भारतीय मानक

Indian Standard

IS 2052 : 2023

पशुओं के लिए मिश्रित आहार — विशिष्टि

(पाँचवा पुनरीक्षण)

Compounded Feeds for Cattle — Specification

(Fifth Revision)

ICS 65.120

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
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February 2023 **Price Group 7**

Animal Feeds and Nutrition Sectional Committee, FAD 05

FOREWORD

This Indian Standard (Fifth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Animal Feeds and Nutrition Sectional Committee had been approved by the Food and Agriculture Division Council.

Compounded cattle feed is a mixture of various concentrate feed ingredients in suitable proportion. It is a balanced source of protein, energy, minerals and vitamins that are vital for normal health, milk production and reproduction for cattle. Animal rations have to be balanced in such a way that both good quality materials as well as agro-industrial by-products complement each other in fulfilling the nutritional requirements of livestock of various categories. Compounded cattle feed should be fed depending on the physiological stage of the animal (pregnant/milking/dry), age of the animal (calf/heifer/adult) as well as the season prevailing at that time(summer/winter/rainy). General recommendation for feeding of cattle feed is about 400 grams per litre to 500 grams per litre of milk production, in addition to 2 kg to 3 kg for body maintenance.

This standard was first published in 1962 and thereafter revised four times, in 1968, 1979 and 2009. The fourth revision of the standard was issued in 2009, wherein specifications for separate type of feed meant for low to medium and high producing animals was introduced considering that all categories of livestock must be fed according to their nutritional needs to utilize our feed resources most judiciously and to harvest their potential.

In this revision, the standard has been updated considering latest technological developments and manufacturing practices. Following major changes have been made in this revision:

a) Five amendments issued to the standard have been incorporated in this revision;
b) Requirement for total nitrogen to sulphur ratio has been updated; and
c) Methods of tests prescribed for various requirements have been updated.

The composition of the committee responsible for formulation of the standard is listed in Annex E.

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

COMPOUNDED FEEDS FOR CATTLE — SPECIFICATION

(Fifth Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and tests for compounded cattle feeds for buffaloes, cattle and working bullocks.

2 REFERENCES

The standards listed in Annex A 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 listed in Annex A.

3 TYPES

3.1 Compounded cattle feeds shall be of two types, namely:

a) Type I (high yielding animals)
b) Type II (low to medium yielding animals)

3.2 Compounded cattle feeds shall be in the form of a meal or cubes or pellets.

4 REQUIREMENTS

4.1 General

The feed shall be free from harmful constituents, metallic pieces and adulterants. The feed shall also be free from fungal growth and insect infestation and from fermented, musty, rancid or any other objectionable odour.

4.2 Ingredients

4.2.1 Ingredients as listed in Annex B may be used for compounded cattle feed.

4.2.2 The proportion of urea when incorporated shall not exceed 1.0 percent by mass. When urea has been added, the compounded cattle feed shall contain not less than 10 percent by mass of easily digestible carbohydrates like molasses, cereal grains, potato starch, tapioca starch, etc. Further, a ratio of total nitrogen to sulphur of 10 : 1 to 12 : 1 shall be maintained in the compounded cattle feed. For testing of total nitrogen, the test method given in IS/ISO 5983 (Part 1)* or IS/ISO 5983 (Part 2) or ISO 16634-1 shall be used and for testing of sulphur, the method given in Annex B of IS 1664* or EN 15621 shall be used.

NOTE — *In case of dispute, the method given in IS 5983 (Part 1) and Annex B of IS 1664* shall be the referee method.

4.2.3 Any material of animal origin except milk and milk products shall not be used as ingredient for manufacturing the product.

4.2.4 Materials of plant origin used for manufacturing the product shall not have aflatoxin B_1 content more than 20 ppb, except solvent extracted rice bran as livestock feed (*see* IS 3593, commonly called as de-oiled rice bran or DORB), rice polish (*see* IS 3163) and whole grains; wherein aflatoxin B_1 shall not be more than 50 ppb when tested as per IS/ISO 14718* or ISO 17375 or AOAC 2003.02.

