Bangladesh Standard
Specification for
Soy Sauce
(*First Revision*)

ICS: 67.040

BANGLADESH STANDARDS AND TESTING INSTITUTION
MINISTRY OF INDUSTRIES
MAAN BHABAN, 116-A, TEJGAON INDUSTRIAL AREA
DHAKA-1208, BANGLADESH

Foreword

This Bangladesh standard was adopted by the Bangladesh Standards and Testing Institution on ……..., after the draft finalized by the Fruits, Vegetables and their Derived Products Sectional Committee had been approved by the Agricultural and Food Products Divisional Committee.

Soy sauce, a liquid condiment, is a key component of many Asian cuisines. It is one of the most widely used flavoring ingredients in modern food processing. In order to ensure that the product conforms to safety and quality requirements it was necessary to prepare this standard so as to safeguard the consumers. This standard 'BDS 1718 Soy Sauce' was first published in 2002. This Bangladesh standard is the first revision of BDS 1718. Major modifications in this version are as follows:

i) requirements for 'Salty Soy Sauce' have been included;
ii) ingredients for soy sauce has been modified;
iii) clauses for 'hygienic requirements', 'pesticide residues' and 'legal requirements' have been included;
iv) the limits for 'pH' and 'Total Nitrogen' have been modified;
v) the parameter for 'Amino Nitrogen' has been deleted;
vi) microbiological limits for *E. coli* and *Salmonella* have been included;
vii) limits for lead and Arsenic have been added; and
viii) requirements for labeling has been modified according to the current practice;

The Sectional Committee responsible for the preparation of this standard has taken into consideration the views of the members of this committee, local producers, consumers, and technologists and has related the standard to the manufacturing and trade practices followed in the country in this field.

This standard is subject to periodical reviews and amendments, if necessary, in order to keep pace with the latest industrial and technological innovations. Any suggestions for improvement will be recorded and placed before the committee in due course.

For the purpose of deciding, whether a particular requirement of this standard is complied with the final value observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with BDS 103. The number of significant places retained in the rounded off value should be the same as that of the specified value in the standard.

This standard BDS 1718:2024 Soy Sauce (1st Rev.) cancels and replaces BDS 1718:2002 Soy Sauce that has been technically revised.

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1. Scope

1.1 This standard specifies the requirements, methods of sampling and test for soy sauce for edible purposes.

2. Normative References

2.1 The relevant standards listed in Annex-A are necessary adjuncts to this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

3. Terminology

3.1 **Soybeans** – Soybeans are mature dry grains of variety grown from *Glycine max* (L.) Merr.

3.2 **Soy sauce** – Soy sauce is a seasoning product for edible purposes prepared from the fermented mash, derived from the enzymatic digestion of Koji, and accompanied by further fermentation by yeast and lactic acid bacteria in a solution of salt brine (edible salt /sodium chloride). Koji is a solid culture of *Aspergillus oryzae* or *Aspergillus sojae* on cooked or steamed soya bean/ defatted soya bean/ defatted soya bean (with proper heat treatment) and grain/flour (wheat, rice, maize or tapioca).

3.3 **Light soy sauce** – Light soy sauce shall be clear reddish brown liquid with a well-blended palatable tart and salty flavour and possessing aroma and body characteristics typical of this type of sauce. It shall not have added caramel. It shall be free of sediments, off flavours, undesirable odours, extraneous and foreign matter.

3.4 **Dark soy sauce** – Dark soy sauce shall be a thick dark, reddish brown liquid with a well-blended, palatable tart, a sweetish salty flavour and possessing aroma and body characteristics typical of this type of sauce. It may or may not have added caramel. It shall not contain off flavours, undesirable odours, extraneous moulds, foreign matters and practically be free of sediments.

4. Requirements

4.1 The soy sauce shall be pasteurized and/or heat treated product made from the following ingredients.

4.1.1 Basic ingredients:

a) soya bean and/or defatted soya bean;
b) grain/flour (wheat, rice, maize or tapioca);
c) Koji – a solid culture of *A. oryzae* or *A. sojae* cultivated in medium comprising of a and b.
d) edible salt (sodium chloride);
e) Culture of *A. oryzae* or *A. sojae*;
f) Mixed culture of yeast and lactic acid bacteria; and
g) potable water.

