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“Knowledge is such a treasure which cannot be stolen”
Indian Standard

SPECIFICATION FOR
MUSTARD OIL

(Second Revision)

Sixth Reprint AUGUST 2007
(Incorporating Amendment No. 1 and Including Amendment Nos. 2, 3, 4, 5 & 6)

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

November 1975
Indian Standard

SPECIFICATION FOR MUSTARD OIL

(Second Revision)

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(Continued on page 2)

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IS: 546-1975

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(Continued on page 9)
(Continued from page 2)

<table>
<thead>
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<tbody>
<tr>
<td>Shri M. Satyanarayana</td>
<td>The Tata Oil Mills Co Ltd, Bombay</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>Shri S. D. Thirumala Rao</td>
<td>Oil Technological Research Institute, Anantapur</td>
</tr>
</tbody>
</table>

MGIPF—302 Deptt. of BIS/2007—100
AMENDMENT NO. 2 JULY 1990
TO
IS: 546 - 1975 SPECIFICATION FOR MUSTARD OIL
( Second Revision )

(Page 5, clause 2.1.2) — Substitute the following for the existing clause:

'2.1.2 Refined Mustard Oil — Refined mustard oil means oil which is obtained by expression or solvent extraction of mustard oil bearing materials, deacidified either with alkali or physical refining or by miscella refining by bleaching with adsorbent earth and/or carbon and deodorized with steam.'

(Page 6, clause 4.3) — Substitute the following for the existing clause:

'4.3 Admixture with Other Oils — The material shall be free from admixture of other oils.

4.3.1 The material shall be free from non-edible oils, when tested according to 9, 10, 11, 12, 14, 15 and 16 of IS: 548 (Part 2)-1976.'

(Page 8, clause 6.2) — Add the following new clause after 6.2:

'6.2.1 The containers may also be marked with the Standard Mark.

Note — 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 Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.'

†Methods of sampling and test for oils and fats: Part 2 Purity tests (third revision).

(CAFDC 5)
AMENDMENT NO. 3 NOVEMBER 1994 TO IS 546 : 1975 SPECIFICATION FOR MUSTARD OIL (Second Revision)

[Page 7, Table 1, Sl No. (v), Iodine value (Wijjs)] — Substitute ‘98 to 112’ for ‘98 to 110’.

(FAD 44)
(Page 4, Foreword, clause 0.6) — Add the following clause 0.7 after 0.6 and renumber the subsequent clause:

'0.7 A scheme for labelling environment friendly products to be known as ECO Mark has been introduced at the instance of the Ministry of Environment and Forests (MEF). The ECO Mark shall be administered by the Bureau of Indian Standards (BIS) under the BIS Act, 1986 as per the Resolution No. 71 dated 20 February 1991 as published in the Gazette of the Government of India vide GSR 85(E) dated 21 February 1991. For a product to be eligible for marking with the ECO Mark it shall also carry the Standard Mark of BIS for quality besides meeting additional optional environment friendly (EF) requirements. The EF requirements for mustard oil are therefore being included through an amendment.

This amendment is based on the Gazette Notification No. 678 dated 30 August 1994 for Labelling Edible Oils, Tea and Coffee as environment friendly products, published by the Ministry of Environment and Forests.'

(Page 6, clause 4.5) — Add the following clauses after 4.5:

'4.6 Optional Requirements for ECO Mark

4.6.1 General Requirements

4.6.1.1 The product shall conform to the requirements of quality prescribed under clauses 4.1 to 4.5.

4.6.1.2 The manufacturers shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the norms laid down under the Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution) Act, 1981; Water (Prevention and Control of Pollution) Cess Act, 1977 respectively, along with the authorization, if required under the Environment (Protection) Act, 1986, while applying for ECO Mark.

4.6.2 Specific Requirements
Amend No. 4 to IS 546 : 1975

4.6.2.1 The product shall not contain aflatoxin, more than 5 mg/kg, when tested by the method prescribed in Appendix A.

4.6.2.2 The pesticide residues, if any, shall not exceed the tolerance limits as prescribed in the Prevention of Food Adulteration Act, 1954 and Rules made thereunder.

4.6.2.3 Only permitted antioxidants not exceeding the quantities specified against each as prescribed under the Prevention of Food Adulteration Act, 1954 and Rules made thereunder, shall be used, if required.