NOTE — *In case of dispute, the method given in IS/ISO 14718 shall be the referee method.

4.3 The material shall also conform to the requirements specified in Table 1.

5 PACKING AND MARKING

5.1 Packing

Compounded cattle feeds shall be packed in clean and sound plain or polyethylene lined jute or laminated paper bags or HDPE or polypropylene bags. The mouth of each bag shall be machine stitched.

5.2 Marking

Each bag shall be legibly marked or labelled to give the following information:

a) Name and type of the material;
b) Name of the manufacturer and address;
c) Net mass in kg;
d) Batch or code number;
e) Proximate composition including rude protein content; Crude fat content; Crude fibre content; Calcium content; Total phosphorus content; Available phosphorus content and Urea percent, if present;
f) Acid insoluble ash;
g) Aflatoxin B_1 content;
h) Date of manufacture;
j) Best before date in day, month and year format;

k) Directions for use (including inside literature); and
m) Any other requirement as given under *The Legal Metrology (Packaged Commodities) Rules*, 2011.

5.2.1 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 the material for ascertaining conformity to this standard shall be drawn according to the method prescribed in Annex D.

7 TESTS

7.1 Tests shall be carried out as prescribed in col 5 of Table 1.

7.2 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 experimental results.

Table 1 Requirements for Compounded Feeds for Cattle
(*Clauses* 4.3, 7.1 *and* D-5.1)

Sl No.	Characteristic	Requirement		Method of Test Ref to
		Type I	Type II	
(1)	(2)	(3)	(4)	(5)
i)	Moisture, percent by mass, *Max*	11	11	**4** of IS 7874 (Part 1)
ii)	Crude protein (N × 6.25), percent by mass, *Min*	22	20	IS/ISO 5983 (Part 1)* or IS 5983 (Part 2) or ISO 16634-1
iii)	Crude fat, percent by mass, *Min*	4.0	3.0	IS/ISO 6492
iv)	Crude fibre, percent by mass, *Max*	10	12	IS/ISO 6865
v)	Acid insoluble ash, percent by mass, *Max*	2.5	3.0	Annex A of IS 1712 or IS 14826*
vi)	Salt (as NaCl based on Na or Cl), percent by mass, *Max*	1.0	1.0	**4** of IS 7874 (Part 2)
vii)	Calcium (as Ca), percent by mass, *Min*	0.8	0.8	IS 13433 (Part 1) or IS 15121* or EN 15621
viii)	Total phosphorus, percent by mass, *Min*	0.5	0.5	IS 14828* or EN 15621
ix)	Available phosphorus, percent by mass, *Min*	0.25	0.25	Annex F of IS 1374
x)	Urea, percent by mass, *Max*	1.0	1.0	IS 7874 (Part 1) or AOAC 967.07*
xi)	Vitamin A, IU/kg, *Min*	7 000	7 000	IS 15120
xii)	Vitamin D_3, IU/kg, *Min*	1 200	1 200	Annex C * or *J. AOAC Int.* 2012, Vol. 95, No. 5, *Pages* 1487–1494
xiii)	Vitamin E, IU/kg, *Min*	30	30	IS 15948
xiv)	Aflatoxin B_1, µg/kg, *Max*	20	20	IS/ISO 14718* or ISO 17375 or AOAC 2003.02
xv)	Cadmium, mg/kg, *Max*	0.5	0.5	EN 17053

NOTES

1 The values specified for requirements at Sl No. (ii) to (xv) are on moisture-free basis.
2 In case of dispute, the test methods wherever indicated by '*' shall be the referee method.
3 For crude fibre, the manual method given in IS/ISO 6865 shall be the referee method.
4 For routine analysis, validated near infrared-analyser may be used by the manufacturer for requirements at SI. No. (ii) to (v).