4.1.2 Other permitted ingredients:

a) sugar;
b) acidity regulators – acetic acid, citric acid or ascorbic acid as per GMP; and
c) monosodium L – glutamate (MSG) as per GMP.

4.2 Food Additives – Soy sauce may contain any food additives as permitted under the food category 12.9.2 in the latest available version of Codex General Standard for Food additives (CODEX STAN 192).

4.3 Food Preservatives –The product may contain only the following preservatives when tested according to the given methods in Table 1.

Table-1 Limit for preservatives

Sl.no.	Preservatives	Limit	Method of test
(1)	(2)	(3)	(4)
1.	Benzoic acid and/or its salts (as Benzoic acid)	120 mg/kg	ISO 5518
2.	Sorbic acid and/or its salts (as Sorbic acid)	1000 mg/kg	ISO 5519
NOTE – Where the use of more than one preservative, the amount of each shall be such that when expressed as a percentage of the amount permitted singly, the sum of the several percentages does not exceed one hundred.			

4.4 It shall be free from any foreign matters and adulterants.

4.5 It shall not contain any non-nutritive sweetening substance.

4.6 It shall not contain any added colouring substance except caramel.

4.7 It shall not contain hydrolyzed vegetable protein.

4.8 The aroma and taste shall be characteristic of soy sauce.

4.9 Soy sauce shall comply with the specific requirements in Table 2.

Table-2 Requirements for soy sauce

Sl. No.	Characteristics	Requirements			Method of test
		Salty soy sauce	Light soy sauce	Dark soy sauce	
(1)	(2)	(3)	(4)	(5)	(6)
i)	pH	4.8 *Max.*	3.5-5.1	3.5-5.1	AOAC 981.12
ii)	Salt (as sodium chloride), % w/v	10.0 *Min.*	20.0 *Max.*	20.0 *Max.*	Annex B (F)*
iii)	Total solid, % w/w	15-40	15-40	22-44	Annex C (F)*
iv)	Total Nitrogen, % w/v, *Min.*	0.3	0.3	0.3	Annex D (F)*
v)	Halophilic yeast count, CFU/ ml	<10	<10	<10	Annex E
vi)	*E. coli* cfu/ml, *Max.*	10	10	10	BDS ISO 16649-2
vii)	*Salmonella* /25ml	absent	absent	absent	BDS ISO 6579-1
viii)	Arsenic (As), *Max. mg/kg*	0.5	0.5	0.5	AOAC 986.15
ix)	Lead (Pb), *Max.mg/kg*	1	1	1	AOAC 999.11

NOTE – Annex F* - relative density determination applies only to dark soy sauce.

4.10 Hygiene – During processing, handling, storage and transportation, effective measures must be taken to prevent cross contamination with chemicals, microbial or physical contaminants.

4.10.1 The product shall be processed and packed under strict hygienic conditions in premises maintained in accordance with BDS 822.

4.11 Pesticide residues – The product covered by this standard shall comply with the maximum residue limits for pesticide established by the Codex Alimentarius Commission.

4.12 Legal Requirement – The product shall in all other aspects comply with the requirements of the legislations enforced in the country.

5. Packing and Marking

5.1 Packing – Soy sauce shall be packaged in containers made from food grade packaging material and sealed in a manner that will safeguard the hygienic, nutritional and organoleptic properties of the product throughout the shelf life of the product.

5.2 Marking – Each package shall be suitably labeled so as to give the following information:

a) Name of the product as 'Soy Sauce';
b) Name and address of the manufacturer/importer;
c) Batch or code number;
d) Net content in ml;
e) Date of manufacture;
f) Date of expiry;
g) Maximum Retail Price (MRP);
h) Any other requirements as specified under the 'Packaged Commodities Rules, 2021' of BSTI.

5.2.1 Each package may also be marked with the BSTI Certification Mark.

NOTE – The use of BSTI Certification Mark is governed by the provisions of Bangladesh Standards and Testing Institution Act, 2018 and the Rules and Regulations made thereunder. Details of conditions, under which a license for the use of BSTI Certification Mark may be granted to manufacturers or processors, may be obtained from the Bangladesh Standards and Testing Institution.