4.6.2.4 The product shall not contain any of the toxic metals in excess of the quantities prescribed in Table 2.

<table>
<thead>
<tr>
<th>SL NO.</th>
<th>CHARACTERISTIC</th>
<th>REQUIREMENT</th>
<th>METHOD OF TEST, REF TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Lead, mg/kg, Max</td>
<td>5.0</td>
<td>15 of IS 1699 : 1995*</td>
</tr>
<tr>
<td>ii)</td>
<td>Arsenic, mg/kg, Max</td>
<td>0.5</td>
<td>do</td>
</tr>
<tr>
<td>iii)</td>
<td>Cadmium, mg/kg, Max</td>
<td>1.0</td>
<td>do</td>
</tr>
<tr>
<td>iv)</td>
<td>Mercury (total) mg/kg, Max</td>
<td>0.25</td>
<td>do</td>
</tr>
</tbody>
</table>

*Methods of sampling and test for food colours (second revision).

(Page 6, clause 5.1) — Add the following clause 5.1.1 after 5.1:

'5.1.1 For ECO Mark the product shall be packed in such packages which are made from recyclable (that is which can be re-processed to manufacture any useful product) or biodegradable materials.'

(Page 6, clause 6.1) — Add the following clause 6.1.1 after 6.1:

'6.1.1 For ECO Mark the containers shall be marked with the following information:

a) List of identified critical ingredients in descending order of quantity, percent by mass, which shall include 'made from mustard oil';

b) The brief criteria for which the product has been labelled for ECO Mark; and

c) Shelf life of the product.'
(Page 8, clause 8.2) — Add the following Appendix after 8.2:

‘APPENDIX A
(Clause 4.6.2.1)

DETERMINATION OF AFLATOXIN

A-1 REAGENTS
A-1.1 Acetone, 70 Percent — 700 ml acetone in 300 ml distilled water.
A-1.2 Acetone, 20 Percent — 200 ml acetone in 800 ml distilled water.
A-1.3 Lead Acetate, 20 Percent — 200 g neutral acetate in distilled water and 3 ml glacial acetic acid, diluted to one litre.

A-2 PROCEDURE
A-2.1 Dissolve 30 g sample in 100 ml hexane.
A-2.2 Extract with 3 x 50 ml 70 percent acetone.
A-2.3 To the extract add 60 ml distilled water and 20 ml lead acetate.
A-2.4 Boil to reduce volume to 150 ml. Cool to about 20°C.
A-2.5 Filter and wash with 20 percent acetone.
A-2.6 Extract filtrate and washings with 3 x 50 ml chloroform.
A-2.7 Pass chloroform layer through anhydrous sodium sulphate.
A-2.8 Concentrate to 50 ml and spot on TLC plate.

A-3 CALCULATION

\[
\text{Aflatoxin, mg/kg} = \frac{V \times s \times 1000}{v \times m}
\]

where

\( V \) = volume of extract in ml,
\( v \) = volume of extract giving minimum observable fluorescence in \( \mu l \),
\( m \) = mass of sample in g, and
\( s \) = standard toxin giving minimum observable fluorescence in \( \mu g \).

(FAD 44)
AMENDMENT NO. 5 MARCH 2002
TO
IS 546 : 1975 SPECIFICATION FOR MUSTARD OIL
(Second Revision)

(Amendment No. 4, page 2, clause 4.6.2.1) — Substitute ‘5 μg/kg’ for ‘5 mg/kg’.

(FAD 44)
AMENDMENT NO. 6 MAY 2004 TO
IS 546 : 1975 SPECIFICATION FOR MUSTARD OIL
( Second Revision )

(Amendment No. 2, clause 4.3.1, line 2) — Delete '10, 11'.

(FAD 13)
Indian Standard

SPECIFICATION FOR MUSTARD OIL

(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 25 September 1975, after the draft finalized by the Oils and Oilseeds Sectional Committee had been approved by the Chemical Division Council and the Agricultural and Food Products Division Council.

0.2 This standard was first published in 1954 and subsequently revised in 1963. India is one of the largest producers of mustard and rape seeds in the world. The chief producing areas in the country of mustard and rape seeds are Uttar Pradesh, Punjab, Rajasthan and Madhya Pradesh. The vegetable oil derived from the seeds of rape and mustard is popularly known as SARSON-KA-TEL (सरसों का तेल).