ANNEX A
(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 253 : 2014	Specification for common salt (*fourth revision*)
IS 1070 : 1992	Reagent grade water — Specification (*third revision*)
IS 1162 : 2021	Cane molasses — Specification (*first revision*)
IS 1374 : 2007	Poultry feeds — Specification (*fifth revision*)
IS 1664 : 2002	Mineral mixtures for supplementing cattle feeds — Specification (*fourth revision*)
IS 1712 : 2022	Cottonseed oilcake as livestock feed ingredient — Specification (*third revision*)
IS 1713 : 2022	Decorticated groundnut oilcake as livestock feed ingredient — Specification (*third revision*)
IS 1781 : 1975	Specification for urea, technical (*first revision*)
IS 1932 : 2022	Mustard and rapeseed oilcake as livestock feed ingredient — Specification (*third revision*)
IS 1934 : 2016	Sesamum oilcake as livestock feed ingredient — Specification (*second revision*)
IS 1935 : 2022	Linseed oilcake as livestock feed ingredient — Specification (*second revision*)
IS 2151 : 2022	Maize germ oilcake as livestock feed ingredient — Specification (*second revision*)
IS 2152 : 2013	Maize gluten as livestock feed ingredient — Specification (*second revision*)
IS 2153 : 2022	Maize bran as livestock feed ingredient — Specification (*second revision*)
IS 2154 : 2014	Coconut oilcake as livestock feed ingredient — Specification (*third revision*)
IS 2239 : 2022	Wheat bran as livestock feed ingredient — Specification (*second revision*)
IS 3160 : 2022	*Tur chuni* as livestock feed ingredient — Specification (*first revision*)
IS 3161 : 2022	Gram *chuni* as livestock feed ingredient — Specification (*first revision*)
IS 3163 : 2022	Rice polish as livestock feed ingredient — Specification (*first revision*)
IS 3440 : 1985	Specification for solvent extracted linseed oilcake (meal) as livestock feed ingredient (*first revision*)
IS 3441 : 2022	Solvent extracted groundnut oil cake as livestock feed ingredient — Specification (*second revision*)
IS 3592 :1985	Specification for solvent extracted decorticated cottonseed oilcake (meal) as livestock feed ingredient (*second revision*)
IS 3593 : 2022	Solvent extracted rice bran (De-oiled rice bran) as livestock feed — Specification (*third revision*)
IS 3648: 1975	Specification for rice bran as livestock feed (*first revision*)
IS 4193 : 2022	Guar meal as livestock feed ingredient — Specification (*second revision*)
IS 4905 : 2015	Random sampling and randomization procedures (*first revision*)
IS 5470 : 2002	Dicalcium phosphate, animal feed grade — Specification (*first revision*)
IS 5862: 2022	Solvent extracted nigerseed oilcake (meal) as livestock feed — Specification (*first revision*)
IS/ISO 5983-1:2005	Animal feeding stuffs — Determination of nitrogen content and calculation of crude protein content: Part 1 (Kjeldahl Method)
(Part 2) : 2009	Block digestion/steam distillation method (*first revision*)
IS 6242 : 1985	Specification for solvent extracted undecorticated safflower oilcake as livestock feed ingredient (*first revision*)

