SRI LANKA STANDARD 811 : 1988

UDC 664.956

SPECIFICATION FOR

MALDIVE FISH

SRI LANKA STANDARDS INSTITUTION

SPECIFICATION FOR MALDIVE FISH

SLS 811:1988

Gr. 7

SRI LANKA STANDARDS INSTITUTION
53, Dharmapala Mawatha,
Colombo 3,
Sri Lanka.

CONSTITUTION OF THE DRAFTING COMMITTEE

CHAIRMAN	*REPRESENTING*
Mr. J. Fernando	Co-operative Wholesale Establishment
MEMBERS	
Miss N. Chinivasagam	National Aquatic Resources Agency
Mr. M.B.J.L. Fernando	Industrial Development Board
Mr. R.D.B. Kumararatna	Department of Commerce
Mr. D.A. Perera	Ceylon Fisheries Corporation
Dr. (Mrs.) C. Piyasena	Medical Research Institute
Dr. (Miss) R.S. Wilson	Ceylon Institute of Scientific and Industrial Research

TECHNICAL SECRETARIAT

SRI LANKA STANDARDS INSTITUTION

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 MALDIVE FISH

FOREWORD

This Sri Lanka Standard was authrorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 1988-01-25, after the draft, finalized by the Drafting Sub-committee on Maldive Fish, had been approved by the Food and Agricultural Products Divisional Committee.

During the formulation of this specification, a common problem encountered in the local maldive fish industry has been the high moisture levels of processed products. This condition greatly reduces the shelf-life and it is therefore recommended that the product is sufficiently dried before marketing. Eventhough the salt content increases the shelf-life of the product over salting has been found to mask the characteristic flavour of the product. A maximum limit for the salt content has been introduced in this specification with a view to achieving the required shelf-life by drying rather than salting the product.

The product, when properly processed using fish of the tuna species, acquires a spindle shape in appearance.

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

This specification is subject to the 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 CS 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 derived from the publications of the Food and Agricultural Organization and the Tropical Products Institute is gratefully acknowledged.

1 SCOPE

This specification prescribes requirements and methods of sampling and test for maldive fish.

2 REFERENCES

CS 102 Presentation of numerical values

SLS 428 Random sampling methods

Official Methods of Analysis, Association of Official Analytical Chemists (AOAC), 14th edition.

3 DEFINITIONS

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

maldive fish: The hard-dried product obtained by wet-salting or dry-salting and drying and smoking the flesh of fresh or frozen wholesome fish of the tuna species.

4 RAW MATERIAL

Maldive fish shall be prepared from fresh or frozen wholesome fish of the tuna species. Suitable species include :

a) Skipjack tuna - *Katsuwonus pelamis* (L);

b) Yellowfin tuna - *Thunnus albacares* (Bonneterre);

c) Mackerel tuna - *Euthynnus affinis* (Cantor); and

d) Frigate mackerel - *Auxis thazard* (Lacepede).

5 GRADES

There shall be two grades of maldive fish, based on the length of pieces, as follows:

Grade 1 - Shall constitute of maldive fish pieces not less than 100 mm.

Grade 2 - Shall constitute of maldive fish pieces between 50 mm - 100 mm.

Pieces smaller than 50 mm may be allowed for Grade 2, subject to a maximum of 20 per cent by mass.

6 PROCESSING

6.1 Preparation for processing

The fish shall be washed in clean, fresh water. Frozen fish shall be thawed prior to washing. The fish shall be deheaded and eviscerated by slightly lifting the pectoral fin and cutting vertically. The fish shall be washed again with fresh, clean water.

6.2 Salting

6.2.1 *Wet-salting*

The fish prepared as in **6.1** shall be boiled in a sodium chloride solution with a concentration of 3 per cent to 5 per cent until the flesh acquires a firm texture enabling easy separation of the flesh. Commercial salt of sodium chloride content not below 95 per cent and insoluble impurities not exceeding 2 per cent shall be used. Throughout the brining period, the concentration of the salt solution shall be maintained. The water shall be drained off the product after boiling.