6. Sampling

6.1 Representative samples of each of the categories of soy sauce shall be prepared as prescribed in col. 3 of BDS 1010.

7. Tests

7.1 Test shall be carried out as prescribed in col. 4 of Table 1.

7.2 Quality of Reagents – Unless specified otherwise, pure chemicals shall be employed in tests and distilled water (BDS 833) shall be used where the use of water as a reagent is intended.

NOTE – 'Pure chemicals' shall mean chemicals that do not contain impurities, which may affect the result of analysis.

8. Compliance

8.1 When on testing, each of the samples is found to conform to the requirements specified in this Bangladesh Standard Specification, the lot, batch or consignment from which the samples have been drawn shall be deemed to comply with standard specification.

Annex - A

[Clause 2.1]

List of Relevant Standards

BDS and ISO No.	Title
BDS 103	Methods of rounding off numerical value
BDS 822	Code of hygienic conditions for food processing units
BDS 833	Water for laboratory use
BDS 1010	Methods of sampling and test for processed fruits and vegetables in cans/containers
ISO 5518	Fruits, vegetables and derived products Determination of benzoic acid content Spectrophotometric method
ISO 5519	Fruits, vegetables and derived products Determination of sorbic acid content
BDS ISO 6579-1	Microbiology of the food chain - Horizontal method for the detection, enumeration and serotyping of Salmonella – Part 1: Detection of Salmonella spp
BDS ISO 16649-2	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of β-glucuronidase- *positive Escherichia* coli — Part 2: Colony-count technique at 44°C using 5-bromo-4-chloro-3-indolyl β-D-glucuronide

Annex – B

[Table-2, item (ii)]

Determination of Salt as Sodium Chloride

B.1 Apparatus

B.1.1 Muffle Furnace controlled at 525°C

B.1.2 Ashing container such a platinum, silica or porcelain dish, 50 to 100 ml capacity

B.1.3 Desiccator

B.1.4 Steam bath

B.2 Reagents

B.2.1 Silver nitrate, 0.1 N solution

B.2.2 Potassium chromate, 2 percent (m/v) solution

B.2.3 Nitric acid solution, 0.1 N solution

B.2.4 Phenolphthalein indicators percent (m/v) solution in 95% alcohol

B.3 Procedure

Weight 10 g (dark soy sauce) or pipette 10 ml (of light soy sauce) into an ashing container. Evaporate the sample to dryness on a steam bath. Char the dried residue over a low flame. Place container and content in the muffle furnace and ash at 525°C for 6 hours. After ashing, cool container and ash in a desiccator.

Wash down the ash into a 250 ml volumetric flask with water and make up to mark. Mix well. Pipette 25 ml of the prepared solution into a 250 ml conical flask and neutralize with the nitric acid solution, using phenolphthalein solution as indicator. Titrate with the silver nitrate solution, using 1 ml of potassium chromate solution as indicator.

B.4 Calculation

$$\text{Salt, \% (m/v)} = V \times 0.005845 \times \frac{250}{25} \times \frac{100}{M_s \ (or\ V_s)} \times d^*$$

$$= 5.845 \times V \times d^* \times \frac{1}{M_s (or\ V_s)}$$

Where

V = volume in millilitres of silver nitrate solution used in the sample titration
d* = density of test sample which is taken as the relative density obtained in Annex F (this applies only to dark soy sauce)
M_s = mass in grams of sample taken (dark soy sauce)
V_s = volume in millilitres of sample taken (light soy sauce)

Annex – C

[Table-2, item (iii)]

Determination of Total Solid

C-1 Apparatus

C-1.1 Dishes shall be of metal (such as nickel or stainless steel) provided with lids. A suitable size is about 7cm in diameter and depth of 2.0 cm. Each dish shall be provided with a short glass rod.

