
मसाले — हल्दी,
साबुत एवं पिसी — विशिष्टि
(चौथा पुनरीक्षण)

**Spices and Condiments — Turmeric,
Whole and Ground — Specification**
(*Fourth Revision*)

ICS 67.220.10

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FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Spices and Condiments Sectional Committee had been approved by the Food and Agriculture Divisional Council.

Turmeric (Haldi) is one of the commonly used spices in India. It is also used as a colouring matter and has an application in the pharmaceutical and cosmetic industries. While bulk of the produce is consumed in India, considerable quantities are also exported.

Indian Standards for turmeric, whole and powder were originally published as IS 3576 : 1966 and IS 2446 : 1963 respectively and were first revised in 1984 and 1980 respectively for updating them as well as to include methods of test for curcumin content in the standard for turmeric whole and for starch and lead content in turmeric powder. Later, when these two Indian Standards came up for a review, it was considered desirable to amalgamate both the Indian Standards for ease of reference to users and the trade and publish the second revision as IS 3576 : 1994. Accordingly, IS 2446 : 1980 was withdrawn. In the third revision of 3576 in 2010, the requirements were updated to align with the standards for turmeric, whole and ground, laid down under the Prevention of Food Adulteration Rules, 1955 and also with the ISO Standard on the subject, ISO 5562 : 1983 'Turmeric, whole or ground (powdered) — Specification'. The categorization of turmeric, whole, into various grades was removed and only a single specification was prescribed for turmeric, whole. This fourth revision is being carried out to align the standard with regulations laid under *Food Safety and Standards Act, 2006* regarding extraneous matter, moisture content, metallic contaminants, microbiological requirements, limits of aflatoxin and the references of this standard have been updated.

In the preparation of this standard due consideration has been given to the *Food Safety and Standards Act, 2006* and the Rules and the Regulations framed thereunder and the *Legal Metrology (Packaged Commodities) Rules, 2011*. However, this standard is subject to restrictions imposed under these rules, wherever applicable.

The composition of the technical committee responsible for formulation of this standard is given at Annex D.

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

SPICES AND CONDIMENTS — TURMERIC, WHOLE AND GROUND — SPECIFICATION

(Fourth Revision)

1 SCOPE

This standard prescribes the requirements and methods of test for turmeric (*Curcuma longa* Linn. or *Curcuma domestica* Veleton), whole and in ground form.

Recommendations relating to storage and transport conditions are given in Annex A for information.

2 REFERENCES

The following standards 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 editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
460 (Part 1) : 2020	Test sieves — Specification: Part 1 Wire cloth test sieves (<i>fourth revision</i>)
1070 : 1992	Reagent grade water (<i>third revision</i>)
1797 : 2017	Spices and condiments — Methods of test (<i>third revision</i>)
1909 : 1992	Indian curry powder — Specification (<i>first revision</i>)
2860 : 1964	Methods of sampling and test for processed fruits and vegetables
4706 (Part 2) : 1978	Methods of test for edible starches and starch products: Part 2 Chemical methods (<i>first revision</i>)
5887 (Part 3) : 1999/ ISO 6579 : 1993	Methods for detection of bacteria responsible for food poisoning: Part 3 General guidance on methods for the detection of Salmonella (<i>second revision</i>)

IS No.

Title

5887 (Part 6) : 2012/ ISO 7932 : 2004	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of presumptive bacillus cereus: Part 6 Colony — Count technique at 30 °C (<i>first revision</i>)
10925 : 1984	Specification for turmeric oleoresin
13145 : 2014	Spices and condiments — Methods of sampling (<i>second revision</i>)
14216 : 1994	Code for hygienic conditions for spices and condiments processing units
ISO 15213 : 2003	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of sulfite-reducing bacteria growing under anaerobic conditions
16287 : 2015	Foodstuffs — Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products — High performance liquid chromatographic method

3 DESCRIPTION

Turmeric shall be the primary (bulbs) or secondary (fingers) rhizomes of the plants of *Curcuma longa* Linn. or *Curcuma domestica* Veleton. The rhizomes shall be dry, well developed and shall have the shape and colour characteristic of the variety. The cured rhizomes may be in natural state or machine polished. No artificial colouring matter or dyes including lead chromate shall be used for colouring. The turmeric (Haldi) powder shall be prepared by grinding clean and dry turmeric (*Curcuma longa* Linn or *Curcuma domestica* Veleton) rhizomes. It shall be free from any added colouring matter, preservatives and extraneous matter.

