IS 5955 (1993): Spices and Condiments - Tamarind Concentrate [FAD 9: Spices and Condiments]

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IS 5955 : 1993
(Reaffirmed - 2012)

भारतीय मानक

मसाले एवं मसाले – इमली सार – विशिष्टि

(पहला पुनरीक्षण)

Indian Standard

SPICES AND CONDIMENTS — TAMARIND CONCENTRATE — SPECIFICATION

(First Revision)

UDC 664·5 : 634·461

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

October 1993 Price Group 3

AMENDMENT NO. 1 NOVEMBER 1994
TO
IS 5955 : 1993 SPICES AND CONDIMENTS — TAMARIND CONCENTRATE — SPECIFICATION

(First Revision)

(*Page* 1, *clause* 2) — Add '(*second revision*)' at the end of title of 'IS 1797 : 1985'.

(*Page* 1, *clause* 4.4, *line* 2) — Delete the word 'of'.

(*Page* 1, *clause* 4.7, *line* 2) — Delete ' , ' in between the words 'dead' and 'insect'.

(*Page* 1, *clause* 6, *first line*) — Substitute 'labelled' *for* 'lebelled'.

(FAD 9)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 FEBRUARY 1996
TO
IS 5955 : 1993 SPICES AND CONDIMENTS — TAMARIND CONCENTRATE — SPECIFICATION

(First Revision)

[*Page* 2, *clause* 6(f)] — Delete.

(*Page* 2, *clause* A-1, *first line*) — Delete 'and 55°C'.

(*Page* 3, *Note under clause* B-2.1) — Substitute following for the existing :

'NOTE — Temperature correction factor as given below shall be applied :

	Percentage of Dry Substance													
Temp (°C)	5	10	15	20	25	30	35	40	45	50	55	60	65	70
	Subtract from Dry Substance Percentage													
15	·29	·31	·33	·34	·34	·35	·36	·37	·37	·38	·39	·39	·40	·40
16	·24	·25	·26	·27	·28	·28	·29	·30	·30	·30	·31	·31	·32	·32
17	·18	·19	·20	·21	·21	·21	·22	·22	·23	·23	·23	·23	·24	·24
18	·13	·13	·14	·14	·14	·14	·15	·15	·15	·15	·16	·16	·16	·16
19	·06	·06	·07	·07	·07	·07	·08	·08	·08	·08	·08	·08	·08	·08
	Add to Dry Substance Percentage													
21	·07	·07	·07	·07	·08	·08	·08	·08	·08	·08	·08	·08	·08	·08
22	·13	·14	·14	·15	·15	·15	·15	·15	·16	·16	·16	·16	·16	·16
23	·20	·21	·22	·22	·23	·23	·23	·23	·24	·24	·24	·24	·24	·24
24	·27	·28	·29	·30	·30	·31	·31	·31	·31	·31	·32	·32	·32	·32
25	·35	·36	·37	·38	·38	·39	·40	·40	·40	·40	·40	·40	·40	·40
26	·42	·43	·44	·45	·46	·47	·48	·48	·48	·48	·48	·48	·48	·48
27	·50	·52	·53	·54	·55	·55	·56	·56	·56	.56	·56	·56	·56	·56
28	·57	·60	·61	·62	·63	·63	·64	·64	·64	·64	·64	·64	·64	·64
29	·66	·68	·69	·71	·72	·72	·73	·73	·73	·73	·73	·73	·73	·73
30	·74	·77	·78	·79	·80	·80	·81	·81	·81	·81	·81	·81	·81	·81

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Spices and Condiments Sectional Committee had been approved by the Food and Agriculture Division Council.

This standard was originally published in 1970. The present revision incorporates current trade practices and opportunity is also taken to incorporate additional requirements like moisture content and acid insoluble ash content.

Tamarind concentrate is a jam like product resulting from concentration (under vacuum to 65° to 68° Brix) of a hot-water extract of soluble solids of pulp obtained from mature fruits of *Tamarindus indica* and widely used as a spice and condiment all over India. The concentrate is clean and easily dispersible in hot water. The concentrate has found wide acceptance in India and abroad for making soup, sauces and other food products. It is hoped that this standard based on research investigations carried out at Central Food Technological Research Institute, Mysore, would enable better quality control of tamarind concentrate produced in the country and would also stabilize the exports.

