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भारतीय मानक मसौदा

अगार, खाद्य ग्रेड — विशिष्टि
(आई एस 5707 का दूसरा पुनरीक्षण)

Draft Indian Standard

AGAR, FOOD GRADE — SPECIFICATION
(Second Revision of IS 5707)

ICS 67.220.20

Food Additives Sectional Committee, FAD 08 **Last date for comments:** 22 February 2025

FOREWORD

(Adoption 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 is required 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.

Agar is widely used as stabilizer and emulsifier in various food products in the country. It is also known as agar-agar, china grass, etc. It is permitted under the *Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011*.

This standard was first published in 1970. In the preparation of this standard, assistance has been derived from Food Chemical Codex (FCC), Third Edition, National Academy of Sciences, National Research Council, Washington, DC.

This standard was first revised in 1996 to incorporate the requirement for solubility to keep it in line with the FCC; to substitute limit of lead by heavy metals and the corresponding test method; and to provide the date of expiry under the marking clause.

In this revision, one amendment issued to the previous version of the standard has been incorporated and 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; and
- b) 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 methods of sampling and test for agar, food grade.

2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute provisions 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>)
IS 5401 (Part 1) : 2012	Microbiology of food and animal feeding stuffs - Horizontal method for the detection and enumeration of coliforms: Part 1 colony count technique (<i>second revision</i>)
IS 5402 (Part 1) : 2021	Microbiology of the food chain - Horizontal method for the enumeration of microorganisms - Part 1: Colony count at 30 C by the pour plate technique (<i>third revision</i>)
IS 16069 (Part 2) : 2013/ ISO 21527-2	Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of yeasts and moulds: Part 2 colony count technique in products with water activity less than or equal to 0.95
IS 5887 (Part 3/Sec 1) : 2020/ ISO 6579-1 : 2017	Methods for detection of bacteria responsible for food poisoning: Part 3 Horizontal method for the detection, enumeration and serotyping of <i>Salmonella</i> : Section 1 Detection of <i>Salmonella</i> spp. (<i>third revision</i>)

3 DESCRIPTION

Agar is a dried hydrophilic, colloidal polygalactoside extracted from red algae of the class *Rhodophyceae*, such as *Gelidiella* species and *Gracilaria* species. It is commercially available in bundles consisting of thin, membranous strips or in cut, flaked, granulated, or powdered forms. It is white to pale yellow in colour. It is either odorless or having a slight characteristic odor, and a mucilaginous taste. Agar is insoluble in cold water but soluble in boiling water.

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 Place a few fragments of unground agar or a small amount of the powder on a slide, add a few drops of water, and examine microscopically. The agar shall appear granular and somewhat filamentous. A few fragments of sponges and diatoms may be present.

4.1.2 Boil 1.5 g of the material with 100 ml of water for 10 min under reflux. A clear liquid shall be obtained which shall congeal between 32 °C and 39 °C to form a firm resilient gel, which on reheating shall not liquify below 85 °C.

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

Table 1 Requirement for Agar, Food Grade
(clause 4.2)

S. No.	Characteristic	Requirement	Method of Test, Ref. to
(1)	(2)	(3)	(4)
i)	Water absorption	To pass the test	Annex A (A-1)
ii)	Moisture content, percent by mass, <i>Max</i>	20	Annex A (A-2)
iii)	Total ash, percent by mass, <i>Max</i>	6.5	Annex A (A-3)
iv)	Acid insoluble ash, percent by mass, <i>Max</i>	0.5	Annex A (A-4)
v)	Gelatin	To pass the test	Annex A (A-5)
vi)	Insoluble matter, percent by mass, <i>Max</i>	1	Annex A (A-6)
vii)	Starch and dextrans	To pass the test	Annex A (A-7)
viii)	Arsenic (as As) mg/kg, <i>Max</i>	3	IS 1699
ix)	Lead (as Pb), mg/kg, <i>Max</i>	5	IS 1699
ix)	Total plate count per g, <i>Max</i>	5000	IS 5402
x)	Coliforms per 10 g	Absent	5401 (Part 1)
xi)	Salmonella per 10 g	Absent	IS 5887 (Part 3/Sec 1)
xii)	Yeasts and moulds per g, <i>Max</i>	500	IS 16069 (Part 2)

5 PACKING

The material shall be securely packed in containers so as to preclude contamination of the contents.

