

Bangladesh Standard
Specification For
Hard candy
(Draft for Fourth Revision)

5

ICS 67.060



BANGLADESH STANDARDS AND TESTING INSTITUTION
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BSTI

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Foreword

This Bangladesh Standard was adopted by the Bangladesh Standards and Testing Institution on, after the draft finalized by the Bakery and Confectionary Products Technical Committee had been approved by the Agricultural and Food Products Divisional Committee.

A wide variety of hard candy is produced, imported and marketed in the country. 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 consumer which mainly comprise of children.

This standard was first published in 1965, then subsequently revised in 1985, 2001, 2014 and an amendment was issued on 2007. Considering the existing trade practices, the committee felt that this standard should be revised. Earlier this standard was titled as 'BDS 490 Lozenges'. While reviewing this standard, the committee decided to accommodate hard boiled sugar confectionary and lozenge within the scope of a single standard as their basic requirements are common. Thereby the committee agreed to update this standard into a single comprehensive user friendly-standard and changed the title to 'BDS 490 Hard candy' in keeping with international nomenclature. Major modifications in this version are as follows:

- a) types for various hard candy have been incorporated;
- b) the ingredient lists have been modified;
- c) requirements for moisture, acid insoluble ash, sulphur dioxide have been updated;
- d) requirement for 'sucrose' has been substituted with 'total sugar';
- e) a limit for cadmium has been included while limits for zinc, copper have been deleted;
- f) a microbiological limit for *Salmonella* has been introduced
- g) clauses for 'hygienic requirements' and 'legal requirements' have been included; and
- h) requirements for labeling have been modified according to the current practice.

This standard has been finalized following a comprehensive review process, taking into account the comments and recommendations received from representative groups of producers, consumers, technologists, manufacturers, association and user agencies. It is subject to periodic review and amendment, if necessary. 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 490:YYYY Hard Candy (4th Rev.) cancels and replaces BDS 490:2014 Lozenges (3rd Rev.) that has been technically revised.

Bangladesh Standard Specification For Hard Candy (Draft for Fourth Revision)

1. Scope

1.1 This Bangladesh Standard prescribes the requirements, methods of sampling and test for hard candy.

2. Normative References

2.1 The Bangladesh Standards listed in Annex-B are necessary adjuncts to this standard the latest edition of the referenced document (including any amendments) applies.

3. Terminology and Types

For the purpose of this standard, the following definitions apply:

3.1 **Hard candy** – It refers to a hard and brittle solid confectionery product prepared from sugar or sweeteners and/or their syrups, with or without the addition of optional ingredients depending on the type. It is produced by mixing and/or heating the ingredients to a specific temperature, followed by forming into desired shapes.

3.1.1 It may or may not contain center filling in the form of liquid, semi-solid or solids, with or without coating of sugar or chocolate or both.

3.2 Hard candy may be of following categories.

3.2.1 **Hard boiled candy**- It refers to a hard, glassy, and amorphous confectionery product obtained by boiling sugar or sweeteners and/or their syrups to a high temperature to produce a concentrated, supersaturated mass. The mass is then cooled, flavored, colored, and formed into desired shapes before solidification.

3.2.2 **Lozenge**- It refers to a solid, single-dose preparation intended to dissolve slowly in the mouth, usually containing sugar or sweeteners with suitable binding materials and lubricants with the added flavours and colours. These are generally made from cold mixing, which means that no preliminary boiling or cooking of the ingredients is required. These confections are produced either as cut goods from a sheet of dough and air-dried or they might be held under pressure to form a hard cohesive confection. The compressed lozenges are produced by cold mixing and wet granulation or slugging procedure.

4. Ingredients

4.1 All ingredients shall conform to the relevant Bangladesh Standard specifications, where available. All materials shall be food grade, halal and free from foreign matter, harmful microorganisms, insect infestation, objectionable flavours and odours, food additives and processing aids.

4.2 Essential ingredients –

i) **Sweeteners**- It may contain one or more sweeteners such as:

a) **Nutritive Sweeteners**- Sugar, Palm sugar, Cane sugar, Invert sugar, Sorbitol, Liquid glucose, Lactose, Dextrin, Dextrose, Dextrose monohydrate, Fructose, Maltose, Icing sugar

b) **Non-Nutritive Sweeteners**- According to the relevant category 05.1 and 05.1.2 of the updated version of CXS 192 or permitted by national legislations.

