भारतीय मानक **IS 13451 : 2024**

Indian Standard

जुगाली पशु आहार संपूरक के रूप में यूरिया शीरा पिंड — विशिष्टि

(पहला पुनरीक्षण)

Urea Molasses Block as Ruminant Feed Supplement — Specification

(First Revision)

ICS 65.120

भारतीय मानक ब्यूरो
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Animal Feeds and Nutrition Sectional Committee, FAD 05

FOREWORD

This Indian Standard (First 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.

Utilization of fibrous feeds by ruminant animals depends on the microbial activity in the rumen. Fibrous feeds are generally low in nitrogen, energy and minerals. As a result, ruminal microbial activity is poor, leading to poorer fermentation rate, coupled with lower microbial output.

Urea molasses (mineral) block (UMB) lick, being a cheap and safe source of nitrogen, energy and minerals, can supply the essential nutrients to the rumen microflora. Feeding of urea molasses block as lick in the ration of lactating, growing and dry cattle and buffaloes, is both beneficial and economical as is evidenced by several farm and field trials.

This standard has been formulated to guide the manufacturers and users about the quality of urea molasses blocks.

This standard was first published in 1992. In this revision, the standard has been updated considering latest technological developments and manufacturing practices. The following major changes have been made incorporated:

a) Considering the problems faced in manufacturing UMB licks by '*hot process*', the ingredient composition and requirements of UMB licks manufactured by *'cold process'* has been incorporated in this revision;

b) The recommended formulation of urea molasses (mineral) block has been updated; and

c) The test methods for various parameters have been updated in order to refer to the advance instrumental test methods.

The composition of the Committee responsible for the formulation of this standard is given 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

UREA MOLASSES BLOCK AS RUMINANT FEED SUPPLEMENT — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for urea molasses block feed supplement for ruminants.

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 REQUIREMENTS

3.1 Description

The urea molasses block (UMB) lick shall be in the form of a rectangular, solid block which shall be fed as a lick. The feed supplement shall be free from fermented odour, metallic pieces, toxic ingredients, adulterants, visible mould growth and insect infestation. It shall have characteristic molasses aroma.

3.2 Ingredients

3.2.1 The ingredients, which shall be used in the manufacture of urea molasses block are given in Annex B.

3.2.2 The recommended proportions of the ingredients in UMB is as follows:

Sl No.	*Particular*	*Hot Process*	*Cold Process*
(1)	(2)	(3)	(4)
i)	Molasses (%)	45	45
ii)	Urea (%)	15	6
iii)	Mineral mixture (%)	15	6
iv)	Common salt (%)	8	–
v)	Calcite powder (%)	4	4
vi)	Bentonite (%)	3	–
vii)	Protein meal (%)	10	–
viii)	DORB	–	14
ix)	Rice polish fine	–	13
x)	Magnesium oxide	–	2
xi)	DAP (ground)	–	10

NOTE — Groundnut, soybean, sesame, coconut, mustard and rapeseed oilcake (meal) may be used singly or in combination for urea molasses block production.

3.3 The UMB shall also conform to the requirements prescribed in Table 1.

3.4 The urea molasses block shall also contain the minerals and vitamins listed below in quantities not less than the values shown against each.

These requirements shall be declared by the manufacturer after periodic testing using test methods prescribed in col (4) of Table 2.

3.5 Hardness

The urea molasses block shall satisfy any one of the following requirements given in **3.5.1**, **3.5.2** and **3.5.3**.

3.5.1 The urea molasses block shall be sufficiently hard on completion of the production process and shall not leave any impression on applying pressure.

3.5.2 The urea molasses block should have a compression strength of 4 000 kPa (4 kg/sq cm).

3.5.3 When the reaction is completed (using hot process), 0.2 g to 0.3 g of the material shall be taken and shaped into a small ball in between the fingers. On throwing with force on a pucca floor, this ball should bounce back to a height of 90 cm (30 feet).