4 REQUIREMENTS

4.1 Odour and Flavour

Turmeric, whole or ground (powdered), shall have the characteristic odour and flavour of the spice. It shall be free from mustiness or other foreign flavours.

4.2 Freedom from Moulds and Insects Infestation

Whole turmeric shall be free from living insects and moulds, and shall be practically free from dead insects, insect fragments and contamination by rodents, visible to the naked eye (corrected, if any, for abnormal vision), with such magnification as may be necessary, in any particular case. In case the magnification exceeds $\times 10$, this fact should be stated in the test report. The proportion of insect damaged matter shall not exceed 1 percent (m/m).

The turmeric powder shall be free from dirt, mould growth, insect infestation.

4.3 Extraneous Matter

Extraneous matter in whole turmeric includes organic matter, such as, chaff, dried leaves or any other vegetable matter as well inorganic matter, such as, stones, clay particles, dust, dirt, etc. The proportion of extraneous matter, when determined by the method specified in 4 of IS 1797, shall not exceed 1 percent (m/m).

Ground turmeric shall be examined by microscope. It shall not contain any morphologically extraneous matter.

4.4 Defective Rhizomes

These include immature, small shrivelled fingers and/or bulbs, internally damaged, hollow or porous rhizomes, rhizomes scorched due to boiling and other types of damaged rhizomes. The proportion of defective rhizomes shall not exceed 5 percent (m/m).

4.5 Turmeric, whole and ground shall also comply with the requirements given in Table 1 and Table 2.

4.6 Fineness

The turmeric powder shall be ground to such a fineness that all the material shall pass through 300 μm IS Sieve [see IS 460 (Part 1)].

4.7 The turmeric, whole and powder shall be manufactured and packed under hygienic conditions (see IS 14216).

4.8 Pesticide residues and metallic contaminants in the product shall not exceed the limits as prescribed in the *Food Safety and Standards (Contaminants, Toxins and Residues) Regulation, 2011*.

5 PACKING AND MARKING

5.1 Packing

The material shall be packed in clean, sound and dry container made of metal, glass, food grade polymers, wood or jute bags. The wooden boxes or jute bags shall be suitably lined with moisture proof lining which does not impart any foreign smell to the product. The container shall be free from any fungal or insect infestation and should not impart any foreign smell. Each container shall be securely closed and sealed.

5.2 Marking

The following particulars shall be legibly and indelibly marked or labelled on each container of turmeric, whole or ground:

- a) Name and address of the manufacturer or packer;
- b) Name of the material (whole or ground);
- c) Trade-name or brand name, if any;
- e) Batch or code number;
- f) Net quantity;
- g) Best before date;
- h) Year of the harvest (in case of whole);
- j) Date of packing (in case of ground); and
- k) Any other markings required under the *Legal Metrology (Packaged Commodities) Rules, 2011*, and the *Food Safety and Standards (Packaging and Labelling) Regulation, 2011*.

5.3 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.

6 SAMPLING

Representative samples of turmeric whether whole or ground shall be drawn and tested for conformity to this specification as prescribed in IS 13145.

7 METHODS OF TEST

The samples of turmeric shall be tested for ascertaining conformity of the material to the requirements in accordance with the relevant clauses given in Table 1 and Table 2.

8 QUALITY OF REAGENTS

Unless specified otherwise, pure chemicals and distilled water (see IS 1070) shall be employed in tests.

