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Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड़ नये के तरफ"  
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 14890 (2001): Sardines - Fresh, Frozen and Canned  
(Amalgamated revision of IS 2421, 6677, 8652, 8653, 9750 and 10761 [FAD 12: Fish and Fisheries Products]
Indian Standard
SARDINES — FRESH, FROZEN AND CANNED — SPECIFICATION

ICS 67.120.30

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

February 2001
FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Fish and Fisheries Products Sectional Committee had been approved by the Food and Agriculture Division Council.

Sardine (Sardinella sp), is a commercially important fish of India.

Earlier, the requirements of sardine were covered under separate standards, namely, IS 2421:1981 ‘Specification for sardine, canned in oil (second revision)’; IS 6677:1972 ‘Specification for sardine, canned in brine’; IS 8652:1977 ‘Specification for sardines, frozen’; IS 8653:1977 ‘Specification for sardines, fresh’; IS 9750:1981 ‘Specification for sardines, canned in tomato sauce’ and IS 10761:1983 ‘Specification for sardines, canned in curry’. While reviewing these standards, it was decided to update these standards, amalgamating them into one comprehensive standard, to make it user friendly. Consequently, this standard will supersede IS 2421, IS 6677, IS 8652, IS 8653, IS 9750 and IS 10761. The requirements for canned sardines have been harmonized with Codex Standard for canned sardines and sardine type products (Codex Standard 94-1981 Rev 1-1995).

In the preparation of this standard, due considerations have been given to the Prevention of Food Adulteration Act, 1954 and Rules framed thereunder and Standards of Weights and Measures (Packaged Commodities) Rules, 1977. However, this standard is subject to the restriction imposed under these, 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

SARDINES—FRESH, FROZEN AND CANNED—SPECIFICATION

1 SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for fresh, frozen and canned sardine.

1.1.1 The term sardine shall apply to the following species:

- Sardinella longiceps
- S. gibbosa
- S. fimbriata
- S. albella
- S. siren
- Dussumiera acuta
- D. hasseltii

2 REFERENCES

The following 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:

<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
<th>Code</th>
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<tbody>
<tr>
<td>321:1964</td>
<td>Absolute alcohol (revised)</td>
<td>Pre-processing stage (first revision)</td>
</tr>
<tr>
<td>460 (Part 1): 1985</td>
<td>Test sieves: Part 1 Wire cloth test sieves (third revision)</td>
<td>Canning stage (first revision)</td>
</tr>
<tr>
<td>594:1981</td>
<td>Common salt for fish curing (second revision)</td>
<td>Whole pomfret — Frozen (second revision)</td>
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<tr>
<td>2168:1971</td>
<td>Pomfret canned in oil (first revision)</td>
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<tr>
<td>2237:1997</td>
<td>Prawn — Frozen — Specification (third revision)</td>
<td></td>
</tr>
<tr>
<td>3882:1966</td>
<td>Tomato ketchup (first revision)</td>
<td></td>
</tr>
<tr>
<td>3883:1993</td>
<td>Canned tomato concentrate — Tomato paste (first revision)</td>
<td></td>
</tr>
<tr>
<td>4303 (Part 1): 1975</td>
<td>Code of hygienic condition for fish industry:</td>
<td></td>
</tr>
<tr>
<td>11427:1985</td>
<td>Methods for sampling for fish and fisheries products</td>
<td></td>
</tr>
</tbody>
</table>

3 GRADES

3.1 Fresh sardines and frozen sardines shall be of the following three grades:

<table>
<thead>
<tr>
<th>Grade Designation</th>
<th>Count (No. per kg) with Head on</th>
</tr>
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<tbody>
<tr>
<td>Large</td>
<td>Below 15</td>
</tr>
<tr>
<td>Medium</td>
<td>15 to 25</td>
</tr>
<tr>
<td>Small</td>
<td>26 and more</td>
</tr>
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</table>

4 GENERAL REQUIREMENTS

4.1 The material (fresh, frozen or canned) shall be prepared and processed as given in Annex A, under hygienic conditions as prescribed in IS 4303 (Part 1) and IS 4303 (Part 2).

