भारतीय मानक

Indian Standard

IS 18674 : 2024

टोफू — विशिष्टि

Tofu — Specification

ICS 67.060

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March 2024 **Price Group 6**

Foodgrains, Allied Products, and Other Agricultural Produce Sectional Committee, FAD 16

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Foodgrains, Allied Products, and Other Agricultural Produce Sectional Committee had been approved by the Food and Agriculture Division Council.

Tofu has been accepted almost all over the world, including India, because of its nutritional qualities and health benefits. The basic ingredients in tofu are whole soybean, one or more permitted coagulants (typically an acid or salt) and water. Whole soybeans are ground, after soaking, prepare soymilk, soymilk is then coagulated in food grade container with permitted coagulants to form curd, transferred in forming box to separate the whey and form tofu by pressing the curd. The finished pressed curds are referred as tofu.

This standard is being laid down with the objective to define requirements for good quality tofu and ensure that the customer gets a standard product which is safe for consumption thereby aiding prevention of consumer deception.

While formulating this standard, necessary consideration has been given to the relevant rules prescribed by the Government of India under the *Food Safety and Standards Act*, 2006 and *Legal Metrology* (*Packaged Commodities*) *Rules*, 2011. This standard is however, subject to the restriction imposed under these, wherever applicable.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

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.

Indian Standard

TOFU — SPECIFICATION

1 SCOPE

This standard specifies requirements and the methods of sampling and test for tofu.

2 REFERENCES

The standards listed in Annex A 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.

3 TERMINOLOGY

For the purpose of this standard, the following definition shall apply.

3.1 Tofu — A soy product prepared by the individual or combined action of acid/salt coagulant on hot soymilk. The phenomenon of coagulation involves the formation of large structural aggregates of proteins in which fat and other colloidal and soluble solids are entrained with whey.

4 REQUIREMENTS

4.1 Description

Tofu shall be prepared by coagulating soymilk using coagulant at the extent of 2 g per liter soymilk depending on type of coagulants (acid or salt). The curd so prepared shall be pressed in container called “forming box”. Tofu shall be clear and free from dirt, insects and rodent contamination and from adulterants. The product shall be free from any added colouring matter. Tofu may have characteristic soybean flavour. Tofu shall have closely knit smooth texture, firm, cohesive and slightly spongy body.

NOTE — Before coagulation, soymilk should be heated to (80 °C to 90 °C).

4.2 Ingredients

4.2.1 Tofu shall be prepared using following ingredients:

a) Soymilk — Soymilk shall conform to the requirements specified in IS 16489; and

b) Potable water — Water conforming to IS 10500 shall be used.

NOTE — Edible salt, spices, seasoning and condiments may be used for enhancing flavour.

4.2.2 Magnesium chloride (nigari), calcium sulfate, calcium chloride, citric acid, acetic acid and glucono-δ-lactone may be used, singly or in combination, as coagulant for producing tofu. The coagulants used shall be of food grade and free from toxic substances.

4.3 Food Additives

Food additives and processing aids as permitted in *Food Safety and Standards* (*Food Products Standards and Food Additives*) *Regulation*, 2011 may be used.

4.4 Tofu shall be manufactured and packed in premises maintained in hygienic conditions (*see* IS 2491).

4.5 In addition to above, tofu shall conform to the requirements specified in Table 1 and Table 2.

4.6 Metallic and other contaminants, if any, in the product shall not exceed the limits specified in Table 3.

5 PACKING AND STORAGE

Fresh tofu shall be packed in suitable hygienic containers which will maintain the product during storage and transport in hygienic conditions. Tofu being a perishable product, ordinarily it is packed in polyethylene bag, sealed and placed in refrigerated conditions for safe storage up to four days.

Various methods may be used to extend the shelf life and guard against spoilage and product quality deterioration. These methods include hygienic production, rapid cooling of the product, storage between 1 °C and 8 °C in refrigerator, vacuum and aseptic packaging and sterilization to get up to 45 days of shelf life.