Table 1 Requirements for Turmeric, Whole and Powder
(Clauses 4.5 and 7)

Sl No.	Characteristic	Requirement		Method of Test, Ref to	
		Whole	Ground	Clause of IS	Annex
(1)	(2)	(3)	(4)	(5)	(6)
i)	Moisture, percent by mass, <i>Max</i>	12.0	10.0	9 of IS 1797	–
ii)	Total ash on dry basis, percent by mass, <i>Max</i>	–	9.0	6 of IS 1797	–
iii)	Dilute HCl insoluble ash on dry basis, percent by mass, <i>Max</i>	–	1.5	8 of IS 1797	–
iv)	Curcumin content on dry basis, percent by mass, <i>Min</i>	2.0	2.0	–	B of IS 10925
v)	Starch on dry basis, percent by mass, <i>Max</i>	–	60.0	9 of IS 4706 (Part 2)	–
vi)	Presence of chromates	Negative	Negative	–	B of this standard
vii)	Lead, ppm, <i>Max</i>	10	10	14 of IS 2860	–
viii)	Copper, ppm, <i>Max</i>	5	5	15 of IS 2860	–
ix)	Arsenic, ppm, <i>Max</i>	0.1	0.1	12 of IS 2860	–
x)	Zinc, ppm, <i>Max</i>	25	25	16 of IS 2860	–
xi)	Cadmium, ppm, <i>Max</i>	0.1	0.1	–	A of IS 1909
xii)	Tin, ppm, <i>Max</i>	0.01	0.01	17 of IS 2860	–
xiii)	Total Aflatoxin, percent by mass, <i>Max</i>	30 µg/kg	30 µg/kg	IS 16287	–
xiv)	Aflatoxin B1, percent by mass, <i>Max</i>	15 µg/kg	15 µg/kg	IS 16287	–

Table 2 Microbiological Requirements for Turmeric, Whole and Powder
(Clauses 4.5 and 7)

Sl No.	Characteristic	Requirement				Method of test, Ref to IS or ISO
		Sampling Plan ¹⁾		Limit (cfu/g)		
		n	c	m	M	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(i)	<i>Salmonella</i>	5	0	Absent/25g	NA	IS 5887 (Part 3)
(ii)	<i>Bacillus cereus</i>	5	2	1 × 10 ³	1 × 10 ⁴	IS 5887 (Part 6)
(iii)	Sulphite Reducing Clostridia (SRC)	5	2	1 × 10 ²	1 × 10 ³	ISO 15213

¹⁾ For sampling plan see Annex C.

ANNEX A

(Informative)

RECOMMENDATIONS RELATING TO STORAGE AND TRANSPORT CONDITIONS

A-1 Containers of turmeric should be stored in covered premises, well protected from the sun, rain and excessive heat.

A-2 The store room should be dry, free from objectionable odours and proofed against entry of insects and vermin. The ventilation should be controlled so as to give good ventilation under dry conditions and

to be fully closed under damp conditions. In an outdoor storehouse, suitable facilities should be available for fumigation.

A-3 The containers should be so handled and transported that they are protected from the rain, sun and objectionable odours and from cross-infestation, especially in the holds of ships.

ANNEX B

[Table 1, Sl No. (vi), Col 6]

CHROMATE TEST

B-1 REAGENT

B-1.1 Dilute Sulphuric Acid — 1 : 7 (v/v).

B-1.2 Diphenyl Carbazide Solution — 0.2 percent (m/v) in ethyl alcohol [95 percent (v/v)].

B-2 PROCEDURE

Ash about 2 g of the material. Dissolve the ash in 4 to 5 ml of dilute sulphuric acid in a test-tube and add 1 ml of diphenyl carbazide solution. The presence of chromate is indicated by the production of violet colour.

ANNEX C

[Table 2]

SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS

C-1 SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS

The terms n, c, m and M used in this standard have the following meaning:

- n = Number of units comprising a sample;
- c = Maximum allowable number of units having microbiological counts above m for 2 class sampling plan and between m and M for 3 class sampling plan;

m = Microbiological limit that separates unsatisfactory from satisfactory in a 2 class sampling plan or acceptable from satisfactory in a 3-class sampling plan; and

M = Microbiological limit that separates unsatisfactory from satisfactory in a 3-class sampling plan.