5 REQUIREMENTS FOR FRESH SARDINES

5.1 Description

The fish, its skin and flesh shall have characteristic colour, free from any discoloration. The gills should be bright red in colour and free from discoloured mucus. The eyes shall be bright red in colour. The meat and stomach portion should be firm and shall not leave a mark when lightly pressed with finger.

5.2 The material shall also conform with the requirements given in Table 1.

6 REQUIREMENTS OF FROZEN SARDINES

6.1 Fresh sardines used for freezing shall conform to the requirements given in 5.

6.2 The material shall be clean, wholesome and free from defects.

6.3 The fish may either be whole or gutted. The entrails shall be removed. Eviscerated fish shall be washed thoroughly with clean water to remove blood.
6.4 The frozen sardine, on thawing, shall be in sound, intact and undamaged conditions and free from defects.

6.5 The product shall be free from any foreign matter.

6.6 The material shall conform to the requirements prescribed in Table 1.

6.7 No sample of fresh and frozen sardines shall contain histamine content exceeding 20 mg/kg when tested by the method given in Annex B of IS 4793.

7 REQUIREMENTS FOR CANNED SARDINES

7.1 Raw Material

The material to be canned may either be fresh or frozen and shall conform to the requirements given in 5 or 6 respectively.

7.1.1 Heads and gills shall be completely removed; scales and/or tail may be removed. The fish may be eviscerated. If eviscerated, it shall be practically free from visceral parts other than roe, milt or kidney. If ungutted, it shall be practically free from undigested feed or used feed.

7.2 Other Ingredients

One or more of the following ingredients which are of food grade quality shall be used depending on type of presentation: edible oil, common salt (see IS 594), tomato ketchup (see IS 3882), tomato puree (see IS 3883) spices and condiments.

7.3 Food Additives

The material shall be free from artificial colouring matter and firming agents except common salt. Food additives for fish and fisheries products permitted under PFA Rules may be used.

7.4 Presentation

The product shall be presented in one of the following packing media: own juice, brine or water, edible oil, tomato sauce or curry.

7.5 The can shall not show any visible external defects like denting, panelling, swelling or rusting.

7.5.1 The contents of the can on opening shall not display any appreciable disintegration. Pieces from which portions have separated out would be treated as disintegrated units. The percentage of detached portion of fish calculated on the basis of the drained mass shall not exceed 5 percent by mass based on the average of 5 cans.

Table 1 Requirements for Sardines, Fresh and Frozen

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Characteristic</th>
<th>Requirement</th>
<th>Method of Test, Ref to</th>
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<tr>
<td></td>
<td></td>
<td>Fresh</td>
<td>Frozen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>1</td>
<td>Total bacterial count/g, Max</td>
<td>100 000</td>
<td>100 000</td>
</tr>
<tr>
<td>i)</td>
<td><em>E. coli</em> count/g, Max</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>ii)</td>
<td><em>S. aureus</em> count/g, Max</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>iii)</td>
<td>Coagulate positive <em>S. aureus</em> count/g, Max</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>iv)</td>
<td><em>Salmonella</em> per 25 g</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>v)</td>
<td><em>Shigella</em> per 25 g</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>vi)</td>
<td><em>V. cholerae</em> per 25 g</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>vii)</td>
<td><em>L. monocytogenes</em></td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>viii)</td>
<td>Formaldehyde, mg/kg, Max</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>ix)</td>
<td>Indole, mg/kg, Max</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>x)</td>
<td>Heavy Metals:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xi)</td>
<td>a) Mercury, mg/kg, Max</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>x)</td>
<td>b) Copper, mg/kg, Max</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>x)</td>
<td>c) Zinc, mg/kg, Max</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>x)</td>
<td>d) Arsenic, mg/kg, Max</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>x)</td>
<td>e) Lead, mg/kg, Max</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>x)</td>
<td>f) Tin, mg/kg, Max</td>
<td>250.0</td>
<td>250.0</td>
</tr>
<tr>
<td></td>
<td>For product in tin plate containers</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>For product in other containers</td>
<td>250.0</td>
<td>250.0</td>
</tr>
</tbody>
</table>
7.6 The product shall have the odour, flavour and colour characteristic of the species.