IS No.	*Title*
IS/ISO 6492 : 1999	Animal feeding stuffs — Determination of fat content
IS/ISO 6865 : 2000	Animal feeding stuffs — Determination of crude fibre content — Method with intermediate filtration
IS 7224 : 2006	Iodized salt, vacuum evaporated iodized salt and refined iodized salt — Specification (*second revision*)
IS 7874 (Part 1): 1975	Methods of tests for animal feeds and feeding stuffs: Part 1 General methods
(Part 2): 1975	Methods of tests for animal feeds and feeding stuffs: Part 1 Minerals and trace element
IS 10759 : 1983	Specification for brewer's yeast
IS 12829 : 1989	Mango seed kernels (solvent extracted) as livestock feed ingredient — Specification
IS 13433 (Part 1) : 1992	Animal feeds and feeding stuffs — Determination of calcium: Part 1 Titrimetric method
IS 14702: 2022	Solvent extracted undecorticated sunflower oilcake as livestock feed Ingredient — Specification (*second revision*)
IS/ISO 14718 : 1998	Animal feeding stuffs — Determination of aflatoxin B_1 content of mixed feeding stuffs — Method using high-performance liquid chromatography
IS 14826: 2021/ ISO 5985 : 2002	Animal Feeding Stuffs — Determination of ash insoluble in hydrochloric acid (*first revision*)
14828 : 2000/ISO 6491 : 1998	Animal feeding stuff — Determination of total phosphorus content spectrophotometric method
15120 : 2002/ISO 14565 : 2000	Animal feeding stuffs — Determination of vitamin A content — Method using high-performance liquid chromatography
15121 : 2002/ISO 6869 : 2000	Animal feeding stuffs — Determination of the contents of calcium, copper, iron, magnesium, manganese, potassium, sodium and zinc - method using atomic absorption spectrometry
15948 : 2011/ISO 6867 : 2000	Animal feeding stuffs — Determination of Vitamin E content — Method using high-performance liquid chromatography
ISO 16634 (Part 1): 2008	Food products — Determination of the total nitrogen content by combustion according to the dumas principle and calculation of the crude protein content — Part 1: Oilseeds and animal feeding stuffs
ISO 17375 : 2006	Animal feeding stuffs — Determination of aflatoxin B_1
EN 15621 : 2017	Animal feeding stuffs — Methods of sampling and analysis — Determination of calcium, sodium, phosphorus, magnesium, potassium, sulphur, iron, zinc, copper, manganese and cobalt after pressure digestion by ICP-AES
EN 17053 : 2018	Animal feeding stuffs — Methods of sampling and analysis — Determination of trace elements, heavy metals and other elements in feed by ICP-MS (multi-method)

ANNEX B
(*Clause* 4.2.1 *and* 4.2.2)

INGREDIENTS FOR COMPOUNDED CATTLE FEEDS

B-1 Besides Common salt, (*see* IS 253)/Iodized salt (*see* IS 7224), Mineral mixture (Type II) (*see* IS 1664), Dicalcium Phosphate (DCP) (*see* IS 5470), Calcite powder, Bypass protein, Bypass amino-acids, Bypass fat and Vitamins, any of the following ingredients may be used for compounded cattle feeds.

B-1.1 Grains and Seeds

a) Barley (*Hordeum vulgare*);
b) Gram (*Cicer arietinumi*);
c) *Guar* seeds (*Cyamposis tetragonolobai*);
d) Horse gram or *Kulthi* (*Dolichos biflorus*);
e) *Jowar* (*Sorghum vulgare*);
f) Maize (*Zea mays*);
g) Oats (*Avena sativa*);
h) *Ragi* (*Eleusine coracana*);
j) Sunhemp seed;
k) *Bajra* (*Pennisetum typhoidesi*);
m) Wheat (*Triticum aestivumy*); and
n) Rice/broken rice (*Oryza sativa*).

B-l.2 Grain By-products

a) *Arhar* or *Tur* (*Cajanus cajan*) chuni (*see* IS 3160);
b) Gram chuni (*see* IS 3161);
c) *Guar* meal (*see* IS 4193);
d) Maize bran (*see* IS 2153);
e) Maize gluten feed (*see* IS 2152) and maize screenings;
f) *Moth* (*Phaseolus aconitifolius*) *chuni*;
g) *Moong chuni* (*Phaseolus aureus*);
h) Rice bran (*see* IS 3648) deoiled rice bran and rice polish (*see* IS 3163);
j) Urad (*Phaseolus mungo*) *chuni*; and
k) Wheat bran (*see* IS 2239).

