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BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY

भारतीय मानक मसौदा

ट्राइसोडियम सिट्रेएट, खाद्य ग्रेड - विशिष्टि

(*आइ एस* 5058 *का दूसरा पुनरीक्षण*)

Draft Indian Standard

TRISODIUM CITRATE, FOOD GRADE — SPECIFICATION

(*Second Revision of IS 5058*)

ICS No. 67.220.20

Food Additives Committee, FAD 08 Last Date of Comments:

FOREWORD

(*Formal clauses would be added later*)

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.

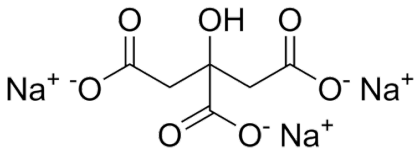
Trisodium citrate, food grade widely used as an emulsifying and stabilizing agent, is permitted under *Food Safety and Standards* (*Food Products Standards and Food Additives*) *Regulation*, 2011.

Chemical Name – Trisodium citrate

Chemical Formulae – a) $C_6H_5Na_3O_7$ (Anhydrous)

b) $C_6H_5Na_3O_7.2H_2O$ (Dihydrated)

c) $C_6H_5Na_3O_7.5H_2O$ (Pentahydrated)



STRUCTURAL FORMULA

This standard was first published in 1969. A considerable amount of assistance were derived from the following publications in preparing this standard:

a) Food chemicals codex, National Academy of Sciences, National Research Council, Washington, DC.
b) Pharmacopoeia of India, 1966.

It was first revised in 1996 to include 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:

a) The word ‘sodium citrate’ has been replaced by ‘trisodium citrate’ in this standard.
b) The requirement for heavy metals has been removed as the limit of lead (contaminant in food colours) is already covered through the standard.
c) 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.

1 SCOPE

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

2 REFERENCES

The following Indian Standards 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 editions of the standards indicated below:

IS No.	*Title*
IS 1070 : 2023	Reagent grade water − Specification (*fourth revision*)
Doc: FAD 08 (23204)WC	Methods of sampling and test for food colours (*third revision of IS 1699*)

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.

NOTE - The solubility is intended only as information regarding approximate solubility and is not to be considered as a quality requirement and is of minor significance as a means of identification or determination of purity.

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 minutes, 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 to 95.5 percent of H_2SO_4) 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.

Table 1 Requirements for Trisodium Citrate, Food Grade
(*Clause* 4.4)

Sl. No.	Characteristic	Requirements	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Purity, as ($C_6H_5Na_3O_7$), percent by mass, on dry basis, *Min*	99.0	Annex A
ii)	Moisture, percent by mass, *Max* a) Anhydrous b) Dihydrate c) Pentahydrate	 1 13 30	Annex B
iii)	Alkalinity, *Max*	To pass the test	Annex C
iv)	Arsenic (as As), on dry basis, mg/kg, *Max*	3	Annex D
vi)	Lead (as Pb), mg/kg, *Max*	2	Doc: FAD 08 (23204)WC

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**:**

a) Name of the material, including the words ‘Food Grade’;
b) Type of the material whether ‘anhydrous’ or ‘dihydrate’ or ‘pentahydrate’;
c) Name and address of the manufacturer;
d) Net content, when packed;
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 Food Safety and Standards* (*Packaging*)

Regulations, 2018 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 TESTS

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

8 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.

ANNEX A
[*Table* 1, *Sl No.* (i)]
DETERMINATION OF PURITY

A-1 REAGENTS

A-l.1 Glacial Acetic Acid

A-1.2 Perchloric Acid – 0.1 N.

A-1.3 Crystal Violet Indicator – 1% 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-l.1 Oven - maintained at 180 ± 1°C

B-l.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 ± 1°C. Remove the bottle from the oven after 18 hours, 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-l REAGENTS

C-l.1 Sulphuric Acid - 0.1 N.

C-l.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 Doc: FAD 08 (23204)WC, except that in the chemical analysis method sample shall be taken after removing the moisture as per the procedure given in **B-2** of this standard. Alternatively, the material obtained after drying and cooling in the moisture determination test can be used for the estimation.