 2 per cent by mass of the wheat flour

5.2.7.1 *Tapioca flour*, conforming to SLS 418

5.2.7.2 *Rice flour*, conforming to SLS 913

5.2.7.3 *Corn flour*, conforming to SLS 964

5.2.7.4 *Potato starch*

- 5.2.8** *Vitamin B₁, nicotinic acid or nicotinamide hydrochloride*, not exceeding 0.25 per cent by mass of the wheat flour
- 5.2.9** *Lysine hydrochloride*, not exceeding 0.25 per cent by mass of the wheat flour
- 5.2.10** *Bakery fats*, conforming to **SLS 1102**
- 5.2.11** *Fat spread and blended fat spread*, conforming to **SLS 1427**

6 ADDITIVES

Additives shall be used at the lowest level necessary to achieve the desired effect.

6.1 Improvers

- 6.1.1** *Calcium carbonate*, not exceeding 0.5 per cent by mass of the wheat flour
- 6.1.2** *Calcium phosphate*, not exceeding 0.25 per cent by mass of the wheat flour
- 6.1.3** *Ammonium persulfate or Potassium persulfate*, not exceeding 0.25 per cent by mass of the wheat flour
- 6.1.4** *Ammonium chloride or Potassium chloride*, not exceeding 0.05 per cent by mass of the wheat flour
- 6.1.5** *Fungal enzymes* (lipase, xylanase and/ or alpha-amylase), not exceeding 0.01 per cent by mass of the wheat flour
- 6.1.6** *Ascorbic acid*, not exceeding 0.005 per cent by mass of the wheat flour
- 6.1.7** *Lecithin* – Limited by GMP
- 6.1.8** *Sodium Stearoyl Lactylate (INS 481)* – Limited by GMP
- 6.1.9** *Sodium carboxy methyl cellulose*, edible sodium alginate, edible guar gum and edible gum tragacanth (Limited by GMP)
- 6.1.10** Glycerine, glyceryl monostearate and mono and diglycerides of other fatty acids (Limited by GMP)

6.2 Preservatives

- | | | | |
|--------------|-----------------------------|---------|---|
| 6.2.1 | <i>Calcium propionate</i> | INS 282 | } 3000 mg/ kg, maximum as propionates
(singly or in combination) |
| 6.2.2 | <i>Sodium propionate</i> | INS 281 | |
| 6.2.3 | <i>Potassium propionate</i> | INS 283 | |
| 6.2.3 | <i>Propionic acid</i> | INS 280 | |

7 PROCESSING REQUIREMENTS

Wheat bread shall be prepared, packed, stored and transported under hygienic conditions as prescribed in **SLS 143** and **SLS 965**.

8 PRODUCT REQUIREMENTS

8.1 Appearance

8.1.1 The crust of wheat bread shall be free from blisters. It shall have a uniform colour of golden to light brown. The crust shall not be burnt. It shall be free from soot and foreign matter.

8.1.2 The crumb shall be springy with small pores uniformly distributed throughout. It shall be free from splits and/ or large holes. It shall also be free from non-porous mass, lumps of flour or salt or any evidence of incomplete mixing.

8.1.3 There shall be no hollow between the crust and the crumb.

8.2 Mould growth, insect infestation and foreign matter

The crumb shall be free from fungal growth and rope formation. It shall also be free from foreign matter and any evidence of insect infestation or rodent contamination.

8.3 Flavour

Wheat bread shall have a flavour characteristic of fresh, well baked bread. It shall be free from bitterness or any other objectionable flavour.

8.4 Physical requirements

8.4.1 The volume/ mass ratio of wheat bread when tested as in Appendix B, shall not be less than 2.5.

NOTE

This requirement is not applicable to the product types mentioned in Clause 4.2.2, Clause 4.2.4.

8.4.2 Weight

8.4.2.1 Top crust, sandwich and double roasted bread

8.4.2.1.1 The average weight of the wheat bread loaves shall be more than or equal to any of the following nominal values (as declared by the manufacturer) as given in Table 1 and weight of each loaf shall be not less than the corresponding lower tolerance value.