B-1.3 Oilcakes and Meals

a) Coconut oilcake (*see* IS 2154), and solvent extracted coconut oilcake (meal) (*see* IS 2154);
b) Cottonseed oilcake (*see* IS 1712), and solvent extracted cottonseed oilcake (meal) (*see* IS 3592);
c) Groundnut oilcake (*see* IS 1713), and solvent extracted groundnut oilcake (meal) (*see* IS 3441);
d) Linseed oilcake (*see* IS 1935), and solvent extracted linseed oilcake (meal) (*see* IS 3440);
e) Maize germ oilcake (*see* IS 2151);
f) Mustard and rape oilcake (*see* IS 1932). And solvent extracted mustard and rape oilcake (meal);
g) Nigerseed oilcake, and solvent extracted nigerseed oilcake (meal) (*see* IS 5862);
h) Sesamum (*Til*) oilcake (*see* IS 1934). And solvent extracted sesamum oilcake (meal);
j) Soyabean (*Glycine max)* oilcake/meal;
k) Sunflower oilcake (*see* IS 14702) and sunflower meal (decorticiated or undecorticated); and
m) Safflower cake/meal (*see* IS 6242).

B-1.4 Tuber and Roots

a) Tapioca spent pulp;
b) Tapioca; and
c) Tapioca starch.

B-1.5 Greens

a) Berseem (*Trifolium alexandrium*) meal; and
b) Lucerne (*Medicago sativa*) meal.

B-1.6 Waste Materials and Industrial By-products

a) *Babul* (*Acacia nilotica*) seeds *chuni*;
b) *Prosopis juliflora* pods not exceeding 15 percent;
c) *Tamarind* seed power;
d) Ambadi (*Hibiscus cannibus*) oilcake/extraction;
e) Bijda (*Citrulus vulgaris*) cake/extraction;
f) Brewer's yeast (*see* IS 10759);
g) Cottonseed bran;
h) Cottonseed hulls;
j) Distillery waste;
k) Mango seed kernel (dried) (*see* IS 12829);
m) Molasses (*see* IS 1162); and
n) Urea (*see IS* 1781).

ANNEX C
[*Table* 1, *Sl No.* (xii)]

METHOD FOR ESTIMATION OF VITAMIN D_3

C-1 SAMPLE PREPARATION

a) Take 1.0 g feed sample in amber colour vial;
b) Add 5 ml of diethyl ether;
c) Shake vigorously and keep vial in a beaker containing acetone in freezer until lower portion is frozen;
d) Take out supernatant from the vial into another vial;
e) Add 4 ml (methyl chloride: methanol, 3 : 1) in each vial and collect the supernatant;
f) Take out supernatant in another vial;
g) Add 5 ml of 0.1 M phosphate buffer in each vial and collect the supernatant;
h) Dry it in water bath at 34 °C to 36 °C or in an oven;
j) Complete drying under nitrogen gas;
k) Reconstitute in mobile phase;
m) Filter through 0.22 µ filter paper; and
n) Inject known quantity in HPLC column.

C-1.1 HPLC Conditions

a) Temperature – 25 ºC;
b) Flow rate – 2.0 ml/min;
c) Detector – UV;
d) Wave length – 265 nm;
e) Runtime – 10 min;
f) Maximum Pressure – 400 kg/cm^2;
g) Column – C 18 (150 mm × 4 mm); and
h) Mobile Phase – Acetonitrile (100 percent).

C-1.2 Calculation

$$\text{Vitamin } D_3\ (\mu g/g) = \frac{V_e \times SA \times Sdc \times Purity\ of\ vitamin\ D_3}{V_1 \times SdA}$$

where

V_e = volume in which the dried extract was dissolved;
SA = sample area from peak;
SdC = standard concentration (Vitamin D_3);
V_1 = volume injected; and
SdA = standard area from the peak.

ANNEX D
(*Clause* 6)

SAMPLING OF COMPOUNDED FEEDS FOR CATTLE

D-l GENERAL REQUIREMENTS OF SAMPLING

D-1.0 In drawing, preparing, storing and handling samples, care should be taken that the properties of the material are not affected. The following precautions and directions shall be observed.

D-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

D-l.2 The sampling instrument shall be clean and dry when used.

D-l.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

D-l.4 The samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample.

D-l.5 Each container shall be sealed air-tight with a stopper or a suitable; closure after filling in such a way that it is not possible to open and reseal it without detection, and marked with full details of sampling, date of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment.