0.3 In India, mustard oil is obtained from the seeds of a number of species of plants or their mixture belonging to the genus Brassica. It is, therefore, impossible to identify the plant species from the seeds of which the oil is derived in trade. There exists great confusion about the proper nomenclature of Indian oleiferous Brassica. The confusion in the use of local names for rape and mustard seeds is even greater than that prevailing in respect of their corresponding botanical nomenclature. As a result of systematic botanical studies, the following nomenclature of rapes and mustards has been generally accepted in India:

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Botanical Name of Plant Species</th>
<th>Common Name in English</th>
<th>Common Name in Hindi</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Brassica campestris Linn. var yellow sarson</td>
<td>Yellow SARSON</td>
<td>PILI SARSON (पीली सरसों)</td>
</tr>
<tr>
<td>ii)</td>
<td>Brassica campestris Linn. var brown sarson</td>
<td>Brown SARSON</td>
<td>KALI SARSON (काली सरसों)</td>
</tr>
<tr>
<td>iii)</td>
<td>Brassica campestris Linn. var toria</td>
<td>TORIA</td>
<td>TORIA OR LAHI (शीरिया या लाही)</td>
</tr>
<tr>
<td>iv)</td>
<td>Brassica juncea Linn. Czern. &amp; Coss.</td>
<td>Mustard</td>
<td>RAI (राई)</td>
</tr>
</tbody>
</table>
With regard to the relationship that these oilseed crops bear to the corresponding crops in Europe, RAI corresponds to mustard, SARSON to colza and TORIA to rape. Brassica napus Linn. is not grown in India at all.

Large quantities of the oil are used for edible purposes; in fact, the characteristic pungent odour of the oil is at times taken as the criterion for judging its quality. Inferior quality oil is generally used as an illuminant and as a lubricant for axles of carts. The oil is also used for pharmaceutical purposes.

In this revision the oil obtained by the process of solvent-extraction has also been included. The earlier version of the standard covered the oil obtained by the process of expression only. Care has also been taken to ensure that the material is free from argemone oil which is reported to cause epidemic dropsy. After the issue and implementation of the Solvent Extracted Oil, Deoiled Meal and Edible Flour (Control) Order of 1967, the refined grade of solvent-extracted oil has been widely accepted for edible purposes and the solvent-extracted rape and mustard seed oil is one such example. Amendment No. 1 of January 1969 issued to this standard has also been incorporated in this revision.

In the preparation of this revised standard considerable assistance has been derived from the data supplied by various processors of solvent-extracted oils; Regional Research Laboratory, Hyderabad; and Solvent Extractors Association of India, Bombay. The assistance so derived is thankfully acknowledged.

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*. 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
1.1 This standard prescribes requirements and methods of sampling and test for mustard oil used for edible and industrial purposes.

2. TERMINOLOGY
2.1 For the purpose of this standard, the definitions given under 2 of IS : 548 (Part I )-1964† and the following shall apply.

*Rules for rounding off numerical values (revised).
†Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests (revised).
2.1.1 Semi-refined Mustard Oil — Mustard oil obtained by the process of solvent-extraction which has been neutralized with alkali, without or with bleaching with bleaching earth or activated carbon or both, no other chemical agent being used.

2.1.2 Refined Mustard Oil — Mustard oil obtained by the process of expression or solvent-extraction which has been refined by neutralization with alkali, bleached with bleaching earth or activated carbon or both, and deodorized with steam, no other chemical agent being used.

3. TYPES AND GRADES

3.1 The material shall be of the following types and grades:

a) Expressed Type
   i) Refined Grade
   ii) Raw Grade 1
   iii) Raw Grade 2

b) Solvent-Extracted Type
   i) Refined Grade
   ii) Semi-refined Grade
   iii) Raw Grade 1
   iv) Raw Grade 2

3.1.1 The refined grade mustard oil of the expressed and solvent-extracted types and the raw grades of the expressed type are suitable for direct edible consumption (see Note).

Note — Raw Grade 1 and Grade 2 of the expressed oil correspond to Grade 1 (Edible) and Grade 2 (Edible) respectively of ‘AGMARK’ specifications of the Directorate of Marketing and Inspection, Ministry of Agriculture, Government of India.

3.1.2 The semi-refined grade and Raw Grade 1 of the solvent-extracted type are suitable for making refined oil and not for direct edible consumption.

3.1.3 Raw Grade 2 of the solvent-extracted type is intended for industrial uses other than for making refined oil, and not for edible consumption.

4. REQUIREMENTS

4.1 Description — The material shall be obtained from good quality mustard cake or from clean and sound seeds of Brassica compestris Linn., Brassica Juncea Linn. Czern. & Coss, or a mixture of these seeds, all belonging to the family Cruciferae, by a process of solvent-extraction or from the mustard seeds by the process of expression.
4.1.1 Solvent-extracted oil shall be obtained from the oleaginous material using solvent hexane conforming to IS: 3470-1966*.

4.2 The material shall be clear and free from adulterants, sediment, suspended and other foreign matter, separated water and added colouring and flavouring substances. When tested as prescribed in 20 of IS : 548 (Part I)-1964† the material shall have peroxide value not more than 10 milliequivalents peroxide oxygen per kg of it and shall have acceptable taste and odour.