Table 1 Requirements for Urea Molasses Block

(*Clause* 3.3 *and* 6.1)

Sl No.	Characteristic	Requirement		Methods of Test, Ref to
		Hot Process	Cold Process	
(1)	(2)	(3)	(4)	(5)
i)	Moisture, percent by mass, *Max*	3.5	5.0	**4** of IS 7874 (Part 1)
ii)	Crude protein (N × 6.25), percent by mass, *Min*	52.0	35.0	IS/ISO 5983 (Part 1)* or IS/ISO 5983 (Part 2) or ISO 16634 (Part 1)
iii)	Crude fibre, percent by mass, *Max*	2.0	5.0	IS/ISO 6865
iv)	Total ash, percent by mass, *Min*	34.0	25.0	**9** of IS 7874 (Part 1)
v)	Acid insoluble ash, percent by mass, *Max*	3.0	3.0	Annex A of IS 1712 or IS 14826*
vi)	Calcium (as Ca), percent by mass, *Min*	4.0	3.0	IS 13433 (Part 1) or IS 15121* or EN 15621
vii)	Phosphorus (as P), percent by mass, *Min*	1.5	1.5	IS 14828* or EN 15621
viii)	Sulphur, percent by mass, *Min*	0.80	0.50	Annex C
ix)	Urea, percent by mass, *Max*	15.0	10.0	IS 14832

NOTES

1 The values specified for requirements at Sl No. (ii) to (ix) are on moisture-free basis.

2 In case of dispute, the test methods given above and 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.

Table 2 Requirements for Minerals and Vitamins in Urea Molasses Block

(*Clause* 3.4)

Sl No.	Mineral and Vitamins	Amount/kg of Block on Dry Matter Basis (mg), *Min*	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Iron	400	IS 15121* or EN 15621
ii)	Iodine	24	IS 7874 (Part 2)
iii)	Copper	64	IS 15121* or EN 15621
iv)	Manganese	96	IS 15121* or EN 15621
v)	Cobalt	14	**11** of IS 7874 (Part 2) * or EN 15621
vi)	Zinc	160	IS 15121* or EN 15621
vii)	Vitamin A	10 000 I. U.	IS 15120

NOTE — In case of dispute, the test methods given above and wherever indicated by '*' shall be the referee method.

4 PACKING AND MARKING

4.1 Packing

The urea molasses block shall be packed and heat sealed in sound, polythene bags of 300 gauge maximum. The blocks may be bulk packed in cardboard cartons.

4.2 Marking

Each bag shall be securely closed and suitably marked or labelled so as to give the following information:

a) Name and type of the material;

b) Name and address of the manufacturer;

c) Batch or code number;

d) Net mass of contents

e) Date of packing;

f) Best before date in month and year format; and

g) Any other requirements as specified under the *Legal Metrology* (*Packaged Commodities*) *Rules*, 2011.

4.2.1 Instructions for use shall be printed on the bag in English and a local language as given in Annex D.

4.2.2 *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.

5 SAMPLING

Representative samples of the material for ascertaining conformity to this standard shall be determined according to the method prescribed in Annex D of IS 2052.

6 TESTS

6.1 Tests shall be carried out as prescribed in col (5) of Table 1, **3.4** and **3.5**, respectively.

6.2 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 results of analysis.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No./Other Standards	*Title*
IS 246 : 1986	Specification for sodium thiosulphate, crystalline, photographic grade (*fourth revision*)
IS 261 : 2023	Copper sulphate — Specification (*third revision*)
IS 262 : 2022	Ferrous sulphate, heptahydrate — Specification (*third revision*)
IS 920 : 1972	Specification for common salt and cattle licks for animal consumption (*first revision*)
IS 1070 : 2023	Reagent grade water — Specification (*fourth revision*)
IS 1162 : 2021	Cane molasses — Specification (*first 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 : 2022	Urea, technical — Specification (*second 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 2052 : 2023	Compounded feeds for cattle — Specification (*fifth revision*)
IS 2154 : 2014	Coconut oilcake as livestock feed ingredient — Specification (*third revision*)
IS 3441 : 2022	Solvent extracted groundnut oil cake as livestock feed ingredient — Specification (*second revision*)
IS/ISO 5983 (Part 1) : 2005	Animal feeding stuffs — Determination of nitrogen content and calculation of crude protein content: Part 1 Kjeldahl method
IS 5983 (Part 2) : 2021/ISO 5983-2 : 2009	Animal feeding stuffs — Determination of nitrogen content and calculation of crude protein content: Part 2 Block digestion and steam distillation method (*first revision*)
IS 6186 : 1986	Specification for bentonite (*first revision*)
IS/ISO 6865 : 2000	Animal feeding stuffs — Determination of crude fibre content — Method with intermediate filtration
IS 7874	Methods of tests for animal feeds and feeding stuffs:
(Part 1) : 1975	General methods
(Part 2) : 1975	Mineral and trace elements
IS 8249 : 2019	Zinc sulphate heptahydrate, agricultural grade — Specification (*second revision*)
IS 10535 : 1983	Specification for manganese sulphate, monohydrate
IS 13057 : 1991	Potassium iodate
IS 13433 (Part 1) : 2024/ISO 6490-1 : 1985	Animal feeds and feeding stuffs — Determination of calcium: Part 1 Titrimetric method (*first revision*)