C-1.2 Steam bath

C-1.3 Drying oven, well-ventilated, electrically heated and capable or maintaining a temperature of 98°C to 100°C

C-1.4 Muffle furnace capable of maintaining a temperature of 800°C

C-1.5 Desiccator which shall be of glass and charged with any efficient, solid desiccant

C-1.6 Test sieves

a. Coarse sieve with sieving apertures of 500 microns
b. Fine sieve with sieving apertures of 180 microns

C-2 Preparation of the Sand Support

Collect the fraction of sand which passes through coarse mesh test sieve and is retained by fine mesh test sieve. Digest a convenient quantity with 1:1 hydrochloric acid to remove oxides of metals, decant off acid, and repeat process until the acid is almost colourless. Wash the acid treated sand thoroughly with distilled water. Dry and ignite the sand to 800°C in a furnace, cool.

C-3 Procedure

Place dish containing about 25 g of the prepared sand together with stirring rod into the oven kept at 98°C to 100°C, placing the cover beside the dish. Dry to constant weight. Replace lid before removing it from oven. Cool in the desiccator for at least 45 minutes and weigh.

Tilt the sand to one side of the dish. Weigh about 5 g (of dark soy sauce) or pipette 5 ml (of light soy sauce) into the clear area of the dish. Thoroughly mix the sample with sand using the glass rod. Place the dish on a steam bath. Occasionally stir the mass to prevent caking until the sample is dry. Lay the rod in the dish. Transfer the dish to the oven kept at 98°C to 100°C. After 1.5 hours, cover the dish and transfer it to a desiccator. Cool for at least 45 minutes and weigh. Repeat drying until loss between successive weightings does not exceed 0.005 g.

C-4 Calculation

Total solids, % (m/v) = $\frac{M}{M_{\circ}(\text{or } V_{\circ})}$ x 100 x d*

Where,

$M_{\circ}$ = mass in grams sample taken (dark soy sauce)

$V_{\circ}$ = volume in millilitre of sample taken (light soy sauce)

M= mass in grams of residue after drying

d*= density of test sample which is taken as the relative density obtained in Annex F. (this applies only to dark soy sauce).

Total solids, less added salt, % (m/v) = % total solids - % salt (see Annex B)

Annex – D

[Table-2, item (iv)]

Determination of Total Nitrogen (Semi-Micro Kjedahl Method)

D-1 Apparatus

D-1.1 Kjeldahl digestion unit

D-1.2 Kjeldahl flask, 50ml capacity

D-1.3 Kjeldahl distillation unit

D-2 Reagents

D-2.1 Concentrated sulphuric acid, d 1.84

D-2.2 Kjeldahl mixture

Prepare by mixing together 96.0 g anhydrous sodium sulphate, 3.5 g copper sulphate and 0.5 g selenium dioxide.

D-2.3 Boric acid solution, 2% (m/v)

D-2.4 Sodium hydroxide solution, 40% (m/v)

D-2.5 Hydrochloric acid, 0.02 N

D-2.6 Screened methyl red indicator. 0.016% methyl red and 0.083% bromocresol green in alcohol.

D-3 Procedure

Place about 0.5 g (of dark soy sauce) or 0.5 ml (of light soy sauce) in a 50 ml kjeldahl flask. Digest it with 0.8 g of catalyst mixture and 10 ml of concentrated sulphuric acid until the contents are clear. Cool the digest and dilute it using 30 ml water. Transfer it to the distilling flask. Rinse the kjeldahl flash 3 times using about 10 ml of water each times. Add the rinsing to the distilling flask. Place the distilling flask in an inclined position and pour in carefully 35 ml of 40% sodium hydroxide along the inclined neck of the flask so that the two layers in the flask do not mix. To the receiving flask add 10 ml of 2% boric acid solution and 2 drops of screened methyl red indicator. Connect up the distillation apparatus with the delivery tube dipping below the boric acid solution. Close the tap and distil the ammonia into boric acid apparatus is steamed out for a further 5 minutes. The distillate is then titrated with 0.02 N hydrochloric acid.

D.4 Calculation

Total nitrogen, % (m/v) = $0.028 \times V \times \frac{d*}{M_{\circ}\ (\text{or}\ V_{\circ})}$

Where

V= Volume in milliliters of 0.02 N hydrochloric acid used in the titration.

d* = density of test sample which is taken as the relative density obtained in Annex G. (this applies to dark but not light soy sauce).

