SRI LANKA STANDARD 964 : 1992

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SPECIFICATION FOR

CORN FLOUR
(MAIZE STARCH)

SRI LANKA STANDARDS INSTITUTION

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SLS 964 : 1992

Gr. 9

SRI LANKA STANDARDS INSTITUTION
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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

SPECIFICATION FOR CORN FLOUR (MAIZE STARCH)

FOREWORD

This standard was approved by the Sectoral Committee on Cereals, Pulses and their products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 1992 - 10 - 07.

Corn flour is a widely used ingredient in food preparations such as custard powder, biscuits, confectionery etc. It is also used as a binding and diluting agent in pharmaceutical products.

Guidelines for the determination of compliance of a lot with the requirements of this standard based on statistical sampling and inspection are given in Appendix A.

During the formulation of this specification due consideration has been given to the relevant provisions made under the Sri Lanka Food Act No. 26 of 1980. Specific requirements given in this specification, wherever applicable, are in accordance with the relevant regulations. However, general provisions made under the Sri Lanka Food Act have not been included in this specification and therfore, the attention of the user of this specification is drawn to these general provisions.

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 the preparation of this specification, valuable assistance dervied from the following publication is gratefully acknowledged:
IS 1005 : 1976 Indian Standard specification for edible maize starch (corn flour) (Second Revision)

1 SCOPE

This specification prescribes the requirements and methods of test for corn flour (maize starch).

2 REFERENCES

SLS 102 Presentation of numerical values.
SLS 143 General principles of food hygiene.
SLS 428 Random sampling methods.
SLS 467 Labelling of prepackaged foods.
SLS 735 Methods of test for milk and milk products
Part 6 : Determination of sugars.
SLS 851 Maize (corn).

3 DEFINITIONS

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

corn flour (maize starch) : Starch obtained from the cereal *Zea mays* L.

4 REQUIREMENTS

4.1 Processing requirements

4.1.1 Corn flour shall be made from the grains of corn conforming to SLS 851.

4.1.2 Corn flour shall be processed, packed, stored and distributed under the hygienic conditions as prescribed in SLS 143.

4.2 Product requirements

4.2.1 Corn flour shall be in the form of a fine powder having a uniform consistancy. It shall be white to creamy - white in colour.

4.2.2 Corn flour shall be free from rancid or any objectionable odours. It shall also be free from extraneous matter, evidence of insect or fungal infestations.

4.2.3 Corn flour when examined under the microscope as prescribed in Appendix B, shall show characteristic starch granules as illustrated in Plate 1 and Figure 1.

4.2.4 Corn flour shall conform to the requirements given in Table 1 when tested as given in Column 4 of the table.

TABLE 1 - Requirements for corn flour (maize starch)

Sl. No. (1)	Characteristic (2)	Requirement (3)	Method of test (4)
i	Moisture, per cent by mass, max.	13	Appendix C
ii	Starch, on dry basis, per cent by mass, min.	97	Appendix D
iii	Total ash, on dry basis, per cent by mass, max.	0.3	Appendix E
iv	Acid insoluble ash, on dry basis, percent by mass, max.	0.1	Appendix F
v	pH of the aqueous extract	4.5 to 7.0	Appendix G

5 PACKAGING

Corn flour shall be suitably packed in clean, dry and moisture proof packages and sealed air-tight.

6 MARKING

6.1 Each package shall be marked or labelled legibly and indelibly with the following:

a) Name of the product as 'CORN FLOUR' or 'MAIZE STARCH';
b) Brand name/trade mark, if any;
c) Net mass, in grams or in kilograms;
d) Name and address of the manufacturer/distributor;
e) Batch or code number; and
d) Date of manufacture.

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

NOTE

Attention is drawn to the certification facilities offered by the Sri Lanka Standards Institution. See the inside back cover of this standard.

7 METHODS OF TEST

Tests shall be carried out as prescribed in Appendicies B to G of this specification.