This standard is also subject to the restrictions imposed under the *Prevention of Food Adulteration Act, 1954* and the Rules framed thereunder, wherever applicable.

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 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SPICES AND CONDIMENTS — TAMARIND CONCENTRATE — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for tamarind concentrate.

2 REFERENCES

The following Indian Standard is a necessary adjunct to this standard:

IS No.	*Title*
1797 : 1985	Methods of test for spices and condiments
2491 : 1972	Code of hygienic conditions for food processing units
2860 : 1964	Methods of sampling and test for processed fruits and vegetables
13145 : 1993	Spices and condiments—Methods of sampling (*first revision*)

3 TERMINOLOGY

3.1 For the purpose of this standard, the following definitions shall apply.

3.1.1 *Harmless Extraneous Vegetable Material*

Fibre and rind common to tamarind, and stems up to 10 mm in length and sepal bracts aggregating an area of 5 cm^2.

3.1.2 *Pit (Stone)*

A whole pit or approximately one-half seed of tamarind fruits.

3.1.3 *Pit Fragments*

A piece of tamarind seed less than the equivalent of one half pit and which weighs at least 5 milligrams.

4 REQUIREMENTS

4.1 General

Tamarind concentrate shall be obtained by hot water extraction of clean tamarind pulp with subsequent concentration under vacuum. The tamarind fruits shall be mature, sound, fresh, and shall be free from insect and fungal attack or any other blemish affecting the quality of the product. Added colouring and flavouring agents shall not be present.

4.2 Hygiene

Tamarind concentrate shall be manufactured under hygienic conditions (*see* IS 2491 : 1972).

4.3 Colour

The concentrate shall be light to dark brown in colour.

4.4 Flavour

The flavour of tamarind concentrate shall be characteristic of tamarind fruit. No burnt of flavour should be present.

4.5 Defects

Tamarind concentrate shall be free from:

a) Harmless extraneous vegetable materials,

b) Pits, and

c) Pit fragments.

4.6 The tamarind concentrate shall also comply with the requirements given in Tables 1 and 2. The cans containing tamarind concentrate shall not show any positive pressure.

4.7 Freedom from Moulds, Insects, etc

The tamarind concentrate shall be free from living insect, moulds, dead, insect fragments and rodent contamination visible to the naked eye (corrected, if necessary, for abnormal vision) or with such magnification as may be necessary in any particular case. If the magnification exceeds × 10, this fact should be stated in the test report.

5 PACKING

Tamarind concentrate shall be packed in tin plate or glass containers which should be appropriately sealed. The tin-plate container shall be lacquered. The lacquer shall be of the acid resistant type.

6 MARKING

Each container shall be marked or lebelled with the following particulars:

a) Name of the material,

b) Name and address of the manufacturer,

c) Net mass of the contents of the container in grams,

d) Date of manufacture or code number indicating the date of manufacture,

e) List of additives, and

f) Manufacturer's licence number.

7 SAMPLING

7.1 The method of drawing representative sample of the material and criteria for conformity shall be as prescribed in IS 13145 : 1993.

Table 1 Requirements for Tamarind Concentrate

(*Clause* 4.6)

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Annex of This Standard	Other Indian Standards
(1)	(2)	(3)	(4)	(5)
i)	Head space of the can in mm, *Max*	6	—	Cl 6 of IS 2860 : 1964
ii)	Microbiological requirements	To satisfy the test	A	—
iii)	Moisture, percent by mass, *Max*	15	—	Cl 9 of IS 1797 : 1985
iv)	Total soluble solids, percent by mass, *Min*	65	B	—
v)	Total insoluble pulp, percent by mass, *Max*	2	C	—
vi)	Total tartaric acid, percent, *Min*	9	D	—
vii)	Acid insoluble ash (on dry basis), percent by mass, *Max*	0·50	—	Cl 8 of IS 1797 : 1985
viii)	Total reducing sugar, percent by mass, *Min*	35	E	—

Table 2 Limits for Heavy Metals in Tamarind Concentrate

(*Clause* 4.6)

Sl No.	Characteristic	Requirement	Method of Test, Ref to Cl No. of IS 2860 : 1964
(1)	(2)	(3)	(4)
i)	Arsenic (as As), ppm, *Max*	1·0	13
ii)	Lead (as Pb), ppm, *Max*	2·5	14
iii)	Copper (as Cu), ppm, *Max*	30	15
iv)	Zinc (as Zn), ppm, *Max*	50	16
v)	Tin (as Sn), ppm, *Max*	250	17

ANNEX A

[*Table* 1, *Item* (ii)]

TEST FOR MICROBIOLOGICAL REQUIREMENTS

A-1 Incubate cans at 37°C and 55°C for 7 days. Examine the cans for evidence of microbiological activity after 7 days of incubation. To satisfy the requirements of this test, the cans shall not show evidence of microbiological activity of any type. The incubated cans shall be deemed to have undergone microbiological spoilage, if any can:

a) bulges when being incubated and remains bulged after being cooled, or remains bulged after incubation; and

b) leaks.