$M_{\circ}$ = mass in grams of sample taken (dark soy sauce)

$V_{\circ}$ = volume in millilitres of sample taken (light soy sauce)

Annex – E

[Table-2, item (v)]

Determination of Halophilic Yeast Count

E.1 General

E-1.1 All precautions shall be taken to prevent microbiological contamination while opening the container and during the test.

E-1.2 All apparatus use in the test shall be sterilized at 160°C to 170°C for 2 hours.

E-2 Apparatus

E-2.1 Sterile graduated pipettes, 1 ml and 10 ml, with cotton wool plug near the upper orifice

E-2.2 Dilution bottles of at least 150 ml capacity
Dilution test-tubes of at least 20 ml capacity

E-2.3 Sterile petri dishes, diameter 90 mm x depth 15mm

E-3 Media

E-3.1 10% Sterile saline solution (diluent)

Sodium chloride	100.0g
Water to make	1 Litter

Dissolve sodium chlorides in distilled water. Dispense 9 ml into dilution test tubes and 90 ml into dilution bottles. Autoclave at 121°C for 20 minutes.

E-3.2 10% Tartaric acid solution

Tartaric acid	10.0 g
Water to make	100 ml

Dissolve tartaric acid in distilled water. Autoclave at 121°C for 20 minutes.

E-3.3 Potato dextrose agar with 10% salt

Potato extract	4.0 g
Dextrose	20.0 g

Sodium chloride	100.0 g
Agar	15.0 g
Water to make	1 litter

Dissolve ingredients in distilled water. Dispense in quantities of 100 ml into suitable containers and autoclave at 121°C for 20 minutes. Immediately before use, adjust the melted agar to pH 3.5 by adding 1.0 ml sterile 10% tartaric acid to 100 ml of sterilized medium at 45°C. Mix thoroughly. Alternatively commercial preparation of the potato dextrose agar in powder form may be used. Follow manufacturer's instructions for the preparation with the addition of 10% sodium chloride.

E-4 Procedure

E-4.1 Preparation of sample

Clean the container with water. Invert the container 25 times by a rapid movement of the wrist to get the contents distributed uniformly throughout. Open the bottle ascetically and flame the top lightly.

E-4.2 Determination

Aseptically transfer 10 ml sample into 90 ml of sterile diluent. This given a dilution of 1 in 10. If necessary, further decimal dilutions can be made in the range of 1:100 and 1:1000 by adding 1 ml of the previous dilution to 9 ml of the sterile diluent. Ascetically, pipette 1 ml of the original sample and 1 ml portions of the diluted sample into each of two sterile petri dishes. Pour into each dish 15 ml of the melted potato dextrose agar containing 10 % salt (maintained at 45°C ± 1°C). Mix thoroughly by rotating the dish without splashing over the edge. Allow to set and incubate at 25°C for 5 days.

E-4.3 Counting of colonies

Count these plates with 25 to 250 visible colonies using the colony counter. If more than one dilution gives a count within this range select the one the higher count for subsequent calculations. Calculate the count by multiplying the mean count obtained for the selected dilution by the reciprocal of that dilution. Report the value obtained as the halophilic yeast count per ml of sample.

Annex - F
Determination of Relative Density

F-1 Apparatus

F-1.1 Specific gravity bottle, 50 ml capacity

F-1.2 Constant temperature water bath

F-1.3 Thermometer with range 0°C - 30°C

F-2 Procedure

Clean the specific gravity bottle thoroughly with acetone. Dry in air suction and weigh. Fill the bottle with the test sample and place the bottle in the bath at 20°C. When the temperature of the sample reaches 20°C remove any excess sample from the top of the capillary tube. Remove the bottle from the water bath, dry and weigh. Repeat the test using distilled water instead of the test sample.

F-3 Calculation

Relative density = $\frac{M2 - M_{\circ}}{M1 - M_{\circ}}$

Where:

$M_{\circ}$ = mass of specific gravity bottle in grams.

M_1 = mass of specific gravity bottle and distilled water in grams.

M_2 = mass of specific gravity bottle and sample under test in grams.