TABLE 1 – Standard weight of unpacked top crust, sandwich and double roasted bread

SI No (1)	Common size (2)	Nominal value (3)	Lower tolerance value (4)
i)	Half loaf	225 g	216 g
ii)	Loaf	450 g	437 g
iii)	Large loaf	900 g	885 g
iv)	Extra-large loaf	1800 g	1773 g

8.4.2.1.2 Packaged breads in the weights given in Table 1 shall be complied with the weight

tolerance defined in Table 1 of SLS 816.

8.4.2.1.3 Breads available in other weights except the weights given in Table 1 shall be complied with the weight tolerance defined in Table 1 of SLS 816.

8.4.2.2 *Roasted bread*

The average minimum mass of the quarter loaf of roasted wheat bread and half loaf of roasted wheat bread shall be as mentioned in Table 2.

TABLE 2 – Standard weight of roasted bread

SI No (1)	Common size (2)	Nominal value (3)	Lower tolerance value (4)
i)	Quarter loaf	110 g	105 g
ii)	Half loaf	225 g	216 g

8.6 Other requirements

8.6.1 White wheat bread

White wheat bread shall conform to the requirements given in Table 3 when tested by the methods given in Column 6.

TABLE 3- Requirements for white wheat bread

SI No (1)	Characteristic (2)	Requirement			Method of test (6)
		Top-crust (unsliced) (3)	Top-crust (sliced) and sandwich (4)	Roasted and double-roasted (5)	
i)	Moisture in any part of the loaf, per cent by mass, max.	40.0	45.0	35.0	Appendix C
ii)	pH of the aqueous extract at 25 °C	5.3 to 6.0			Appendix D
iii)	Acid insoluble ash, on dry basis, per cent by mass, max.	0.1			Appendix E
iv)	Crude fiber on dry basis, per cent by mass, min.	0.25			SLS 1362 Part 1

8.6.2 Whole meal/ whole wheat/ whole grain bread

Whole meal/ whole wheat/ whole grain bread shall conform to the requirements given in Table 4 when tested by the methods given in Column 5.

TABLE 4- Requirements for whole meal/ whole wheat/ whole grain bread

SI No	Characteristic	Requirement		Method of test
		Top-crust (unsliced)	Top-crust (sliced) and sandwich	
(1)	(2)	(3)	(4)	(5)
i)	Moisture in any part of the loaf, per cent by mass, max.	42.0	45.0	Appendix C
ii)	pH of the aqueous extract at 25 °C	5.0 to 6.0		Appendix D
iii)	Acid insoluble ash, on dry basis, per cent by mass, max.	0.1		Appendix E
iv)	Crude fiber on dry basis, per cent by mass, min.	0.5		SLS 1362 Part 1

8.7 Microbiological requirements

The product shall conform to the limits given in Table 5, when tested in accordance with the methods prescribed in Column 7 of the table.

TABLE 5 - Microbiological limits

SI No	Test organism	n	c	Limit		Method of test (SLS 516)
				m	M	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Yeast and mould count, per g	5	0	-	1×10^2	Part 2: Section 2
ii)	Coliforms, MPN per g	5	2	00	10	Part 3: Section 1
iii)	<i>E.coli</i> , MPN per g	5	0	00	-	Part 12
iv)	<i>Salmonella</i> , per 25 g	5	0	Absent	-	Part 5

where,

n is the number of sample units to be tested;

c is the maximum allowable number of sample units yielding values between m and M ;

m is the limit under which a count is acceptable for any sample unit; and

M is the limit above which a count is unacceptable for any sample unit.

9 CONTAMINANTS

9.1 Potentially toxic elements

The product shall not exceed the limits given in Table 6, when tested according to the relevant methods given in Column 4 of the table.

Table 6 - 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.	0.1	AOAC 986.15 or AOAC 2013.06
ii)	Lead, as Pb, mg/ kg, max.	0.1	AOAC 999.11 or AOAC 2013.06
iii)	Cadmium, as Cd, mg/ kg, max.	0.1	AOAC 999.11 or AOAC 2013.06

9.2 Aflatoxins

The product shall not exceed the level 2.0 µg/ kg for aflatoxin B₁ and 4.0 µg/ kg for total aflatoxin, when determined according to the method given in Part 1 of SLS 962 or 968.22 of AOAC.

