

Indian Standard

**SPECIFICATION FOR
EDIBLE TAPIOCA CHIPS**

(*First Revision*)

Second Reprint APRIL 1989

UDC 664.272

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3

September 1969

Indian Standard

SPECIFICATION FOR EDIBLE TAPIOCA CHIPS

(First Revision)

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Indian Standard
SPECIFICATION FOR
EDIBLE TAPIOCA CHIPS
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 30 June 1969, after the draft finalized by the Edible Starches and Glucose Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Edible tapioca chips are prepared from the fresh tubers of tapioca (*Manihot utilissima* Pohl and *Manihot palmata* Muell. Arg.). They are generally of two types, namely, white and parboiled. The white chips are obtained by removing the outer skin of the tubers, drying the sliced tubers in the sun or in any drier. The parboiled chips are prepared much in the same way as the white chips, except that the slices are boiled in water before drying.

0.2.1 Tapioca chips of both the types are used as food as cooked or fried material and those of the white type for the preparation of edible tapioca flour and starch.

0.3 The Sectional Committee responsible for the preparation of this standard, took into consideration the prevailing methods of manufacture of edible tapioca chips and available data on the composition of the chips made from different varieties of the tapioca tubers in the country. In addition to the above, due consideration was also given to the relevant rules prescribed by the Government of India under the Prevention of Food Adulteration Act, 1954. This standard is, however, subject to the restrictions imposed under that Act, wherever applicable.

0.4 This standard was first published in 1958. The various provisions of this standard have been under the review of the Sectional Committee from time to time and the present revision has been taken up with a view to modifying the earlier requirements in the light of experience gained both by manufacturers and users.

0.5 This revision incorporates a number of important modifications, namely, (a) retention of inner rind of raw tubers of tapioca used in the preparation of tapioca chips is allowed (the inner rind has since been proved to be digestible), (b) in accordance with the normal market

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practice, the maximum thickness of chips has been prescribed as 20 mm instead of 12 mm, (c) the limit of crude fibre has been relaxed from 2.0 percent to 2.10 percent, and (d) an additional requirement for cold-water solubles has been included. Apart from these, there are modifications of less importance.

0.6 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 IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for edible tapioca chips.

2. TYPES

2.1 The material shall be of the following two types:

- a) *Edible Tapioca Chips, White (ETCW)* — It shall be the material obtained by drying slices made from raw tubers of tapioca (*Manihot utilissima* Pohl and *Manihot palmata* Muell. Arg.) from which the outer skin has been removed.
- b) *Edible Tapioca Chips, Parboiled (ETCP)* — It shall be the material obtained by boiling and drying slices made from raw tubers of tapioca (*Manihot utilissima* Pohl and *Manihot palmata* Muell. Arg.) from which the outer skin has been removed.

NOTE — To facilitate easy identification of the starch granules, a photomicrograph has been provided in Fig. 1.

3. REQUIREMENTS

3.1 Description — The material shall be in the form of chips made from raw tubers of tapioca (see 2.1) and of a thickness not exceeding 20 mm. It shall be free from adulterants, insect or fungus infestation and from rancid, musty, fermented or other undesirable odour. Before skinning, the material shall be washed thoroughly in running water to remove all adherent dirt.

3.2 When examined by the method prescribed in Appendix A, not more than 2 percent by weight of the material shall have the outer residual skin.

*Rules for rounding off numerical values (revised).

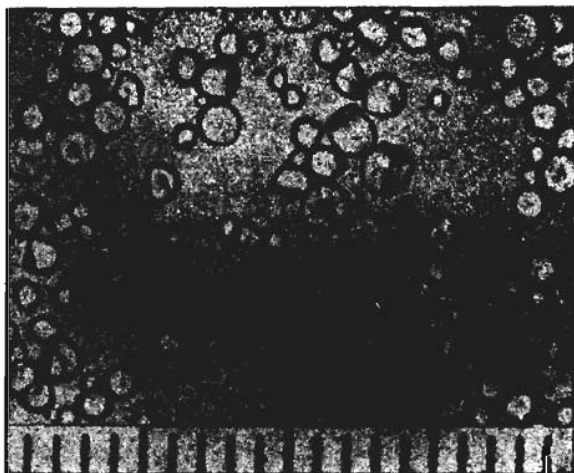


FIG. 1 PHOTOMICROGRAPH OF TAPIOCA STARCH ($\times 325$)
(Scale : 1 division = 10 microns)

3.3 The material shall be free from dirt and other suspended and extraneous material when examined by the method prescribed in 15 of IS : 4706-1968*.

3.4 The material shall be free from hydrocyanic acid, when tested by the method prescribed in Appendix B.

3.5 Hygienic Conditions — The product shall be processed and packed under hygienic conditions conforming to IS : 2491-1963†.

3.6 The material shall also conform to the requirements given in Table 1.

4. PACKING

4.1 The material shall be packed in clean and sound jute bags or any other container as agreed to between the purchaser and the vendor.

*Methods of test for edible starches.

†Code for sanitary conditions for food processing units.