6 MARKING

6.1 The container shall bear legibly and indelibly the following information:

- a) Name of the material including the words 'Food Grade';
- b) Source of manufacture;
- c) Net content when packed;
- d) Batch or code number;
- e) Date of manufacture; and
- f) Expiry/ Best before date;
- g) 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

8.1 Tests shall be carried out by the method referred to in col (4) of Table 1.

8.2 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 results of analysis.

ANNEX A
[Table 1]
ANALYSIS OF AGAR, FOOD GRADE

A-1 WATER ABSORPTION

A-1.1 Procedure

Place 5 g of the material in a 100 ml graduated cylinder, fill to the mark with water, mix and allow to stand at about 25 °C for 24 h. Pour the contents of the cylinder through moistened glass wool, allowing the water to drain into another 100 ml graduated cylinder. Not more than 75 ml of water shall be obtained.

A-2 MOISTURE

A-2.1 Procedure

Weigh accurately about 5 g of the material in a tared weighing bottle. Place the bottle containing the sample (uncovered) in the oven maintained at (105 ± 1) °C for 5 h. Remove the bottle from oven, close it and allow to come to room temperature in a desiccator and weigh. Calculate the loss or drying percent by mass.

A-3 TOTAL ASH

A-3.1 Procedure

Weigh accurately about 3 g of the material in a tared crucible, ignite at about 550 °C. not to exceed very dull redness, until free from carbon, cool in a desiccator, And weigh. If a carbon free ash is not obtained, wet the charred mass with hot water, collect the insoluble residue on an ash less filter paper, and ignite the residue and filter paper until the ash is white or nearly so. Finally, add the filtrate, evaporate it to dryness, and heat the whole to a dull redness. If a carbon-free ash is still not obtained. cool the crucible, add 15 ml of alcohol, break up the ash with glass rod then burn off the alcohol. Again heat the whole to a dull redness, cool and weigh. Calculate the percentage of ash from the weight of sample taken.

A-4 ACID INSOLUBLE ASH

A-4.1 Procedure

Boil the ash obtained as directed under total ash (*see A-3.1*) with 25 ml of diluted hydrochloric acid for 5 min, collect the insoluble matter on a tared Gooch crucible or ash less filter, wash with hot water, ignite, and weigh. Calculate the percentage of acid insoluble ash from the weight of sample taken.

A-5 GELATIN

A-5.1 Procedure

Dissolve about 1 g of the material in 100 ml of boiling water, and allow to cool to about 50 °C. To 5 ml of the solution, add 5 ml of trinitrophenol. No turbidity shall appear within 10 min.

A-6 INSOLUBLE MATTER

A-6.1 Procedure

To 7.5 g of the material, add sufficient water to make 500 g, boil for 15 min, and re-adjust to the original weight. To 100 g of the mixture, add hot water to make 200 ml. Heat almost to boiling, filter while hot through a tared sintered glass crucible of G-4 or G-5 porosity, rinse the container with several portions of hot water, and pass the rinsing through the crucible. Dry the crucible and its contents at 105 °C to constant weight, cool in a desiccator and weigh. Calculate the percentage of insoluble matter.

A-7 STARCH AND DEXTRINS

A-7.1 Reagents

A-7.1.1 Iodine Solution

Dissolve 14 g of iodine in a solution of 36 g of potassium iodide in 100 ml of water, add 3 drops of hydrochloric acid and dilute with water to 1000 ml.

A-7.2 Procedure

Prepare 0.5 percent aqueous solution of the material. Warm it to 40 °C and add 2 drops of iodine solution. Where the drops fall, a red-violet colour shall appear. On mixing, the solution shall become golden brown and not blue or reddish in colour.