6.2.2 *Dry-salting*

The fish shall be prepared as in **6.1** and slit along the ventral surface without separating the flesh. Grains of commercial salt shall be placed along the cut and on the surface of the fish for 30 minutes. Commercial salt of sodium chloride content not below 95 per cent and insoluble impurities not exceeding 2 per cent shall be used. The proportion of fish to salt shall be not less than 6:1.

6.3 Smoking and drying

6.3.1 The fish when salted as given in **6.2.1**, shall be allowed to cool and shall be separated into two lateral pieces along the ventral side such that the vertebral column is removed without damaging the flesh. Each chunk of flesh thus obtained shall be separated into two pieces lengthwise. The loins shall be sun-dried or mechanically dried under hygienic conditions. The loins shall be smoked. The drying period may also be combined with intermittent smoking. Smoking shall be carried out such that the product becomes neither scorched nor burnt.

6.3.2 The fish when salted as given in **6.2.2**, may be baked over a slow fire for 8 hours to 12 hours. Thereafter, the drying and smoking processes may be applied as given in **6.3.1**.

7 REQUIREMENTS

7.1 Appearance

The product shall be free from scales, bones, visible mould growth and insect or mite infestation. It shall have neither a burnt nor scorched appearance. The product, when cut, shall have the characteristic reddish brown sheen of good quality maldive fish. The product shall be free from the presence of a powdery substance both on the surface or within the material.

7.2 Odour

The product shall be free from any putrid, rancid or mouldy odour.

7.3 Texture

The product shall be hard-dried and firm. It shall not be rubbery in texture.

7.4 Flavour

The product shall have the characteristic flavour of maldive fish. It shall be free from bitter, sour, stale or putrid flavour. The product shall not produce and irritating sensation when tasted.

7.5 Additives

There shall be no additives.

7.6 Other requirements

The product shall conform to the requirements prescribed in Table 1 and Table 2, when tested in accordance with the methods specified in Column 4 of Table 1.

TABLE 1 - Requirements for maldive fish

Sl. No. (1)	Characteristic (2)	Requirement (3)	Method of test Reference (4)
i)	Moisture, per cent by mass, max.	16.0	Appendix B
ii)	Sodium chloride, per cent by mass, (dry basis), min.	see Table 2	Appendix C
	max.	5.0	
iii)	Acid insoluble ash, (dry basis) per cent by mass, max.	0.5	Appendix D
iv)	Histamine content, mg/kg max.	200	Appendix E

**NOTE - The shelf-life of dried and salted fish products mainly depends on their water activity (aw) which indicates the water available to support the growth of micro-organisms. Salting and drying in combination reduces the water activity enabling the product to maintain its stability. Retaining the water activity below 0.70 has been found to ensure the mould-free shelf-life of dried/salted fish products. The minimum salt content required to maintain the water activity of maldive fish below 0.70 depends on the moisture content of the product, and is given in Table 2.*

TABLE 2 - Minimum salt contents for maldive fish

Moisture content, per cent by mass (1)	Sodium chloride, per cent by mass, min. (2)
Up to and including 13	1.5
Up to and including 14	2.0
Up to and including 15	3.0
Up to and including 16	4.0

8 PACKAGING AND MARKING

8.1 Packaging

8.1.1 Maldive fish shall be bulk-packed in clean jute bags or woven polypropylene bags so as to protect the product during transport and handling. The bags shall not impart to the product, any toxic, harmful or extraneous substances or contaminate the product in any other manner. The mouth of each bag shall be firmly stitched.

8.1.2 Maldive fish shall be packed for retail sale in transparent, moisture-proof packages.

8.2 Marking

8.2.1 Each bag or package shall be marked legibly and indelibly with the following information. In case of packages, an attached label may be marked with this information :

a) The words "MALDIVE FISH";

b) Grade of the product;

c) Name and address of the producer/packer/trader (including country of origin);

d) Brand/trade name;

e) net mass, in kilograms in the case of bulk packages and in grams, in the case of retail packages; and

f) Month and year of processing.