Note- When combinations of non-nutritive sweeteners are used, the sum of the proportions of individual sweeteners, expressed as percentages of their respective maximum permitted levels, shall not exceed 100%.

ii) **Water, potable**

4.3 Optional ingredients

- i. Milk and milk products
- ii. Edible salt
- iii. Edible gelling agents, e.g. gelatin
- iv. Edible gums
- v. Edible starches
- vi. Malt and malt extracts
- vii. Chocolate and their derivatives
- viii. Cocoa and their derivatives
- ix. Honey
- x. Coffee and coffee products
- xi. Tea extracts
- xii. Fruit and fruit products
- xiii. Candied fruits and peels
- xiv. Spices, condiments and their extracts
- xv. Edible fats and oils
- xvi. Vitamin and Mineral
- xvii. Protein isolates
- xviii. Eucalyptus oil, menthol oil crystals, pepper mint oil
- xix. Thymol
- xx. Nuts and nut products
- xxi. Permitted enzyme and enzyme derivatives
- xxii. Edible desiccated coconut
- xxiii. Glycerine, food grade
- xxiv. Beewax, caranauba wax and other food grade wax

4.3.1 In the preparation of hard candies, the addition of flavourings, colourings, acidulants, preservatives, humectants, emulsifiers, stabilizing agents, lubricants required shall be according to the relevant category 05.1 and 05.1.2 of the updated version of CXS 192 or permitted by national legislations.

5. Requirements

5.1 The product shall be in any desired colour and flavour, pleasant taste, distinctive type, uniform size and attractive appearance. They shall be hard but smooth eating and shall also have a good snap. They shall not be damp or fragile. They shall be free from undesirable smell, rancidity, dirt, filth, adulterants and harmful ingredients.

NOTE- The appearance, taste, odour shall be determined by organoleptic test.

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

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

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

5.4 The product shall also comply with the requirements given under Table 1 and shall not contain the poisonous metal in excess of the limits specified in Table 2.

6. Packing and Marking

6.1 Packing – The product, if wrapped, shall be in food grade, plain or printed waxed paper, foil or cellulose film or other food grade thermoplastic films. In case of printed packaging material, the printing ink shall be non-toxic and shall not come in direct contact with the product. The wrapped or unwrapped material shall be bulk packed in clean, food grade, reasonably air-tight and sound containers that have no effect on product properties. Such containers shall be made of tinplate, glass, plastics, moisture proof paper, cellulose film or any other suitable packing material.

Table-1 Requirements for hard candy

(Sub-Clause 5.4)

Sl. No.	Characteristic	Requirements	Method of test to
(1)	(2)	(3)	(4)
i.	Moisture, percent by mass, Max.	a) 4.0 b) 8.0 (with filling)	Annex- A of BDS 1000
ii.	Sulphated ash, percent by mass, Max.	3.0	Annex- B of BDS 1000
iii.	Acid insoluble ash, percent by mass, Max.	0.4	Annex- C of BDS 1000
iv.	Total sugar, percent by mass, max*	85.0	Annex-A of this standard
v.	Sulphur dioxide, mg/kg, Max.	250	Annex- G of BDS 1000

*shall not be applicable for hard candy containing non-nutritive sweeteners

Table-2 Microbiological and heavy metals limit for hard candy

(Sub-Clause 5.4)

Sl.No.	Characteristic	Limits	Method of Test Ref. to
(1)	(2)	(3)	(4)
i.	<i>Salmonella</i> , cfu/g	Absent	BDS ISO 6579-1
iii.	Arsenic (as As), mg/kg, max.	1	AOAC 986.15
iii.	Lead (as Pb), mg/kg, max.	1	AOAC 994.02
iv.	Cadmium (as Cd), mg/kg, max.	1	AOAC 999.11
v.	Tin (as Sn), mg/kg, max.	2	AOAC 985.16

6.2 Marking – The following particulars shall be marked or labeled and indelibly on each container:

- Name of the product 'Hard candy/Lozenge';
- Name and address of manufacturer/importer;
- When non-nutritive sweeteners are added as substitutes for sugars, the statement, "with/added non-nutritive sweetener(s)" or "sugar-free", shall be included in conjunction with or in close proximity to the product name;
- Batch or code number;
- Net mass (g);
- List of ingredients and food additives;
- Allergen, if any;
- Date of manufacture;
- Date of expiry;
- Maximum Retail Price (MRP);
- If the product contains Aspartame, below declaration shall be used. "Not for Phenylketonurics"
- Any other requirements as specified in the current Legislations and Regulation enforced in the country.

NOTE - Containers having less than 60 g may not be marked with the particulars mentioned under 6.2. Containers having more than 60 g and less than 120 g shall be marked with the particular given under 6.2 (a), (b), (e), (f), (g) (h) and (i) but may not be marked with the particulars under 6.2 (c), and (d).

6.2.1 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.