NOTE

Tests for potentially toxic elements and aflatoxins may not be necessary for routine analysis and carried out only if requested by the Competent Authority.

10 PACKAGING

Wheat bread may be packaged as it is or in sliced form, in a clean and dry or any other suitable food-grade packaging material to preserve freshness.

NOTE

In-case of unpacked wheat bread, the product shall be sold to the end consumer within 6 hours.

11 MARKING AND/ OR LABELLING

Each package shall be marked and/ or labelled legibly and indelibly or a label shall be attached to the package with the following information.

- Name of the product as WHEAT BREAD/ BREAD, including the type and style (as mentioned in Clause 4);
- Brand name or trade mark;
- Net mass, in grams;
- Date of expiry;
- Date of manufacture;

SLS 141:

- f) List of ingredients;
- g) Any permitted food additives name and INS number;
- h) Batch or code number of decipherable code marking;
- j) Name and address of the manufacturer and/ or distributor; and
- k) Instruction for storage, if applicable.

12 SAMPLING

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

13 METHODS OF TEST

Tests shall be carried out as prescribed in Appendices B to E of this Standard, Section 2 of Part 2, Section 1 of Part 3, Part 5 and 12 of SLS 516, Part 1 of SLS 962, Part 1 of SLS 1362 and Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC).

12 CRITERIA FOR CONFORMITY

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

12.1 Each package inspected as in A.5.1 satisfies the packaging and marking and/ or labelling requirements.

12.2 Each sample examined as in A.5.2 satisfies the requirements given in Clauses 8.1, 8.2, 8.3 and 8.4.2.

12.3 The sub-sample tested as in A.5.3 satisfies the requirements given in Clause 8.4.2.

12.4 The sub-sample tested as in A.5.4 satisfies the requirements given in Table 3 or 4 as appropriate (except moisture) and the requirements given in Clause 9.

12.5 Each sample tested as in A.5.5 satisfies the requirement for moisture given in Table 3 or 4 as appropriate.

12.6 Each sample tested as in A.5.6 satisfies the microbiological requirement given in Table 5.

APPENDIX A SAMPLING

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, appropriate schemes of sampling and inspection shall be adopted based on manufacturer's control systems coupled with type tests and testing procedures.

A.1 LOT

In any consignment, all the white bread loaves belonging to one batch of manufacture should constitute a lot. If the consignment is declared to consist of different batches of manufacture, the loaves of the same batch should be grouped together and each group should constitute a separate lot.

A.2 GENERAL REQUIREMENTS OF SAMPLING

A.2.1 The samples should be placed in clean and dry sample containers such as polythene bags or glass bottles, and should be stored in such a manner that the material is not unduly affected.

A.2.2 Sample containers should be sealed air-tight and marked with necessary details of sampling.

A.2.3 Samples should be tested within the shelf-life of the product.

A.3 SCALE OF SAMPLING

A.3.1 The number of loaves/ packages to be tested from a lot should be in accordance with Table 7.

TABLE 7 - Scale of sampling

Number of loaves/ packages in the lot (1)	Number of loaves/ packages to be selected (2)	Size of the sub-sample (3)
Up to 150	5	3
151 to 500	8	5
501 to 1200	13	5
1201 and above	13	8

A.3.2 Separate 5 units drawn aseptically for the microbiological analysis.

A.3.3 The loaves should to selected at random. In-order to ensure randomness of selection random numbers as given in **SLS 428** should be used.

A.4 PREPARATION OF TEST SAMPLES

A.4.1 All the loaves/ packages selected as in **A.3.1** shall be inspected for the requirements given in **8.1** to **8.3**. Each loaf shall be weighed individually and the mass shall be recorded and average mass of the sample shall be calculated (Clause **8.4.2**).

A.4.2 After inspecting as in **A.4.1**, a sub—sample of size as given in Column **3** of Table **7** shall be drawn at random. All the loaves of the sub—sample shall be tested for volume/ mass ratio (Clause **8.4.1**).

