

ट्राइसोडियम साइट्रेट, खाद्य ग्रेड — विशिष्टि  
(दूसरा पुनरीक्षण)

Trisodium Citrate, Food Grade —  
Specification  
( Second Revision )

ICS 67.220.20

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भारतीय मानक ब्यूरो  
BUREAU OF INDIAN STANDARDS  
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI - 110002  
[www.bis.gov.in](http://www.bis.gov.in) [www.standardsbis.in](http://www.standardsbis.in)

December 2024

Price Group 3

## FOREWORD

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

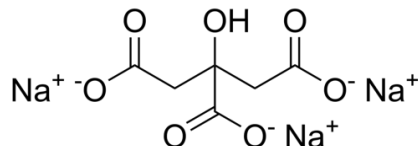
Food additives are added to improve the appearance, flavour, texture or storage properties, etc of the processed foods. As certain impurities in these substances have been found to be harmful, it is necessary to have a strict quality control of these food additives. A series of standards have, therefore, been prepared to cover purity and identification of these substances. These standards would help in checking purity, which requires to be checked at the stage of manufacture, for it is extremely difficult to detect the impurity once these substances have been added to the processed foods. Besides, these standards are intended to guide the indigenous manufacturers in making their product conform to specifications that are accepted by scientists, health authorities and national/international bodies.

Trisodium citrate, food grade widely used as an emulsifying and stabilizing agent, is permitted under *Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011*.

Chemical name — Trisodium citrate

Chemical formulae

- $C_6H_5Na_3O_7$  (anhydrous)
- $C_6H_5Na_3O_7 \cdot 2H_2O$  (dihydrated)
- $C_6H_5Na_3O_7 \cdot 5H_2O$  (pentahydrated)



STRUCTURAL FORMULA

This standard was first published in 1969. In formulation of this standard, a considerable amount of assistance were derived from food chemicals codex (FCC), National Academy of Sciences, National Research Council, Washington, DC and Pharmacopoeia of India, 1966.

It was first revised in 1996 to incorporate the requirement of solubility in line with FCC and the additional information like directions for storage, type of the material and expiry date under marking clause.

In this revision, following major changes have been made:

- The title of the standard has been changed to 'trisodium citrate' from the earlier title 'sodium citrate' to bring the clarity;
- The test method for determination of purity has been change to align it with JECFA monograph;
- The requirement for heavy metals has been removed as the limit of lead (contaminant in food colours) is already covered through the standard; and
- The marking requirements have been updated.

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 : 2022 'Rules for rounding off numerical values (*second revision*)'. 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***TRISODIUM CITRATE, FOOD GRADE — SPECIFICATION***( Second Revision )***1 SCOPE**

This standard prescribes the requirements and the methods of sampling and test for trisodium citrate, food grade.

**2 REFERENCES**

The standards given below contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards:

<i>IS No.</i>	<i>Title</i>
IS 1070 : 2023	Reagent grade water — Specification ( <i>fourth revision</i> )
IS 1699 : 2024	Food colours — Methods of sampling and test ( <i>third revision</i> )

**3 DESCRIPTION**

Trisodium citrate shall be in the form of colourless crystals or white crystalline powder. It may be anhydrous or may contain two or five molecules of water of crystallization.

**4 REQUIREMENTS****4.1 Identification**

A 5 percent solution of trisodium citrate shall give positive test for sodium given in [4.1.1](#) and positive test for citrate given in [4.1.2](#).

**4.1.1 Test for Sodium**

Convert the material to chloride or nitrate. When to this solution uranyl zinc acetate is added, a yellow crystalline precipitate shall be formed with several minutes agitation.

**4.1.2 Test for Citrate**

To 5 ml of the 5 percent solution, add 1 ml of calcium chloride and 3 drops of bromothymol blue, slightly acidify with dilute hydrochloric acid, and

add 1 N sodium hydroxide until the colour changes to a clear blue, then boil for 3 min, agitating gently during the heating period. The precipitate shall appear in the liquid. The precipitate shall be insoluble in sodium hydroxide but soluble in dilute hydrochloric acid.

**4.2 Oxalate**

Prepare a mixture of 1 ml of water and 3 ml of dilute hydrochloric acid and dissolve in it one gram of the material. Add to it 4 ml of 90 percent alcohol and 4 drops of solution of calcium chloride. Allow to stand for one hour. The mixture shall remain clear.

**4.3 Readily Carbonizable Substances**

Take 10 ml of sulphuric acid (94.5 percent to 95.5 percent of H<sub>2</sub>SO<sub>4</sub>) in a test-tube and add one gram of the material. Heat in a boiling water-bath for one hour. Not more than a pale brown colour shall be produced.

**4.4** The material shall also conform to the requirements given in [Table 1](#).

**5 PACKING AND STORAGE****5.1 Packing**

The material shall be securely packed in containers with minimum access to light and moisture. The containers shall be such as to preclude contamination of the contents with metals or other impurities.