7.7 The product shall be free from foreign materials, filth and from grittiness.

7.8 The can shall give a negative pressure when punctured. If round cans are used, the vacuum shall be not less than 100 mm of Hg, when measured at 27±2°C with a vacuum gauge of the piercing type or as electric vacuum recorder.

7.9 The drained mass of the contents in each can shall be not less than 65 percent of the net water capacity of the can as tested by the method given in Annex B. A tolerance of ±5 percent is permitted provided average content of fish on the basis of 5 cans lot shall not be less than 60 percent of the net mass.

7.10 The percentage of sodium chloride in the final product shall be 3.5 percent in the case of brine treated cans when tested by the method given in Annex C. The acidity of brine as citric acid anhydrous shall be between 0.06 to 0.20 percent (m/v) when tested by the method given in Annex D.

7.11 No sample of canned sardines shall contain histamine content exceeding 20 mg/100 g when tested by the method given in Annex B of IS 4793.

7.12 The canned sardines shall also conform to the requirements prescribed in Table 2.

8 PACKING

8.1 Sardine (fresh and frozen) shall be packed in suitable container as agreed between the purchaser and the processor. In the absence of any such agreement the material shall be packed in containers which may withstand the stress and strain of transportation and prevent deterioration during transportation and frozen storage. A layer of food grade polyethylene shall be used between the material and the container when individually frozen sardines are packed.

8.2 Canned sardine shall be packed in suitable containers, free from rust and hermetically sealed. Cans shall be lacquered, the lacquer used shall be non-toxic and shall be of such quality that it does not impart any foreign taste and smell to the contents of the cans and does not peel off during processing and storage of the product. The lacquer shall not be soluble in oil or brine.

9 MARKING

9.1 Each container of fresh material or each wrapped frozen material shall be marked or labelled with the following particulars:

   a) Name of the material with indication of fresh or frozen or canned;
   b) Name and address of the processor;
   c) Batch or code number;
   d) Grade, in case of fresh and frozen sardines;
   e) Net mass;
   f) Name of packing medium for canned sardines;
   g) If the fish has been smoked or smoke flavoured, this information shall appear in close proximity to the name;
   h) List of ingredients in descending order;
   j) Date of packing.

Table 2 Requirements for Sardines, Canned

<table>
<thead>
<tr>
<th>S1 No.</th>
<th>Characteristic</th>
<th>Requirement</th>
<th>Method of Test, Ref to Annex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mercury, mg/kg, Max</td>
<td>0.5</td>
<td>L-3 of IS 2237</td>
</tr>
<tr>
<td>2</td>
<td>Zinc, mg/kg, Max</td>
<td>50.0</td>
<td>L-4 of IS 2237</td>
</tr>
<tr>
<td>3</td>
<td>Copper, mg/kg, Max</td>
<td>10.0</td>
<td>L-4 of IS 2237</td>
</tr>
<tr>
<td>4</td>
<td>Arsenic, mg/kg, Max</td>
<td>1.0</td>
<td>L-5 of IS 2237</td>
</tr>
<tr>
<td>5</td>
<td>Lead, mg/kg, Max</td>
<td>1.0</td>
<td>L-6 of IS 2237</td>
</tr>
<tr>
<td>6</td>
<td>Tin, mg/kg, Max :</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For product in tin plate containers</td>
<td>250.0</td>
<td>L-7 of IS 2237</td>
</tr>
<tr>
<td></td>
<td>For product in other containers</td>
<td>50.0</td>
<td>L-7 of IS 2237</td>
</tr>
<tr>
<td>7</td>
<td>Microbiological requirements</td>
<td>Shall be commercially sterile</td>
<td>G of IS 2168</td>
</tr>
</tbody>
</table>
k) The words 'Best before............' (month and year to be indicated); and

m) Any other requirements as specified under the Standards of Weights and Measures (Packaged Commodities) Rules, 1977/Prevention of Food Adulteration Rules, 1955.