A.4.3 After testing for volume/ mass ratio, each of the loaves of the sub—sample shall be cut diagonally. One of the portions from every loaf shall be cut into pieces and mixed together to form a composite sample. The composite sample so obtained shall be tested for the requirements given in Table 3 or 4 as appropriate except for moisture and the requirements given in Clause 9.

A.4.4 Each of the other portions of the loaves shall be treated as individual samples and shall be transferred into sample containers. Tests for the determination of moisture shall be conducted individually on each of these samples.

A.5 NUMBER OF TESTS

A.5.1 Each sample selected as in A.3.1 shall be inspected for packaging and marking and/or labelling requirements.

A.5.2 Each sample selected and prepared as in A.4.1 shall be tested for the requirements given in Clause 8.1, 8.2, 8.3 and 8.4.2.

A.5.3 Sub-samples prepared as in A.4.2 shall be tested for the requirements given in Clause 8.4.1.

A.5.4 The composite sample prepared as in Clause A.4.3 shall be tested for the requirements given in Table 3 or 4 as appropriate (except moisture) and requirements given in Clauses 9.1 and 9.2

A.5.4 Samples prepared as in Clause A.4.4 shall be tested for the moisture content given in Table 3 or 4 as appropriate.

A.5.6 The samples selected as in A.3.2 shall be tested for the requirements given in Table 5.

APPENDIX B DETERMINATION OF VOLUME/ MASS RATIO

B.1 APPARATES/ MATERIAL

B.1.1 *Graduated cyliner, 500-ml capacity.*

B.1.2 *Wooden box, to contain a loaf of wheat bread so that the top surface of the loaf remains about 15 mm below the top level of the box, when the loaf is placed over a thin layer of sesame seeds.*

B.1.3 *Sesame (gingelly) seeds/ mustard seeds/ rape seeds*

B.2 PROCEDURE

B.2.1 *Determination of the density of sesame (gingelly) seeds/ mustard seeds/ rape seeds*

Weigh, to the nearest 0.01 g, the cylinder (B.1.1). Fill it to the 500-ml mark with sesame seeds and re-weigh. Take the average of three readings.

$$\text{Density of sesame seeds (D), in g/ ml} = \frac{(m_1 - m_0)}{500}$$

where,

m_1 is the mass, in g, of the cylinder filled with the seeds ; and
 m_0 is the mass, in g, of the cylinder.

B.2.2 *Determination of the volume of loaf*

Weigh, to the nearest. 0.01 g, the loaf of bread.

Fill the wooden box (B.1.2) with sesame seeds and level the top surface with a wooden plate. Weigh the box with the seeds. Take two such readings and record the average.

Empty out the seeds leaving a thin layer. Place the loaf on this layer of seeds. Do not press the loaf. Fill the rest of the space with sesame seeds. Level off the surface with a wooden plate and weigh. Take two such readings and record the average.

B.3 CALCULATION

$$\text{B.3.1 } \textit{volume of the loaf, in ml} = \frac{(m_1 - m_2)}{D}$$

where,

m_1 is the mass, in g, of the box filled with seeds plus the mass of the loaf;
 m_2 is the mass, in g, of the box with loaf and seeds in the residual space; and
 D is the density, in g/ml, of the sesame seeds (*see* B.2.1).

B.3.2 Determine the volume/ mass ratio of the loaf.

APPENDIX C DETERMINATION OF MOISTURE

C.1 Apparatus

C.1.1 *stainless steel dish*

C.1.2 *Oven, maintained at 105 ± 2 °C*

C.2 PROCEDURE

C.2.1 Cut portions from parts of the loaf which appear to contain the most moisture. Cut the portions into fine pieces, mix them thoroughly.

C.2.2 Weigh, to the nearest 0.1 g, about 10 g of the prepared sample in a previously dried and tared dish (C.1.1). Dry in the oven (C.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 two successive weighings does not exceed 1 mg.

Carry out the determination in duplicate.