6 MARKING

6.1 Each package shall be suitably marked legibly

and indelibly to give the following information:

a) Name of the product;

b) Name and address of the manufacturer;

c) Date of manufacture;

d) Trade/brand name;

e) Best before date;

f) Batch Number;

g) Net quantity in g;

h) Country of origin (only in case of imported product);

j) Refrigeration information labeling — Tofu that is not heat sterilized and aseptically packaged may be labeled "fresh," and shall bear on the principal display panel and in boldface type the declaration "PERISHABLE, KEEP REFRIGERATED." Tofu that is heat sterilized and aseptically packaged may not be labeled "fresh," need not include any refrigeration instructions, and shall include with directions for use, in boldface type, the statement "DISCARD IF PACKAGE IS BLOATED OR BROKEN"; and

k) Any other information required under the *Legal Metrology* (*Packaged Commodities*) *Rules*, 2011 and the *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 shall be drawn in accordance with IS 11546, and conformity of the material to the requirements of this specification shall be determined by the procedure described in IS 11546.

8 TEST

8.1 All the tests shall be carried out as specified in col (4) of Table 1, Table 2 and Table 3.

8.2 Quality of Reagents

Unless specified otherwise, pure chemicals shall be employed in tests and distilled water (*see* IS 1070) shall be used where the use of water as reagent is intended.

NOTE — Pure chemicals shall mean chemicals that do not contain impurities which affect the test result.

Table 1 Requirement for Tofu

(*Clauses* 4.5 *and* 8.1)

Sl No.	Characteristic	Requirements	Methods of Test, Ref to
(1)	(2)	(3)	(4)
i)	Moisture, percent by mass, *Max*	76.0	Annex A of IS 10484
ii)	Protein, percent by mass (on dry basis), *Min*	50.0	IS 7219 or IS 16634 (Part 2)*
iii)	Fat, percent by mass (on dry basis)	3.0 to 6.0	IS 1224 (Part 2) or ISO 11085*
iv)	Crude fiber, percent by mass (on dry basis)	0.5 to 6.0	IS 10226 (Part 1)
v)	Total ash content, percent by mass (on dry basis)	0.3 to 2.0	Annex D of IS 10484
vi)	Acid insoluble ash, percent by mass (on dry basis), *Max*	0.15	Annex D of IS 14433

Table 1 (*Concluded*)

Sl No.	Characteristic	Requirements	Methods of Test, Ref to
(1)	(2)	(3)	(4)
vii)	Titrable acidity (as lactic acid), percent by mass, *Max*	1.5	Annex C of IS 10484
viii)	Urease activity (change in *p*H unit), *Max*	0.5	Annex B of IS 7835

NOTE — In case of any dispute, the method indicated by '*'shall be the referee method.

Table 2 Microbiological Limits for Tofu

(*Clauses* 4.5 *and* 8.1)

Sl No.	Microorganism	Limit	Methods of Test, Ref to
(1)	(2)	(3)	(4)
i)	Coliform count, cfu/g, *Max*	1	IS 5401 (Part 1)
ii)	Total plate count per g, *Max*	1 00 000	IS 5402 (Part 1)
iii)	*Staphylococcus aureus* per 25 g	Nil	IS 5887 (Part 8/Sec 1* or 2)
iv)	*Salmonella* spp. per 25 g	Nil	IS 5887 (Part 3/Sec 1)

NOTE — In case of any dispute, the method indicated by '*'shall be the referee method.

Table 3 Limits for Metallic and Other Contaminants in Tofu

(*Clauses* 4.6 *and* 8.1)

Sl No.	Contaminants	Limit	Methods of Test, Ref to
(1)	(2)	(3)	(4)
i)	Lead, mg/kg, *Max*	2.5	IS 12074 or AOAC 2015.01*
ii)	Copper, mg/kg, *Max*	30	**15** of IS 1699 or ISO 15151 or ISO 21424*
iii)	Arsenic, mg/kg, *Max*	1.1	IS 11124 or AOAC 2015.01*
iv)	Cadmium, mg/kg, *Max*	1.5	**15** of IS 1699 or AOAC 2015.01*
v)	Total aflatoxin, µg/kg, *Max*	15	IS 16287
vi)	Aflatoxin B_1, µg/kg, *Max*	10	IS 16287