APPENDIX A
COMPLIANCE OF A LOT

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 based on manufacturer's control systems coupled with type testing and check tests or any other procedure, appropriate schemes of sampling and inspection should be adopted.

A.1 Lot

In any consignment, packages of the same size containing corn flour (maize starch) belonging to one batch of manufacture or supply should constitute a lot.

A.2 Scale of sampling

A.2.1 The number of packages to be selected from a lot should be in accordance with Table 2.

TABLE 2 - Scale of sampling

Number of packages in the lot	Number of packages to be selected
Upto 250	4
251 to 500	5
501 to 1200	6
1201 and above	7

A.2.2 Packages should be selected at random. In order to ensure randomness of selection, tables of random numbers as given in SLS 428 should be used.

A.3 NUMBER OF TESTS

A.3.1 Each package selected as in A.2.1 should be inspected for packaging and marking requirements.

A.3.2 Each package selected as in A.2.1 should be examined/tested for the requirements given in 4.2.1 to 4.2.3.

A.3.3 Approximately an equal quantity of material should be drawn from each package selected as in A.2.1 using clean and dry sampling instruments and mixed to form a composite sample. The composite sample thus obtained should be tested for the requirements given in Table 1.

A.4 CRITERIA FOR CONFORMITY

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

A.4.1 Each package inspected as in A.3.1 satisfies the relevant requirements.

A.4.2 Each package examined/tested as in A.3.2 satisfies the relevant requirements.

A.4.3 The test results on the composite sample when tested as in A.3.3 satisfy the relevant requirements.

APPENDIX B
MICROSCOPICAL EXAMINATION

Transfer about 1 g of corn flour into 50 ml of distilled water. Stir with a glass rod. Immediately place a drop of the suspension on a clean microscopic slide. Place a cover slip ommitting any entrapping air bubbles. Examine under a microscope with a magnification of 660 and compare with Plate 1.

Plate 1 - Photomicrograph of corn starch granules x 660

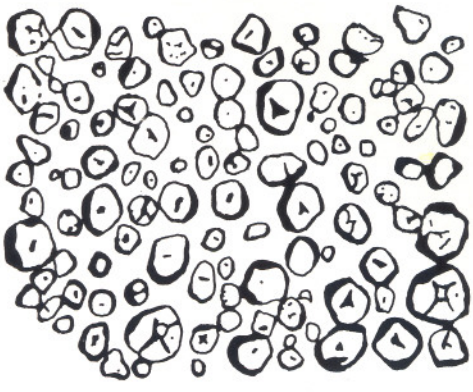

Figure 1 - Microscopical features of corn starch x 600

Corn starch granules are usually concentric, polygonal or rounded in shape, hilum is prominant, splitting of starch grain into three or four parts is common, no striae are observed.

APPENDIX C
DETERMINATION OF MOISTURE

C.1 APPARATUS

C.1.1 *Metal dish,* with a lid.

C.1.2 *Oven,* maintained at 130 °C to 133 °C.

C.1.3 *Desiccator.*

C.2 PROCEDURE

C.2.1 Dry the dish (C.1.1) in an oven for about 30 minutes. Cool in the desiccator and weigh to the nearest milligram.

C.2.2 Weigh, to the nearest milligram, about 5 g of the sample in the dish (C.2.1). Dry in the oven (C.1.2) for 1 1/2 hours. Cool in the desiccator (C.1.3) 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.

C.3 CALCULATION

$$\text{Moisture, per cent by mass} = \frac{m_1 - m_2}{m_1 - m_0} \times 100$$

where,

m_1 is the mass, in g, of the dish and the lid with the sample before drying;

m_2 is the mass, in g, of the dish and the lid with the sample after drying; and

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

APPENDIX D
DETERMINATION OF STARCH

D.1 REAGENTS

D.1.1 *Di-ethyl ether*

D.1.2 *Ethyl alcohol,* 10 per cent (V/V)

D.1.3 *Hydrochloric acid,* 10 per cent (V/V)

D.1.4 *Sodium carbonate solution,* 20 g of sodium carbonate dissolved in 100 ml of water.