TABLE 1 REQUIREMENTS FOR EDIBLE TAPIOCA CHIPS

(Clause 3.6)

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST REF TO	
			Appendix of this Standard	CI of IS : 4706-1968*
(1)	(2)	(3)	(4)	(5)
i)	Moisture, percent by weight, <i>Max</i>	13.0	—	3
ii)	Total ash (on dry basis), percent by weight, <i>Max</i>	1.80	—	4
iii)	Acid insoluble ash (on dry basis), percent by weight, <i>Max</i>	0.10	—	5
iv)	Crude fibre (on dry basis), per- cent by weight, <i>Max</i>	2.10	—	9
v)	pH of aqueous extract	4.7 to 7.0	—	10
vi)	Cold-water solubles (on dry basis), percent by weight, <i>Max</i>	11.0	C	—

*Methods of test for edible starches.

5. MARKING

5.1 Each container shall be suitably marked so as to give the following information:

- Name of the material,
- Type of the material,
- Name of the manufacturer,
- Batch or code number, and
- Net weight.

5.1.1 Each container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. SAMPLING

6.1 The method of drawing representative samples of the material and the criteria for conformity shall be as given in IS : 4662-1968*.

7. TESTS

7.1 The tests shall be carried out as prescribed in 3.2, 3.3, 3.4 and in col 4 and 5 of Table 1.

7.2 Quality of Reagents — Unless specified otherwise, pure chemicals shall be employed in tests and distilled water (see IS : 1070-1960†) 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 test results.

7.3 Preparation of Material — Prepare the material for tests prescribed in 3.3 and col 4 and 5 of Table 1, as given in Appendix D.

APPENDIX A

(Clause 3.2)

DETERMINATION OF OUTER RESIDUAL SKIN

A-1. PROCEDURE

A-1.1 Weigh accurately about 50 g of the material and pick out the chips with outer residual skin only. Keep them separately and weigh.

A-2. CALCULATION

A-2.1 Material with outer residual skin, percent by weight = $\frac{100 W_1}{W}$

where

W_1 = weight in g of the material with outer residual skin, and

W = weight in g of the material taken for the test.

*Methods for sampling of starch.

†Specification for water, distilled quality (revised).

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APPENDIX B

(Clause 3.4)

TEST FOR PRESENCE OF HYDROCYANIC ACID

B-1. REAGENTS

B-1.1 Picric Acid Solution — one percent (*w/v*), aqueous.

B-1.2 Sodium Carbonate Solution — 10 percent (*w/v*).

B-1.3 Sodium Picrate Paper — Prepare strips of filter paper, dip them in the picric acid solution and dry. Then dip these in the sodium carbonate solution and again dry. Preserve these strips in a stoppered bottle.

B-1.4 Chloroform

B-2. PROCEDURE

B-2.1 Take a small quantity of the material and grind it coarsely in a pestle and mortar. Place the material in a test-tube. Insert in the test tube a sodium picrate paper moistened with water, taking care that it does not come in contact with the material. Add a few drops of chloroform and stopper the test tube tightly. Note the colour of the sodium picrate paper. If hydrocyanic acid is present, the colour changes to orange.

NOTE — This test is a delicate one and the rapidity of the colour change depends on the quantity of free hydrocyanic acid present in the material.

APPENDIX C

[Table 1, item (vi)]

DETERMINATION OF COLD-WATER SOLUBLES

C-1. PROCEDURE

C-1.1 Weigh accurately 2 g of the *prepared sample* (**D-1.2**) dried to constant weight in an hot air-oven at 105° to 110°C. Transfer it to an Erlenmeyer flask and add distilled water to make the volume to 100 ml. Stir for 30 minutes at 200 rev/min and allow to settle. Filter through a Whatman filter paper No. 1. Rinse a beaker with about 10 ml of the filtrate and collect the rest of the filtrate in it. Pipette out 25 ml of the filtrate and evaporate to dryness in a tared porcelain dish. Cool and weigh the residue.

C-2. CALCULATION

C-2.1 Cold-water solubles (on dry basis), percent by weight =
$$\frac{x \times 4 \times 100}{x_1}$$

where

x = weight in g of the residue after drying, and

x_1 = weight in g of the sample taken for the test.

APPENDIX D

(Clause 7.3)

PREPARATION OF MATERIAL FOR TESTS

D-1. PROCEDURE

D-1.1 For Examination for Dirt and Other Suspended and Extra-neous Matter — Grind the material in a pestle and mortar and sieve through 150-micron IS Sieve. Use the material passing through the sieve for the test (*see 3.3*).

NOTE — In case 150-micron IS Sieve (conforming to IS : 460-1962*) is not available, BS Test Sieve 100, ASTM Sieve 100 or Tyler Sieve 100, which have their apertures within the limits specified for this IS Sieve, may be used.

D-1.2 For Moisture, Total Ash, Acid Insoluble Ash, Crude Fibre, pH of Aqueous Extract and Cold-Water Solubles — Grind in a pestle and mortar about 100 g of the material so that at least 90 percent passes through 425-micron IS Sieve (*see Note*). Transfer this *prepared sample* to a well stoppered glass bottle. Use this sample for tests mentioned in col 4 and 5 of Table 1.

NOTE — In case 425-micron IS Sieve (conforming to IS : 460-1962*) is not available, BS Test Sieve 36, ASTM Sieve 40, or Tyler Sieve 35, which have their apertures within the limits specified for this IS Sieve, may be used.

*Specification for test sieves (*revised*).

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