NOTE - When bags are being re-used for bulk packaging, the existing markings shall be crossed out with indelible ink or dye.

9 SAMPLING

Sampling shall be carried out as prescribed in Appendix A.

10 METHODS OF TEST

Tests shall be carried out as prescribed in Appendices B, C, D and E.

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 package examined as in A.6.1 satisfies the relevant requirements.

11.2 Contents of each package tested as in A.6.2 satisfies the relevant requirements.

11.3 Each sample tested as in A.6.3 satisfies the relevant requirements.

APPENDIX A

SAMPLING

A.1 LOT

All bags/packages containing approximately equal quantities of maldive fish of the same grade, and belonging to one batch of manufacture or supply shall constitute a lot.

A.2 GENERAL REQUIREMENTS OF SAMPLING

A.2.1 Sampling shall be carried out in such a manner as to protect the sample, the material being sampled, the sampling instrument, and the containers in which the samples are placed, from adventitious contamination.

A.2.2 All sampling apparatus shall be clean and dry when used.

A.2.3 The sample containers after filling shall be sealed air-tight and marked with necessary details of sampling.

A.3 SCALE OF SAMPLING

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

The number of packages to be drawn for sampling

A.3.2 The number of packages to be drawn for sampling shall be in accordance with Column 2 of Table 3.

TABLE 3 - Scale of sampling

No. of packages in the lot (1)	No. of packages to be selected (2)
Up to 15	2
16 to 25	3
26 to 50	4
51 to 90	5
91 to 150	7
151 to 280	9
281 to 500	12
501 and above	15

A.3.3 The packages shall be selected at random. In order to ensure randomness of selection random number tables as given **SLS 428** shall be used.

A.4 PREPARATION OF SAMPLES

A.4.1 Samples from bulk packages

Five different chunks shall be selected randomly at five different locations from each package selected as in **A.3.2**. A piece of approximately 70 mm in length shall be cut from each of the five chunks selected, so that the total quantity of the pieces shall have a mass in the range 150 g to 200 g. The samples shall be immediately transferred to separate sample containers and sealed air tight.

A.4.2 Samples from retail packages

If the mass of a package is less than or equal to 200 g, the retail packages selected as in **A.3.2**, shall constitute the samples. Otherwise approximately 200 g shall be taken from each of the retail package selected as in **A.3.2** and transferred to separate sample containers and sealed air tight.

A.5 REFERENCE SAMPLE

If a reference sample is required, then the size of the sample to be drawn shall be three times the sizes given in **A.4.1** or **A.4.2**. Each of the samples shall be divided into three equal parts to make three sets of samples. One set shall be marked for the purchaser, one for the supplier and the

third set as the reference sample to be used in case of dispute between the purchaser and the supplier.

A.6 NUMBER OF TESTS

A.6.1 Each package selected as in A.3.2 shall be inspected for packaging and marking requirements (This may be done at the place of inspection).

A.6.2 The contents of each package selected as in A.3.2 shall be examined for the requirements given in 7.1 (This may be done at the place of inspection).

A.6.3 Each sample prepared as in A.4 shall be tested for the requirements given in 7.2, 7.3, 7.4 and 7.6.

APPENDIX B

DETERMINATION OF MOISTURE

B.1 PREPARATION OF THE SAMPLE

Remove carefully the test sample from the container and cut into thin flakes avoiding any loss of moisture during the process. Any bony material present shall be separated and left out prior to cutting. Mix well and store in an air-tight container for testing.