ANNEX B

[*Table* 1, *Item* (iv)]

DETERMINATION OF SOLUBLE SOLIDS

B-1 APPARATUS

B-1.1 Refractometer—either hand or Abbe refractometer.

B-2 PROCEDURE

B-2.1 Keep one or two drops of the tamarind concentrate sample between the two prisms of the refractometer and read the percentage refractometric soluble solids.

NOTE — Temperature correction factor is 0·07/ degree increase or decrease in temperature.

ANNEX C

[*Table* 1, *Item* (v)]

DETERMINATION OF TOTAL INSOLUBLE PULP

C-1 PROCEDURE

C-1.1 Boil 20 g of sample with 100 ml distilled water for 30-40 minutes. Filter through dried and weighed filter paper. Wash with hot water. Dry the filter paper at 100°C to constant weight. From the weight, subtract the weight of the filter paper. This gives the weight of total insoluble pulp.

ANNEX D

[*Table* 1, *Item* (vi)]

DETERMINATION OF TOTAL TARTARIC ACIDS

D-1 REAGENTS

D-1.1 Hydrochloric Acid — Concentrated.

D-1.2 Alcohol — 95 percent and 80 percent (*v/v*).

D-1.3 Potassium Hydroxide Solution — 30 percent.

D-1.4 Phenolphthalein Indicator

D-2 PROCEDURE

D-2.1 Take 2 g of tamarind concentrate, dissolve in 30 ml of hot water, cool and acidify with 2 ml of hydrochloric acid. Add 65 ml of 95 percent alcohol with stirring and filter the precipitated pectin. Concentrate the filtrate to 30 ml and neutralize with potassium hydroxide solution. Acidify with 3 ml of glacial acetic acid. Add the stirring 80 ml of 95 percent alcohol. Cool overnight in refrigerator. Filter off precipitated bitartrate using 9 cm quantitative filter paper. Wash with ice-cold 80 percent alcohol (15-ml portions, 3 times) Transfer back filter paper with precipitate to precipitation flask, boil with distilled water until it dissolves and titrate with 0·1 N alkali, using phenolphthalein as indicator.

D-3 CALCULATION

D-3.1 Express the results in milli-equivalents (that is, in ml of normal alkali solution) per 100 ml of the product. One millilitre of 0·1 N sodium hydroxide is equivalent to 0·015 g of tartaric acid.

ANNEX E

[*Table* 1, *Item* (viii)]

DETERMINATION OF TOTAL REDUCING SUGARS

E-1 TOTAL REDUCING SUGARS

E-1.1 Reagents

E-1.1.1 *Soxhlet Modification of Fehling's Solution* — Prepare by mixing equal volumes of solution *A* (**E-1.1.2**) and solution *B* (**E-1.1.3**) immediately before using. Transfer into a conical flask of 250 ml capacity. Heat this mixture to boiling on an asbestos gauze and add standard invert sugar solution (**E-1.1.5**) from a burette, about one millilitre less than the expected volume which will reduce the Fehling's solution completely (about 48 ml). Add one millilitre of methylene blue indicator while keeping the solution boiling. Complete the titration within three minutes, the end point being indicated by change of colour from blue to red. From the volume of invert sugar solution used, calculate the strength(s) of the copper sulphate solution by multiplying the titre value by 0·001 (mg/ml of the standard invert sugar solution). This would give the quantity of invert sugar required to reduce the copper in 5 ml of copper sulphate solution.

E-1.1.2 *Copper Sulphate Solution (Solution A)*

Dissolve 34·639 g of copper sulphate crystals ($CuSO_4 . 5 H_2O$) in water, dilute to 500 ml and filter through glass wool or filter paper.