D-l.6 Samples shall be stored in such a manner that there is no deterioration of the material.

D-1.7 Sampling shall be done by a person agreed to between the purchaser and the vendor and if desired by any of them, in the presence of the purchaser (or his representative) and the vendor (or his representative).

D-2 SCALE OF SAMPLING

D-2.1 Lot

The quantity of the cattle feed of a particular type,

produced under relatively similar conditions in a day shall constitute a lot.

NOTE — Relatively similar conditions would mean the use of raw material having insignificant variations and similar conditions of manufacture.

D-2.1.1 Samples shall be tested for each lot for ascertaining conformity of the material to the requirements of this standard.

D-2.2 The number of bags to be selected from the lot shall depend on the size of the lot and shall be in accordance with col 2 and 3 of Table 2.

D-2.3 The bags shall be chosen at random from the lost and for this purpose a random number table as agreed to between the purchaser and the vendor shall be used (*see* IS 4905). If such a table is not available, the following procedure shall be adopted.

Starting from any bag count 1, 2, 3……. etc up to *r* and so on in a systematic manner and withdraw the r^{th} bag; *r* being the integral part of *N/n;* where *N* is the total number of bags in the lot, and *n* the number of bags to be selected according to Table 2.

D-3 TEST SAMPLES AND REFEREE SAMPLES

D-3.1 Preparation of Individual Samples

Draw with an appropriate sampling instrument, equal quantities of the material from the top, bottom and the sides of each bag selected according to Table 2. The total quantity of the material drawn from each bag shall be not less than 1.5 kg. Mix all the portions of the material drawn from the same bag thoroughly. Take out about 0.75 kg of the material and divide it into three equal parts. Each portion, thus obtained, shall constitute the test sample representing that particular bag and shall be transferred immediately to clean and dry sample containers and sealed airtight. These shall be labelled with particulars given in **D-l.5**. The individual samples thus obtained shall be formed into three sets in such a way that each set has a test sample representing each bag selected. One of the sets shall be for the purchaser, another for the vendor, and the third for the referee.

D-3.2 Preparation of Composite Samples

From the mixed material from each selected bag remaining after the individual samples have been taken, equal quantities of the material from each bag shall be taken and mixed up together so as to form a composite sample weighing not less than 0.75 kg. This composite sample shall be divided into three equal parts and transferred to clean and dry containers and labelled with particulars given under **D-l.5** and sealed airtight. One of these samples shall be for the purchaser, another for the vendor, and the third for the referee.

D-3.3 Referee Samples

Referee samples shall consist of a set of test samples (*see* **D-3.1**) and a composite sample (*see* **D-3.2**) and shall bear the seal of the purchaser and the vendor and shall be kept at a place agreed to between the two.

D-4 TESTING OF SAMPLES

D-4.1 Test for crude protein shall be conducted individually on each of the samples constituting a set of test samples (*see* **D-3.1**).

D-4.2 Tests for the remaining characteristics, prescribed in Table 1 shall be conducted on the composite sample (*see* **D-3.2**).

D-5 CRITERIA FOR CONFORMITY

D-5.1 A lot shall be declared as conforming to this standard when the test results in the composite sample satisfy the relevant requirements specified in Table 1.

Table 2 Number of Bags to be Selected for Sampling
(*Clauses* D-2.2 *and* D-3.1)

Sl No.	Lot Size	No. of Bags to be Selected
(1)	(2)	(3)
i)	Up to 50	1
ii)	51 to 100	3
iii)	101 to 300	4
iv)	301 to 500	5
v)	501 and above	7

ANNEX E

(*Foreword*)