B.2 PROCEDURE

Transfer 3 to 4 grams of prepared sample into a tared dry porcelain or silica crucible with a lid. Weigh the sample to the nearest milligram and dry it in an air oven maintained at 100 °C to 105 °C for 3 hours. Cool to room temperature in a desiccator, and weigh. Repeat heating, cooling and weighing at half an hour intervals until the difference between two consecutive weighings does not exceed 1 milligram. Retain the dried sample for determination of sodium chloride (Appendix C) and acid insoluble ash (Appendix D).

B.3 CALCULATION

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

where,

m_1 = mass, in grams, of the material taken for test; and

m_2 = mass, in grams, of the dried material.

APPENDIX C

DETERMINATION OF SODIUM CHLORIDE

C.1 REAGENTS

C.1.1 *Standard silver nitrate solution*, c($AgNO_3$) = 0.1 mol/l, Standardized against a sodium chloride solution, c(NaCl) = 0.1 mol/l.

C.1.2 *Standard potassium thiocyanate solution*, c(KCNS) = 0.1 mol/l.

C.1.3 *Indicator solution*, a saturated solution of ferric alum $(NH_4)_2SO_4.Fe_2(SO_4)_3.24H_2O$.

C.1.4 *Dilute nitric acid*, 20 per cent (*V/V*), prepared using concentrated nitric acid.

C.2 PROCEDURE

Weigh to the nearest milligram, approximately 1 g of the dried material (see B.2), into a tared 250-ml Erlenmeyer flask. Add 50 ml of standard silver nitrate solution and 20 ml of dilute nitric acid. Boil on sand bath or hot plate for 45 minutes. Cool, add 50 ml of distilled water and 5 ml of indicator solution.

Titrate against standard thiocyanate solution until a permanent light brown colour appears.

C.3 CALCULATION

$$\text{Sodium chloride, per cent by mass} = \frac{(V_1 c_1 - V_2 c_2) \times 5.85}{m}$$

where,

V_1 = volume, in millilitres, of the standard silver nitrate solution used;

c_1 = concentration, in mol/l, of the standard silver nitrate solution (C.1.1);

V_2 = volume, in millilitres, of the standard thiocyanate solution used;

c_2 = concentration, in mol/l, of the standard thiocyanate solution (C.1.2); and

m = mass, in grams, of the dried material taken for the test.

APPENDIX D

DETERMINATION OF ACID INSOLUBLE ASH

D.1 REAGENT

Concentrated hydrochloric acid : water, 1:1, prepared using concentrated nitric acid.

D.2 PROCEDURE

Weigh, to the nearest milligram, about 2 g of the dried material (see B.2) into a tared silica or porcelain dish and ignite with a Bunsen burner for one hour. Complete the ignition by keeping it in a muffle furnace at 600 ± 20 °C until a grey ash results. Cool and add 25 ml of dilute hydrochloric acid; cover with a watch glass and heat on water bath for 10 minutes. Cool and filter through Whatman filter paper No. 42 or its equivalent. Wash the residue with hot water until the washings are free from chlorides as tested with silver nitrate solution and return the filter paper and residue to the dish. Keep it in a hot air oven maintained at 135 ± 2 °C for 3 hours. Ignite in a muffle furnace at 600 ± 20 °C for one hour. Cool in desiccator and weigh. Repeat this process till the difference between two successive weighings is less than one milligram. Note the lowest mass.

D.3 CALCULATION

$$\text{Acid insoluble ash per cent by mass, dry basis} = \frac{m_2 - m_o}{m_1 - m_o} \times 100$$

where,

m_2 = mass, in grams, of the dish with acid insoluble ash;

m_1 = mass, in grams, of the dish with the dried material taken for the test; and

m_o = mass, in grams, of the empty dish.

APPENDIX E

DETERMINATION OF HISTAMINE CONTENT
(Fluorometric method)

Determine the histamine content according to the method described in 18.067 (page 341) of the Offical Methods of Analysis published by the Association of Offical Analytical Chemists (AOAC) 14th edition (1984).

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.*

Printed at SLSI (Printing Unit)

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.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.