E-1.1.2.1 Standardization of copper sulphate solution using separate pipette accurately 5 ml of solution *A* (**E-1.1.2**) and 5 ml of solution *B* (**E-1.1.3**).

E-1.1.3 *Potassium Sodium Tartrate (Rochelle Salt) Solution (Solution B)*

Dissolve 173 g of potassium sodium tartrate and 50 g of sodium hydroxide in water, dilute to 500 ml. Let the solution stand for a day and filter.

E-1.1.4 *Hydrochloric Acid*

Sp gr 1·18 at 20°C (approximately 12 N).

E-1.1.5 *Standard Invert Sugar Solution*

Weigh accurately 0·95 g sucrose and dissolve it in 500 ml of water. Add 2 ml of concentrated hydrochloric acid, boil gently for 30 minutes and keep aside for 24 hours. Neutralize with sodium carbonate and make the final volume to 1 000 ml; 50 ml of this solution contains 0·05 g invert sugar.

E-1.1.6 *Methylene Blue Indicator*

0·2 percent in water.

E-1.2 Procedure

Place accurately weighed about one gram (*W*) of the prepared sample of tamarind concentrate into a 250 ml volumetric flask and dilute with about 150 ml of water; mix thoroughly the contents of the flask and make the volume to 250 ml with water. Using separate pipettes, take accurately 5 ml each of solution A (**E-1.1.3**), in a procelain dish. Add about 12 ml of tamarind concentrate solution from a burette and heat to boiling over an asbestos gauze. Add one millilitre of methylene blue indicator and while keeping the solution boiling complete the titration, within three minutes, the end point being indicated by change of colour from blue to red. Note the volume (*H*) in ml of tamarind concentrate solution required for the titration.

E-1.3 Calculation

$$\text{Total reducing sugars, percent by mass} = \frac{250 \times 100\ S}{H \times M}$$

where

S = strength of copper sulphate solution,

H = volume in ml of honey solution required for titration, and

M = mass in g of honey.

NOTE — For true total reducing sugar refer to **C-3.2.2**

E-2 SUCROSE

E-2.1 Procedure

To 100 ml of the stock honey solution (*see* **E-1.2**), add one millilitre of concentrated hydrochloric acid and heat the solution to near boiling. Keep aside overnight. Neutralize this inverted tamarind concentrate solution with sodium carbonate and determine the total reducing sugars as described in **E-1.2.**

E-2.2 Calculation

E-2.2.1 Sucrose, percent by mass = [(reducing sugars after inversion, percent by mass) − (reducing sugars before inversion, percent by mass)] × 0 95.

E-3 FRUCTOSE-GLUCOSE RATIO

E-3.1 Reagents

E-3.1.1 *Iodine Solution* — 0·05 N.

E-3.1.2 *Sodium Hydroxide Solution* — 0·1 N.

E-3.1.3 *Sulphuric Acid* — concentrated.

E-3.1.4 *Standard Sodium Thiosulphate Solution* — 0·05 N.

E-3.2 Procedure

Pipette 50 ml of tamarind concentrate solution (*see* **E-1.2**) in a 250 ml stoppered flask. Add 40 ml of iodine solution and 25 ml of sodium hydroxide solution. Stopper the flask and keep in dark for 20 minutes. Acidify with 5 ml of sulphuric acid and titrate quickly the excess of iodine against standard sodium thiosulphate solution. Conduct a blank using 50 ml of water instead of tamarind concentrate solution.

E-3.3 Calculations

E-3.3.1 Approximate glucose, percent by mass (w) $= \frac{(B-S) \times 0{\cdot}004}{a} \times \frac{502 \times 100}{}$

where

B = volume of sodium thiosulphate solution required for the blank;

S = volume of sodium thiosulphate solution required for the sample; and

a = mass of tamarind concentrate taken for test.

E-3.3.2 Approximate fructose, percent by mass (x) $= \frac{\text{Approximate total reducing sugar, percent} - w}{0{\cdot}925}$

True glucose, percent by mass (y) $= w - 0{\cdot}012x$

True fructose percent by mass (z) $= \frac{\text{Approximate reducing sugars, percent} - y}{0{\cdot}925}$

True reducing sugars, percent by mass $= y + z$

E-3.3.3 Fructose-glucose ratio $= \frac{\text{True fractose, percent by mass } (z)}{\text{True glucose, percent by mass } (y)}$

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard 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 which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'. Comments on this Indian Standard may be sent to BIS giving the following reference:

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