COMMITTEE COMPOSITION

Animal Feeds and Nutrition Sectional Committee, FAD 05

Organization	*Representative(s)*
In Personal Capacity (*81, North City, Opposite Air Force Station Gate, Pilibhit Road, Izatnagar, Bareilly - 243122*)	DR R. K. SINGH **(*Chairperson*)**
All India Poultry Breeders Association, New Delhi	DR A. K. RAJPUT
Animal Welfare Board of India, Faridabad	DR PRACHI JAIN DR DEBALINA MITRA (*Alternate*)
Association of Indian Pet Food Manufacturers, New Delhi	DR AKANKSHA SINGH SHRI GOVIND SURYAWANSHI (*Alternate*)
CSIR - Central Drug Research Institute, Lucknow	DR D. S. UPADHYAY DR DHANANJAY HANSDA (*Alternate*)
Centre for Science and Environment, New Delhi	SHRI AMIT KHURANA
Centre of Analysis and Learning in Livestock and Food, Anand	DR RAJESH NAIR DR RAJEEV CHAWLA (*Alternate*)
Chhattisgarh Kamdhenu Vishwavidyalaya, Raipur	DR SANJAY SHAKYA DR MANOJ KUMAR GENDLEY (*Alternate*)
Compound Livestock Feed Manufacturers Association of India, Navi Mumbai	MS CHANDRIKA VENKATESH SHRI SURESH DEORA (*Alternate*)
Department of Animal Husbandry and Dairying, Panchkula	DR BIRENDER SINGH LAURA DR RAJIV BANGER (*Alternate)*
Federation of Indian Animal Protection Organizations, New Delhi	MS SIRJANA NIJJAR MS VARNIKA SINGH (*Alternate*)
Food Safety and Standards Authority of India, New Delhi	DR K. ABIRAMI MS MANPREET KOUR (*Alternate*)
Guru Angad Dev Veterinary and Animal Sciences, University, Ludhiana	DR J. S. LAMBA DR JASMINE KAUR (*Alternate*)
ICAR-Central Avian Research Centre, Bareilly	DIRECTOR CARI DR S. K. BHANJA (*Alternate*)
ICAR-Central Institute for Research on Buffaloes, Hisar	DR P. C. LAILER DR AVIJIT DEY (*Alternate*)
ICAR-Central Sheep and Wool Research Institute, Avikanagar	DR RANDHIR SINGH BHATT DR SROBANA SARKAR (*Alternate*)

Organization	*Representative(s)*
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ICAR - Indian Veterinary Research Institute, Izzatnagar	DR A. K. VERMA
ICAR-National Research Centre on Equines, Hisar	DR S. C. MEHTA DR R. A. LEGHA (*Alternate*)
ICAR-National Research Centre on Pig, Guwahati	DR KESHAB BARMAN DR SANTANU BANIK (*Alternate*)
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National Dairy Research Institute, Karnal	DR NITIN TYAGI DR SACHIN KUMAR (*Alternate*)
National Egg Coordination Committee, New Delhi	SHRI AJIT SINGH SHRI BHAGWATI SINGH (*Alternate*)
ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru	DR RAGHAVENDRA BHATTA DR D. T. PAL (*Alternate*)
PETA India, Mumbai	DR MANILAL VALLIYATE MS HARSHIL MAHESHWARI (*Alternate*)
People for Animals, New Delhi	MS GAURI MAULEKHI MS SHREYA PAROPKARI (*Alternate*)
Poultry Federation of India, Sonipat	SHRI VIJAY SARDANA
Tamil Nadu Veterinary and Animal Sciences University, Chennai	DR A. NATRAJAN DR R. RAJENDRAN (*Alternate*)
Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan (DUVASU), Mathura	PROF (DR) P. K. SHUKLA DR VINOD KUMAR (*Alternate*)

Organization	*Representative(s)*
BIS Directorate General	SHRIMATI SUNEETI TOTEJA, SCIENTIST 'E'/DIRECTOR AND HEAD [(FOOD AND AGRICULTURE) [REPRESENTING DIRECTOR GENERAL (*Ex-Officio*)]

Member Secretary
SHRIMATI NITASHA DOGER
SCIENTIST 'D'/JOINT DIRECTOR
(FOOD AND AGRICULTURE), BIS

Panel for reviewing the Indian Standards on Cattle Feed and Feed Ingredients, FAD 05/Panel 11

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