C.3 CALCULATION

$$\text{Moisture content, percent by mass} = \frac{(m_1 - m_2)}{(m_1 - m_0)} \times 100$$

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 sample after drying; and

m_0 is the mass, in g, of the empty dish.

APPENDIX D DETERMINATION OF pH THE AQUEOUS EXTRACT

D.1 APPARATUS

pH meter, with glass electrode or a suitable pH comparator provided with standard colour discs.

D.2 REAGENTS

D.2.1 *Distilled water*, boiled for 10 minutes and cooled to room temperature immediately before use. Re-distil the water in an all-glass apparatus if its pH is not within 6.2 to 7.0.

D.2.2 *Universal indicator solution*.

D.2.3 *Chlorophenol red indicator solution*, 0.4 g/l.

Weigh 0.1 g of chlorophenol red and grind with 23.6 ml of 0.01 mol/l Sodium hydroxide solution in an agate mortar. Transfer quantitatively to a 250-ml volumetric flask and make up to the volume with water.

This solution has a pH range of 4.8 to 6.4. It turns yellow in an acid medium and red in

alkaline.

D.3 PROCEDURE

D.3.1 Grind to a fine paste, about 10 g of bread in a glass pestle and mortar. Add 100 ml of water (**D.2.1**) and mix thoroughly. Allow to stand for about 15 minutes. Filter and collect the filtrate to a beaker.

D.3.2 Determine the pH of the filtrate (**D.3.1**) using a pH meter or a pH comparator (as per the procedure described in clause **D.3.3**). In case of a dispute, always use a pH meter.

D.3.3 Clean the two glass tubes of the pH comparator with carbon tetrachloride and allow to dry. Fill the two tubes with the aqueous extract to the 10-ml mark. Add 5 drops of universal indicator solution (**D.2.2**) to one of the tubes and mix well.

Insert the standard colour discs provided for the universal indicator. Place the two tubes in position. The tube, without the indicator should be placed behind the colour discs. Compare the colour until a nearest colour match is obtained. Record the approximate pH of the aqueous extract.

Discard the contents of the glass tube to which the indicator had been added, wash with water and dry. Clean the tube with carbon tetrachloride and dry. Fill the tube with the aqueous extract to the 10-ml mark. Add 5 drops of an appropriate indicator solution and mix well. Place this tube in position, replace the previous standard colour disc with the one provided for the indicator used and read the exact pH of the solution when the nearest colour match is obtained.

APPENDIX E DETERMINATION OF ACID INSOLUBLE ASH

E.1 APPARATUS

E.1.1 *Platinum or silica or porcelain dish*

E.1.2 *Oven, maintained at 105 ± 2 °C*

E.1.3 *Muffle furnace, maintained at 600 ± 20 °C*

E.2 REAGENT

Dilute Hydrochloric acid, 5 mol/l solution

E.3 PROCEDURE

Cut slices of bread into fine pieces. Weigh, to the nearest 0.1 g, about 10 g in the dish. (**E.1.1**) Heat the dish in the oven (**E.1.2**) for about 2 hours. Ignite using a suitable burner for about 1 hour. Complete the ignition in a muffle furnace (**E.1.3**) for 1 hour. Cool in a desiccator.

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Add 25 ml of hydrochloric acid (E.2) to the ash in the dish. Cover with a watch-glass and heat on a water-bath for 10 minutes. Allow to cool. Filter through a slow ashless filter paper. Wash the filter paper with water until the washings are free from the acid. Return the filter paper and residue to the dish. Dry in an oven for about 2 hours. Incinerate in the muffle furnace. Cool and weigh.

Repeat the process of igniting, cooling and weighing at 30-minute intervals until the difference between two successive weighings does not exceed 1 mg.

E.4 CALCULATION

$$\text{Acid insoluble ash, on dry basis,} \\ \text{percent by mass} = \frac{(m_1 - m_0)}{(m_2 - m_0)(100 - M)} \times 10\,000$$

where,

m_1 is the mass, in g, of the dish with the acid insoluble ash;

m_2 is the mass, in g, of the dish with the sample;

m_0 is the mass, in g, of the empty dish; and

M is the moisture in any part of the loaf, per cent by mass (see Appendix C)