C-2 INTERPRETATION OF RESULTS

2-Class Sampling Plan (where n, c and m are specified)	3-Class Sampling Plan (where n, c, m and M are specified)
<ol style="list-style-type: none"> 1. Satisfactory, if all the values observed are $\leq m$ 2. Unsatisfactory, if one or more of the values observed are $> m$. 	<ol style="list-style-type: none"> 1. Satisfactory, if all the values observed are $\leq m$ 2. Acceptable, if a maximum of c values are between m and M. 3. Unsatisfactory, if one or more of the values observed are $> M$ or more than prescribed c values are $> m$

ANNEX D*(Foreword)***COMMITTEE COMPOSITION**

Spices, Culinary Herbs and Condiments Sectional Committee, FAD 09

<i>Organization</i>	<i>Representative(s)</i>
Spices Board, Kochi	DR A. B. REMA SHREE, DIRECTOR RESEARCH (Chairman)
AB Mauri India Private Ltd, Cochin	MR V. M. HAROON MR PRAKASH NAMBOODIRI (<i>Alternate</i>)
All India Consumer Council, Gurugram	SHRI J. P. SINGH SAHNI SHRI KABIR SAHNI (<i>Alternate</i>)
All India Spices Exporters Forum, Cochin	SHRI CHERIAN XAVIER SHRIMATI PRIYAMVADA NILAYANGOD (<i>Alternate</i>)
Central Food Technological Research Institute, Mysore	DR M. MADHAVA NAIDU DR S. NAGARAJAN (<i>Alternate</i>)
Confederation of Indian Industry, New Delhi	MS NEHA AGGARWAL
Consumer Coordination Council, Noida	SHRI RAMJI BHAI MAVANI SHRI S. C. SHARMA (<i>Alternate</i>)
Defence Food Research Laboratory, Mysore	DR K. R. ANILAKUMAR SHRI DEV KUMAR YADAV (<i>Alternate</i>)
Directorate of Arecanut and Spices Development, Calicut	DR HOMEY CHERIYAN DR FEMINA (<i>Alternate</i>)
Directorate of Marketing and Inspection, Faridabad	JT AGRICULTURAL MARKETING ADVISER (QC) DY AGRICULTURAL MARKETING ADVISER (QC-II) (<i>Alternate</i>)
Export Inspection Council of India, New Delhi	SHRI WASI ASGHAR SHRI SHASHI PRAKASH TRIPATHI (<i>Alternate</i>)
Food Safety and Standards Authority of India, New Delhi	MS RUBY MISHRA
ICAR-Indian Institute of Spices Research, Kozhikode (Calicut)	DR N. K. LEELA DR E. JAYASHREE (<i>Alternate</i>)
Kerala Agricultural University, Kerala	DR SAJI GOMEZ DR SEEJA THOMACHAN PANJIKKARAN (<i>Alternate</i>)
National Institute for Inter Disciplinary Science and Technology (CSIR), Kerala	DR RAGHU K. G.
National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Sonapat	DR SUNIL PAREEK
National Research Centre on seed Spices, Ajmer	DR S. N. SAXENA DR B. K. MISHRA (<i>Alternate</i>)
Praveen Masalewale	SHRI ANAND CHORDIA MS ROHINI KULKARNI (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
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World Spice Organization, Kochi	SHRI RAMKUMAR MENON SHRI PHILIP KURUVILLA (<i>Alternate</i>)
BIS Directorate General	SHRIMATI SUNEETI TOTEJA, SCIENTIST 'E' AND HEAD (FAD) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary

SHRIMATI NAVITA YADAV
SCIENTIST 'D' (FAD), BIS

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This Indian Standard has been developed from Doc No.: FAD 09 (16224).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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