7. Sampling

7.1 Representative samples of the material shall be drawn as prescribed in Annex-H of BDS 1000.

8. Tests

8.1 Test shall be carried out as prescribed in the appropriate annexes specified in Col. 6 of Table-1 and col 4 of table 2.

8.2 **Quality of reagents** – Unless specified otherwise, pure chemicals and distilled water (see 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 affect the results of analysis.

Annex-A [Table-1, Sl.No. iv]

Procedure for Determination of Total Sugar by High Performance Liquid Chromatograph (HPLC)

A.1 Principle

Extraction of Sugar (Fructose, Glucose and Sucrose) from a test portion using a mixture of Acetonitrile and Water (70:30). The concentration of Sugar (Fructose, Glucose and Sucrose) is determined by means of high performance liquid chromatography (HPLC) using a Normal Phase NH₂ column and refractive index (RI) detector.

A.2 Apparatus and Equipment

- (a) HPLC equipped with RI detector
- (b) Analytical Balance with capacity of weighing to an accuracy of 0.0001 g .
- (c) Vortex mixture
- (d) Ultrasonic bath
- (e) Micro pipette
- (f) Measuring cylinder
- (g) Volumetric flask
- (h) Beaker
- (i) Syringe Filter
- (j) Vacuum filtration system

A.3 Reagents

- (a) CRM of Fructose, Glucose and Sucrose
- (b) Acetonitrile (HPLC Grade)
- (c) Water (Type-1)

A.4 Reagent Preparation

A.4.1 Working Standard preparation

Fructose first stock solution (10000 mg/L): Dissolve 100 mg of Fructose CRM in 5 mL of water and make up to the mark with water in a 10 mL volumetric flask, to obtain the stock solution.

Glucose first stock solution (10000 mg/L): Dissolve 100 mg of Glucose CRM in 5 mL of water and make up to the mark with water in a 10 mL volumetric flask, to obtain the stock solution.

Sucrose first stock solution (10000 mg/L): Dissolve 100 mg of Sucrose CRM in 5 mL of water and make up to the mark with water in a 10 mL volumetric flask, to obtain the stock solution.

Mixed (Fructose, Glucose and Sucrose) secondary stock solution (2500 mg/L):

Name of Analyte	First stock solution Concentration (mg/L)	Volume taken from first stock solution (mL)	Volumetric Flask used (mL)
Fructose	10000	2.5	10
Glucose	10000	2.5	10
Sucrose	10000	2.5	10

Make the volumetric flask up to mark with water

Mixed calibration standard is prepared as follows:

Prepare 2500 mg/L, 1250 mg/L, 625 mg/L, 312.50 mg/L, 156.25 mg/L calibration standard by serial dilution.

A.4.2 Mobile phase preparation

Mix 70 volume parts of acetonitrile with 30 volume parts of water and filter with vacuum filter and sonicate with ultrasonic bath.

A.4.3 Extraction solvent

Mix 70 volume parts of acetonitrile with 30 volume parts of water

A.5 Sample Preparation Procedure

Homogenize or mix the sample carefully. Take 0.5g of a sample in approximately 30 mL of extraction solvent in a 50 mL volumetric flask and vortex for 5 min. Put the flask in the ultrasonic bath, mix the contents for at least 10 min and then dilute to the mark with extraction solution. Filter the solution through a 0.45 µm syringe filter.

A.6 HPLC Operating Conditions

- (a) Column: Normal Phase NH₂ (250 mm × 4.6 mm I.D., 5 µm)
- (b) Measurement: Refractive Index (RI) Detector
- (c) Flow (isocratic): 1 mL/min
- (d) Column oven temperature: 40°C
- (e) Injection volume: 5 µL

A.7 Calculation

Fructose, Glucose and Sucrose are quantitatively determined from the linear regression equation:

$$y = mx + c \text{ [Where: } x = \text{Concentration, } m = \text{Slope, } c = \text{Intercept, } y = \text{Area of Sample]}$$

Concentration (mg/L) of Fructose/Glucose/Sucrose = (Peak Area-Intercept) / Slope Concentration (mg/kg) = [Mean value from the linear regression (mg/L) × Final Volume(mL)] / Sample Weight(g)

Final Concentration (% m/m) = Concentration (mg/kg) /10000

Total Sugar (% m/m) = Fructose + Glucose + Sucrose

Annex-B (Clause-2) List of relevant standards

BDS 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 1000	Soft Candy
BDS ISO 6579-1	Microbiology of the food chain - Horizontal method for the detection, enumeration and serotyping of <i>Salmonella</i> – Part 1: Detection of. <i>Salmonella</i> spp