**5.2 Storage**

The material shall be stored in a cool and dry place so as to avoid excessive exposure to heat.

**6 MARKING**

**6.1** Each container shall be legibly and indelibly marked with the following information:

- Name of the material, including the words 'Food Grade';
- Type of the material whether 'anhydrous' or 'dihydrate' or 'pentahydrate';
- Name and address of the manufacturer;
- Net content, when packed;

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- e) Batch or code number;
- f) Date of manufacture;
- g) Instructions for storage;
- h) Expiry date; and
- j) Any other requirements as specified under the *Legal Metrology (Packaged Commodities) Rules, 2011* and *Food Safety and Standards (Labelling and Display) Regulations, 2020*.

## 6.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

## 7 SAMPLING

The representative samples of the material shall be drawn according to the method prescribed in IS 1699.

## 8 TESTS

Tests shall be carried out by the methods as specified in col (4) of [Table 1](#).

## 9 QUALITY OF REAGENTS

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the experimental results.

**Table 1 Requirements for Trisodium Citrate, Food Grade**

(Clauses [4.4](#) and [8](#))

SI No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Purity, as (C <sub>6</sub> H <sub>5</sub> Na <sub>3</sub> O <sub>7</sub> ), percent by mass, on dry basis, <i>Min</i>	99.0	<a href="#">Annex A</a>
ii)	Moisture, percent by mass, <i>Max</i>		
	a) Anhydrous	1	
	b) Dihydrate	13	<a href="#">Annex B</a>
	c) Pentahydrate	30	
iii)	Alkalinity, <i>Max</i>	To pass the test	<a href="#">Annex C</a>
iv)	Arsenic (as As), on dry basis, mg/kg, <i>Max</i>	3	<a href="#">Annex D</a>
vi)	Lead (as Pb), mg/kg, <i>Max</i>	2	IS 1699

## ANNEX A

[Table 1, Sl No. (i)]

## DETERMINATION OF PURITY

## A-1 REAGENTS

## A-1.1 Glacial Acetic Acid

## A-1.2 Perchloric Acid — 0.1 N

**A-1.3 Crystal Violet Indicator** — one percent solution of methyl violet (methyl-rosaniline chloride; crystal violet) in glacial acetic acid.

## A-2 PROCEDURE

Transfer about 350 mg of the sample, accurately weighed, to a 250 ml beaker. Add 100 ml of glacial acetic acid, stir until completely dissolved, and titrate with 0.1 N perchloric acid, using crystal violet as indicator. Perform a blank determination and make any necessary correction. Each ml of 0.1 N perchloric acid is equivalent to 8.602 mg of  $C_6H_5Na_3O_7$ .

## ANNEX B

[Table 1, Sl No. (ii)]

## DETERMINATION OF MOISTURE

## B-1 APPARATUS

**B-1.1 Oven** — maintained at  $180\text{ }^\circ\text{C} \pm 1\text{ }^\circ\text{C}$

**B-1.2 Weighing Bottle** — glass-stoppered, shallow

## B-2 PROCEDURE

Weigh accurately about 2 g of the powdered sample

in the tared weighing bottle. Distribute the sample as evenly as practicable to a depth of about 5 mm. Place the bottle containing the sample (uncovered) in the oven maintained at  $180\text{ }^\circ\text{C} \pm 1\text{ }^\circ\text{C}$ . Remove the bottle from the oven after 18 h, close the bottle promptly and allow it to come to room temperature in a desiccator. Weigh it.

Calculate loss on drying percent by mass.

## ANNEX C

[Table 1, Sl No. (iii)]

## TEST FOR ALKALINITY

## C-1 REAGENTS

**C-1.1 Sulphuric Acid** — 0.1 N

**C-1.2 Phenolphthalein Indicator**

## C-2 PROCEDURE

A 5 percent solution of the material in water is alkaline to litmus paper but after the addition of 0.2 ml of the sulphuric acid, no pink colour shall be produced by one drop of phenolphthalein.

## ANNEX D

[Table 1, Sl No. (iv)]

## DETERMINATION OF ARSENIC

## D-1 PROCEDURE

Proceed as given in IS 1699, except that in the chemical analysis method sample shall be taken

after removing the moisture as per the procedure given in [B-2](#). Alternatively, the material obtained after drying and cooling in the moisture determination test can be used for the estimation.





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This Indian Standard has been developed from Doc No.: FAD 08 (25262).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

## BUREAU OF INDIAN STANDARDS

### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: [www.bis.gov.in](http://www.bis.gov.in)

### Regional Offices:

	Telephones
Central : 601/A, Konnectus Tower -1, 6 <sup>th</sup> Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	{ 2323 7617
Eastern : 8 <sup>th</sup> Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	{ 2367 0012 2320 9474
Northern : Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	{ 265 9930
Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	{ 2254 1442 2254 1216
Western : 5 <sup>th</sup> Floor/MTNL CETTM Technology Street, Hiranandani Gardens, Powai, Mumbai - 400076	{ 283 25838

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