D.2 PROCEDURE

D.2.1 *Preparation of the sample solution*

Weigh, to the nearest milligram, about 2 g of the sample. Place on a quantitative medium fast filter paper and extract with five 10-ml portions of diethyl ether (D.1.1). Evaporate the ether and wash with 150 ml of ethyl alcohol (D.1.2). Carefully wash off the residue from the filter paper with 200 ml of cold water. Reflux the residue with 200 ml of hydrochloric acid (D.1.3) in a flask with a reflux condenser for 2 1/2 hours. Cool and neutralize with sodium carbonate (D.1.4). Transfer quantitatively to a 500-ml graduated flask and make up to volume.

D.2.2 Transfer the prepared solution to a 50-ml burette and proceed as given in 4.3.2 of SLS 735 : Part 6 : 1989.

D.3 CALCULATION

$$\text{Starch, on dry basis, per cent by mass} = \frac{9.3\, m_1\, V}{m_2(100-M)}$$

where,

m_1 is the milligrams of anhydrous dextrose in 1 ml of the sample solution;
V is the volume, in ml, of the sample solution;
m_2 is the mass, in g, of the sample used to prepare V ml of the solution; and
M is the percentage of moisture.

APPENDIX E
DETERMINATION OF ASH

E.1 APPARATUS

E.1.1 *Dish,* of silica or platinum.

E.1.2 *Oven,* maintained at 130 ± 5 °C.

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

E.1.4 *Desiccator,*

E.2 PROCEDURE

Dry the test sample in the oven (E.1.2) for about 2 hours. Weigh, to the nearest milligram, about 2 g to 6 g of the dried sample in the dish. (E.1.1) Char the dried material using a suitable burner or a hot plate. Complete the ignition in the furnace (E.1.3) until a grey ash is obtained. Cool in a desiccator and weigh. Repeat the process of igniting, cooling and weighing at 30-minute intervals until the difference between two sucessive weighings does not exceed 1 mg.

E.3 CALCULATION

$$\text{Total ash, on dry basis, per cent by mass} = \frac{m_1 - m_0}{m_2 - m_0} \times 100$$

where,

m_1 is the mass, in g, of the dish with the ash;
m_2 is the mass, in g, of the dish with the dried sample; and
m_0 is the mass, in g, of the empty dish.

APPENDIX F
DETERMINATION OF ACID INSOLUBLE ASH

F.1 PROCEDURE

Add 25 ml of 5 mol/l hydrochloric acid to the dish containing ash obtained in E.2, cover with a watch glass and heat on a water bath for 10 minutes. Cool and filter through a slow ashless filter paper. Wash with water until the washings are free from acid. Place the filter paper with the residue in the dish and dry in the oven for about 30 minutes. Char the dried filter paper with the residue using a suitable burner or a hot plate. Ignite in the furnace for one hour. Cool in a desiccator 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.

F.2 CALCULATION

$$\text{Acid insoluble ash, on dry basis, per cent by mass} = \frac{m_3 - m_0}{m_2 - m_0} \times 100$$

where,

m_3 is the mass, in g, of the dish with acid insoluble ash;
m_2 is the mass, in g, of the dish with the dried sample; and
m_0 is the mass, in g, of the empty dish.

APPENDIX G
DETERMINATION OF pH

Weigh 10.0 g of the sample in a dry conical flask and add 100 ml of recently boiled and cooled distilled water. Shake until the particles are evenly suspended and the mixture is free of lumps. Digest for 30 minutes shaking frequently. Let it stand for 10 minutes and decant the supernatant liquid into the electrode vessel. Immediately determine the pH value using a potentiometer and electrodes calibrated against known buffer solutions.

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.*

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SRI LANKA STANDARDS INSTITUTION

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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.

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