4.2.1 The clarity of the material shall be judged by the absence of turbidity after keeping the filtered sample at 30°C for 24 hours.

4.3 Admixture with Other Oils — The material shall be free from admixture with other oils, when tested according to the methods prescribed in IS : 548 (Part II)-1974‡.

4.4 Freedom from Argemone Oil and Hydrocyanic Acid — The material shall be free from argemone (argemone mexicana Linn.) oil and hydrocyanic acid when tested as prescribed in 10 and 11 of IS : 548 (Part II)-1974‡.

4.5 The material shall also comply with the requirements given in Table 1.

5. PACKING

5.1 The material shall be supplied packed in suitable well-closed containers as agreed to between the purchaser and the supplier.

6. MARKING

6.1 The containers shall be marked with the following particulars:

   a) Name, type and grade of the material;

   b) Mass of the material in the container;

   c) Manufacturer’s name and his recognized trade-mark, if any;

   d) Batch number or lot number in code or otherwise; and

   e) Month and year of manufacture.

*Specification for hexane, food grade.
†Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests (revised).
‡Methods of sampling and test for oils and fats: Part II Purity tests (second revision).
### TABLE 1 REQUIREMENTS FOR MUSTARD OIL

( Clause 4.5 )

<table>
<thead>
<tr>
<th>Requirement for Types</th>
<th>Method of Test, Ref to Cl No.</th>
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<tbody>
<tr>
<td><strong>Expressed</strong></td>
<td></td>
</tr>
<tr>
<td>Re-refined Grade 1</td>
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</tr>
<tr>
<td>Raw Grade 1</td>
<td></td>
</tr>
<tr>
<td>Raw Grade 2</td>
<td></td>
</tr>
<tr>
<td><strong>Solvent-Extracted</strong></td>
<td></td>
</tr>
<tr>
<td>Re-refined Grade 1</td>
<td></td>
</tr>
<tr>
<td>Semi-refined Grade 1</td>
<td></td>
</tr>
<tr>
<td>Raw Grade 1</td>
<td></td>
</tr>
<tr>
<td>Raw Grade 2</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Characteristic</th>
<th>Expressed</th>
<th>Solvent-Extracted</th>
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</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7)</td>
<td>(8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(9)</td>
<td>(10)</td>
</tr>
</tbody>
</table>

i) Moisture and insoluble impurities, percent by mass, *Max*

0.1 0.25 0.25 0.1 0.25 1.00 1.25 5 & 6

ii) Colour in 1/2-in cell on the Lovibond scale, expressed as Y + 5R, not deeper than 15 50 50 15 30 90 100 13

iii) Refractive index at 40°C

---

iv) Saponification value

---

v) Iodine value (Wijs)

98 to 110

vi) Acid value

0.5 1.5 6.0 0.5 2.0 12 40 7

vii) Unasaponifiable matter, percent by mass, *Max*

1.2 1.2 1.2 1.2 1.5 2.0 2.0 8

viii) Natural essential oil, percent by mass (as allyl isothiocyanate)

---

ix) Bellier turbidity temperature, °C, *Max*

27.5

x) Flash point, Pensky-Martens (closed), °C, *Max*

250 125 100 90

*Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemical tests (revised).
†Methods of sampling and test for oils and fats: Part II Purity tests (second revision).
‡Methods of test for petroleum and its products, P : 21 Flash point (closed) by Pensky Martens apparatus (first revision).
In addition in the case of semi-refined grade and raw Grades 1 and 2 of the solvent-extracted type, the following information shall be suitably marked, either printed on the label affixed to the container or lithographed or stencilled thereon with indelible ink in a type size not less than 50 mm:

a) Raw Grade 1 and semi-refined grade

b) Raw Grade 2

7. SAMPLING

7.1 Representative samples of the material shall be drawn as prescribed under 3 of IS : 548 (Part I)-1964*.

8. TESTS

8.1 Tests shall be carried out as prescribed in IS : 548 (Part I)-1964*, IS : 548 (Part II)-1974† and IS : 1448 [P : 21]-1970‡ reference to which is given in 4.2 to 4.4 and col 10 of Table 1.

8.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (see IS : 1070-1960§) shall be used in tests.

Note — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

---

*Methods of sampling and test for oils and fats: Part I Methods of sampling, physical and chemicals tests (revised).
†Methods of sampling and test for oils and fats: Part II Purity tests (second revision).
‡Methods of test for petroleum and its products, P : 21 Flash point (closed) by Pensky Martens apparatus (first revision).
§Specification for water, distilled quality (revised).