9.2 BIS Certification Marking

The product may also be marked with the Standard Mark.

9.2.1 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 details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

10 SAMPLING

10.1 The method of drawing representative samples of the material, fresh, frozen and canned for test and the criteria for conformity shall be according to the method prescribed in IS 11427.

ANNEX A

(Clause 4.1)

PREPARATION AND PROCESSING OF SARDINE, FRESH, FROZEN AND CANNED

A-1 FRESH SARDINE

A-1.1 Preparation

A-1.1.1 The material shall be washed in clean potable water containing 5 mg/kg chlorine to remove all adhering impurities and shall be iced immediately in suitable containers. The top, bottom and sides shall be covered with a layer of crushed ice.

A-1.1.2 The material shall be grouped according to the grade of the fish (see 3.1).

A-1.1.3 The temperature of the fish in the container shall not exceed 5°C.

A-2 FROZEN SARDINE

A-2.1 Processing

A-2.1.1 Clean, wholesome and fresh sardine (see A-1.1.1) which do not show any signs of spoilage shall be used.

A-2.1.2 To prevent belly bursting, the fish may be given a dip treatment in 15 percent brine for 30 min before freezing.

A-2.1.3 The material shall be properly arranged and quick frozen at a temperature not exceeding -40°C in the minimum possible time and the quick-frozen material shall be stored in cold storage at a temperature of -23°C or below throughout.

A-2.1.4 The material shall be packed according to grade.

A-3 CANNED SARDINE

A-3.1 Processing

A-3.1.1 Processing shall be at such a temperature and for such length of time as will ensure thorough cooking and commercial sterility. The water used for cooling cans shall be maintained in clean condition and chlorinated to maintain a minimum free residual chlorine concentration of one ppm.

A-3.1.2 Fish curry, if used shall be prepared as agreed to between the purchaser and the producer, care being taken that during preparation all the fish juices or other ingredients are retained in full.
ANNEX B
(Clause 7.9)

DETERMINATION OF DRAINED MASS AND WASHED DRAINED MASS

B-1 APPARATUS

B-1.1 Sieve — 2.00 mm for drained mass; 2.8 mm for washed drained mass [see IS 460 (Part 1)].

B-2 PROCEDURE

B-2.1 Drained Mass for Packs in Own Juice, Brine, Water or Oil

B-2.1.1 Weigh the unopened containers that have been kept at a temperature of not less than 20°C or more than 24°C for a minimum of 12 h prior to examination.

B-2.1.2 After opening, tilt the containers so as to distribute the contents over the meshes of the tared (pre-weighed) circular sieve. Incline the sieve at an angle of approximately 17°-20° and allow the product to drain two minutes, measured from the time the product is poured into the sieve.

NOTE: Collect the drained liquid for determination of sodium chloride in brine (see C-2).

B-2.1.3 Remove adhering liquids from bottom of the sieve by use of a paper towel. Weigh the sieve containing the drained contents.

B-2.2 Washed Drained Mass for Packs with Sauces and Curries, also with Optional Ingredients

B-2.2.1 Weigh the unopened containers that have been kept at a temperature of not less than 20°C or more than 24°C for a minimum of 12 h prior to examination.

B-2.2.2 After opening, tilt the container and wash first the covering sauce and then the full contents with hot tap water (approx 40°C) using a wash bottle on the tared circular sieve.

B-2.2.3 Wash the contents of the sieve with hot water until free of adhering sauce; where necessary separate optional ingredients (spices, vegetables, fruits) with pincers. Incline the sieve at an angle of approximately 17° - 20° and allow the contents to drain two minutes, measured from the time the washing procedure has finished.

B-2.2.4 Remove adhering water from the bottom of the sieve by use of a paper towel. Weigh the sieve containing the washed drained contents.

