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भारतीय मानक मसौदा

सॉर्बिक एसिड, खाद्य ग्रेड – विशिष्टि

(आइ एस 4818 का दूसरा पुनरीक्षण)

Draft Indian Standard

SORBIC ACID, FOOD GRADE — SPECIFICATION

(Second Revision of IS 4818)

ICS No. 67.220.20

Food Additives Committee, FAD 08

Last Date of Comments: 20 June 2024

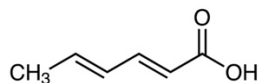
FOREWORD

(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.

Sorbic acid, food grade used as a food additive is permitted under *Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011*.

Chemical Names and Formula — The recognized chemical names are sorbic acid; trans, all trans 2,4-hexadienoic acid. Empirical formula is $C_6H_8O_2$. Its molecular weight is 112.13. Structural formula is:



STRUCTURAL FORMULA

This standard was first published in 1968. In the formulation of this standard, considerable amount of assistance was derived from Food Chemical Codex (FCC), issued by the National Academy of Sciences, National Research Council, Washington.

It was first revised in 1996 to upgrade the standard by reducing the moisture content, to incorporate the requirement of solubility in line with FCC and to include the instructions for storage under marking clause.

In this revision, the following major changes have been made:

- a) The requirement for heavy metals has been removed as the limit of lead (contaminant in food colours) is already covered through the standard.
- b) The requirement of stability and corresponding test method has been removed to align it with JECFA Monograph.
- c) The requirement of absorption maximum has been incorporated under identification test to align it with JECFA Monograph.
- d) 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*). This 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 tests for sorbic acid, food grade.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
IS 1070 : 2023	Reagent grade water – Specification (<i>fourth revision</i>)
IS 2362 : 1993	Determination of water by Karl Fischer method – Test method (<i>second revision</i>)
IS 4448 : 2022	Benzoic acid, food grade — Specification (<i>second revision</i>)
IS 1699 : 202X	Methods of sampling and test for synthetic food colours (<i>third revision</i>) [<i>Under preparation Doc: FAD 08(23204)F</i>]

3 DESCRIPTION

It is slightly soluble in water and soluble in ethanol.

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

4.1.1 *Melting Range*

The melting range of the material shall be 132°C to 135°C when determined by the method given in Annex A of this standard.

4.1.2 When 1 ml of saturated solution of bromine in water, 0.02 g of the material is added and shaken well, the colour shall disappear.

4.1.3 A 1 in 400000 solution in isopropanol solution shows absorbance maximum at 254±2 nm.

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

5 PACKING AND STORAGE

5.1 Packing

The material shall be filled in amber colour glass containers or any other containers with as little air space as possible. 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.

Table 1 Requirements for Sorbic Acid, Food Grade*(Clause 4.2)*

Sl. No.	Characteristic	Requirements	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Purity as C ₆ H ₈ O ₂ percent by mass, on dry basis, <i>Min</i>	99	Annex B
ii)	Moisture, percent by mass, <i>Max</i>	0.5	Annex C
iii)	Sulphated ash, percent by mass, <i>Max</i>	0.2	IS 4448
iv)	Aldehydes, percent by mass, <i>Max</i>	0.1	Annex D
v)	Arsenic (as As), mg/kg, <i>Max</i>	3	IS 1699
vi)	Lead (as Pb), mg/kg, <i>Max</i>	2	IS 1699

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';
- Name of the manufacturer or registered trade-mark, if any;
- Net quantity when packed;
- Lot/batch No.;
- Month and year of manufacture;
- Expiry date; and
- 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

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

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
(*Clause 4.1.1*)
DETERMINATION OF MELTING RANGE

A-1 APPARATUS

A-1.1 Suitable glass apparatus provided with an appropriate liquid like paraffin or silicone oil with a suitable stirring device, an accurate thermometer to read the melting range expected and a controlled source of heat.

Capillary tube: 10 cm long and 0.8 to 1.2 mm internal diameter with wall thickness of 0.8 to 1.2 mm.

A-1.2 Procedure

Dry the material over a suitable desiccant, say sulphuric acid for 24 hours. Charge a capillary glass tube, one end of which is sealed, with sufficient quantity of the dry powder to form a column in the bottom of the tube, of 2.5-3.5 mm high when packed down as closely as possible by moderate tapping on a solid surface. Heat the bath until a temperature $10 \pm 1^\circ\text{C}$ below the expected melting range is reached, then introduce the charged tube previously attached to the thermometer with its closed end at the level of the middle of the bulb so that the thermometer bulb is 2 cm above the bottom of the bath, and heat at a rate of raise of 1°C per minute.

Note the temperature at which the column of the sample is observed to collapse definitely against the side of the tube at any point which is the beginning of melting. Note the temperature at which the sample becomes liquid throughout which is the end of melting. The two temperatures shall fall within the limits of the melting range.

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

B-1 REAGENTS

B-1.1 Sulphuric Acid

B-1.2 Sodium Hydroxide - 1 N

B-1.3 Phenolphthalein Indicator

Dissolve 0.2 g of phenolphthalein ($\text{C}_{20}\text{H}_{14}\text{O}_4$) in 60 ml 90 percent ethanol and add a sufficient quantity of water to produce 100 ml.

B-2 APPARATUS

B-2.1 Vacuum Desiccator

B-2.2 Titrimetric Method

Weigh 1.500 g of the material, previously dried in a vacuum desiccator over concentrated sulphuric acid for 24 hours. Dissolve in about 25 ml of ethanol, weigh 1.500 g of the material, previously dried in a vacuum desiccator over concentrated sulphuric acid for 24 hours. Dissolve in about 25 ml of ethanol, titrate with 1 N sodium hydroxide using phenolphthalein as indicator.

Calculation : 1 ml of 1 N sodium hydroxide = 0.112 1 g of sorbic acid.

ANNEX C

[Table 1, Sl No. (ii)]

DETERMINATION OF MOISTURE

C-1 Two methods for determination of moisture are specified. In case of dispute, Method I shall be used.

C-2 METHOD I

C-2.1 Karl Fischer method as in IS 2362.

C-3 METHOD II

C-3.1 Procedure

Weigh accurately about 10 g of the material in a tared petri dish and spread the sample evenly. Dry it over sulphuric acid in a desiccator for 24 hours. Remove the petri dish and weigh. Calculate the percentage of moisture.

ANNEX D

[Table 1, Sl No. (iv)]

DETERMINATION OF ALDEHYDES

D-1 REAGENTS

D-1.1 Schiff's Reagent

Aqueous solution of 0.125 g of crystalline rose aniline chlorohydrate in 1000 ml and decolourized with sulphuric acid.

D-1.2 Formaldehyde Solution

D-2 PROCEDURE

Prepare a saturated aqueous solution of the material. In a test tube to 1 ml of this solution, add 0.5 ml of Schiff's reagent and allow to stand for 10 to 15 minutes. Compare the colour with that produced by 1 ml of formaldehyde solution corresponding to 0.1 percent of aldehydes, with the same amount of Schiff's reagent under the same conditions. The colour produced in the test solution shall not be more intense than that in the formaldehyde solution.