NOTE — In case of any dispute, the method indicated by '*'shall be the referee method.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No./Other Standards	*Title*
IS 1070 : 2023	Reagent grade water — Specification (*fourth revision*)
IS 1224 (Part 2) : 1977	Determination of fat by the Gerber method: Part 2 Milk products (*first revision*)
IS 1699 : 1995	Methods of sampling and test for food colours (*second revision*)
IS 2491 : 2013	Food hygiene — General principles — Code of practice (*third revision*)
IS 5401 (Part 1) : 2012/ISO 4832 : 2006	Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of coliforms: Part 1 Colony-count technique (*second revision*)
IS 5402 (Part 1) : 2021/ISO 4833-1 : 2013	Microbiology of the food chain — Horizontal method for the enumeration of microorganisms: Part 1 Colony count at 30 °C by the pour plate technique (*third revision*)
IS 5887	Methods for detection of bacteria responsible for food poisoning:
(Part 8)	Horizontal method for the enumeration of coagulase-positive staphylococci (*Staphylococcus aureus* and other species),
(Sec 1) : 2023/ISO 6888-1 : 2021	Method using baird-parker agar medium (*first revision*)
(Sec 2) : 2023/ISO 6888-2 : 2021	Method using rabbit plasma fibrinogen agar medium (*first revision*)
(Part 3/Sec 1) : 2020/ISO 6579-1 : 2017	Horizontal method for the detection, enumeration and serotyping of *salmonella*, Section 1 Detection of *salmonella* spp. (*third revision*)
IS 7219 : 1973	Method for determination of protein in foods and feeds
IS 7835 : 2013	Edible medium — Fat soya flour — Specification (*first revision*)
IS 10226 (Part 1) : 1982/ISO 5498 : 1981	Method for determination of crude fibre content in food products: Part 1 General method
IS 10484 : 2021	*Paneer* — Specification (*first revision*)
IS 10500 : 2012	Drinking water — Specification (*second revision*)
IS 11124 : 1984	Method for atomic absorption spectrophotometric determination of arsenic
IS 11546 : 2012/ ISO 707 : 2008	Milk and milk products — Guidance on sampling (*second revision*)
IS 12074 : 1987	Method for determination of lead by atomic absorption spectrophotometer
IS 14433 : 2022	Infant milk substitutes — Specification (*second revision*)

IS No./Other Standards	*Title*
IS 16287 : 2015/ ISO 16050 : 2003	Foodstuffs — Determination of aflatoxin B_1, and the total content of aflatoxins B_1 , B_2 , G_1 and G_2 in cereals, nuts and derived products — High-performance liquid chromatographic method
IS 16489 : 2018	Soymilk (non-dairy Product) — Specification
IS/ISO 16634 (Part 2) : 2016	Food products — Determination of the total nitrogen content by combustion according to the dumas principle and calculation of the crude protein content: Part 2 Cereals, pulses and milled cereal products
ISO 11085 : 2015	Cereals, cereals-based products and animal feeding stuffs — Determination of crude fat and total fat content by the Randall extraction method
ISO 15151 : 2018	Milk, milk products, infant formula and adult nutritionals — Determination of minerals and trace elements — Inductively coupled plasma atomic emission spectrometry (ICP-AES) method
ISO 21424 : 2018	Milk, milk products, infant formula and adult nutritionals — Determination of minerals and trace elements — Inductively coupled plasma mass spectrometry (ICP-MS) method

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Foodgrains, Allied Products, and other Agricultural Produce Sectional Committee, FAD 16

Organization	*Representative(s)*
ICAR - Central Institute of Post-Harvest Engineering and Technology, Ludhiana	DR NACHIKET KOTWALIWALE **(*Chairperson*)**
All India Food Processors Association, New Delhi	SHRI KRISHNA KUMAR JOSHI SHRIMATI KAMIA JUNEJA (*Alternate*)
Central Warehousing Corporation, New Delhi	SHRI SIDHARTH RATH DR ANURAG TRIPATHI (*Alternate*)
Confederation of Indian Food Trade and Industry, New Delhi	SHRI KANNAN B. MS RITIKA (*Alternate*)
Confederation of Indian Industry, New Delhi	SHRI HIMALAYA KOUL MS NEHA AGGARWAL (*Alternate*)
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Organization	*Representative(s)*
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Protein Foods and Nutrition Development Association of India, Mumbai	DR SHASHANK BHALKAR DR JASVIR SINGH (*Alternate*)
Roller Flour Millers Federation of India, New Delhi	SHRI D. V. MALHAN
Vasantdada Sugar Institute, Pune	DR KAKASAHEB KONDE SHRI SANTOSH DEVKAR (*Alternate*)
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