B-2.3 Determination of Water Capacity of Container

B-2.3.1 Select a container which is undamaged in all respects.

B-2.3.2 Wash, dry and weigh the empty container after cutting out the lid without removing or altering the height of the double seam.

B-2.3.3 Fill the container with distilled water at 20° to 5 mm vertical distance below the top level of the container, and weigh the container thus filled.

B-2.3.4 Subtract the mass found in B-2.3.2 from the mass found in B-2.3.3. The difference shall be considered to be the weight of water required to fill the container.

B-3 CALCULATIONS

B-3.1 The percentage $m/m$ of drained or washed drained sardines is given by the following equation:

$$\frac{m_2 - m_1}{m_w} \times 100$$

where

- $m_1 =$ mass of the sieve,
- $m_2 =$ mass of the sieve plus drained or washed drained product, and
- $m_w =$ water capacity of the container.
ANNEX C
(Clauses 7.10)
DETERMINATION OF SODIUM CHLORIDE IN BRINE

C-1 REAGENTS

C-1.1 Standard Silver Nitrate Solution
0.1 N.

C-1.2 Dilute Nitric Acid
(1:4) freed from lower oxides of nitrogen by boiling till colourless.

C-1.3 Ferric Alum Indicator Solution
A saturated solution of ferric alum \( \text{FeNH}_4\text{(SO}_4\text{)}_3\text{.12H}_2\text{O} \).

C-1.4 Standard Ammonium Thiocyanate Solution
0.1 N.

C-2 PROCEDURE

C-2.1 Preparation of Solution
Wash the emptied can \( \text{see B-1.2.2} \) thoroughly with water and wash the residue on the sieve at least thrice with cold water. Collect the drained liquid and all the washings together in a 1000 ml graduated flask and make up the volume. Centrifuge the made-up liquid for at least 5 min at 1000 rev/min.

C-2.2 Take a suitable aliquot of the clear supernatant solution prepared as in C-2.1, add a known volume of the standard silver nitrate solution in slight excess and then add 20 ml of dilute nitric acid. Boil gently on a hotplate or a sand-bath until all solids except silver chloride dissolve (usually 15 min). Cool, add 50 ml of water and 5 ml of the ferric alum indicator solution and titrate with the standard ammonium thiocyanate solution until permanent light brown colour appears.

C-3 CALCULATIONS

C-3.1 Sodium chloride in the brine,

\[
\text{percent by weight} = \frac{5.85 (V_1 \times N_1 - V_2 \times N_2)}{M}
\]

where

\( V_1 \) = volume in ml of the standard silver nitrate solution added,

\( N_1 \) = normality of the standard silver nitrate solution,

\( V_2 \) = volume in ml of the standard ammonium thiocyanate solution used,

\( N_2 \) = normality of the standard ammonium thiocyanate used, and

\( M \) = mass in g of the brine in the aliquot.

NOTE: The total mass of brine is obtained by finding the difference between the net mass and the drained mass of the contents of the can.

ANNEX D
(Clauses 7.10)
DETERMINATION OF ACIDITY OF BRINE

D-1 REAGENTS

D-1.1 Standard Sodium Hydroxide Solution
0.1 N.

D-1.2 Phenolphthalein Indicator Solution
Dissolve one gram of phenolphthalein in 100 ml of 95 percent \((\text{m/v})\) alcohol \( \text{see IS 321} \).

D-2 PROCEDURE

D-2.1 Take a suitable aliquot of the brine solution \( \text{see C-2.1} \), add about 200 ml of water and titrate against the standard sodium hydroxide solution using phenolphthalein indicator solution. Calculate the percentage acidity of the brine in terms of citric acid from the relationship: 1 ml of 0.1 N sodium hydroxide solution is equivalent to 0.006 4 g of citric acid (anhydrous).
Bureau of Indian Standards

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This Indian Standard has been developed from Doc : No. FAD 12 (676)

Amendments Issued Since Publication

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<th>Text Affected</th>
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</table>

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