IS No./Other Standards	*Title*
IS 14826 : 2021/ ISO 5985 : 2002	Animal feeding stuffs — Determination of ash insoluble in hydrochloric acid (*first revision*)
IS 14828 : 2000/ ISO 6491 :1998	Animal feeding stuff — Determination of total phosphorus content — Spectrophotometric method
IS 14832 : 2000/ ISO 6654 : 1991	Animal feeding stuff — Determination of urea
IS 15120 : 2002/ ISO 14565 : 2000	Animal feeding stuffs — Determination of vitamin a content — Method using high performance liquid chromatography
IS 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
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
EN 15621 : 2012	Animal feeding stuffs — Determination of calcium, sodium, phosphorus, magnesium, potassium, sulphur, iron, zinc, copper, manganese and cobalt after pressure digestion by ICP-AES

ANNEX B

(*Clause* 3.2.1)

INGREDIENTS FOR UREA MOLASSES BLOCKS

B-1 MOLASSES (*see* IS 1162)

B-2 UREA (*see* IS 1781)

B-3 MINERAL MIXTURE (*see* IS 1664)

B-4 SALT (*see* IS 920)

B-5 CALCITE POWDER

B-6 OIL CAKES/MEALS

a) Decorticated groundnut oilcake (*see* IS 1713) and solvent extracted groundnut oilcake (meal) (*see* IS 3441);

b) Solvent extracted soybean oilcake (meal);

c) Sesame oilcake (*see* IS 1934);

d) Coconut oilcake as livestock feed ingredient (*see* IS 2154); and

e) Mustard and rapeseed oilcake (*see* IS 1932).

B-7 BENTONITE (*see* IS 6186)

B-8 TRACE MINERALS

a) Ferrous sulphate (*see* IS 262);

b) Copper sulphate (*see* IS 261);

c) Zinc sulphate (*see* IS 8249);

d) Cobalt chloride;

e) Manganese sulphate (*see* IS 10535);

f) Potassium iodate (*see* IS 13057); and

g) Sodium thiosulphate (*see* IS 246).

B-9 VITAMIN A AND D_3

ANNEX C

[*Table* 1, *Sl No.* (viii)]

DETERMINATION OF SULPHUR

C-1 PRINCIPLE

Sulphur in the sample is oxidized to magnesium sulphate when heated with magnesium oxide or nitrate. Sulphur from magnesium sulphate is precipitated as barium sulphate after adding barium chloride to the hot solution in the acidic conditions.

C-2 APPARATUS

C-2.1 Crucible

C-2.2 Muffle Furnace

C-3 REAGENTS

C-3.1 Magnesium Oxide

C-3.2 Magnesium Nitrate

C-3.3 Sucrose Powder

C-3.4 Nitric Acid

C-3.5 Hydrochloric Acid — (1 + 2.5) (*v/v*)

C-3.6 Barium Chloride — 10 percent (*m/v*)

C-4 PROCEDURE

C-4.1 Weigh accurately 3.0 g of magnesium oxide or equivalent quantity of magnesium nitrate (19.2 g), 1 g sucrose and 50 ml of nitric acid in a large crucible. Add 2 g to 3 g of the urea molasses block.

C-4.2 Evaporate on steam bath to paste.

C-4.3 Place the crucible in an electric muffle furnace and gradually heat furnace up to 550 °C ± 10 °C until all nitric oxide fumes are driven off and all organic matter is destroyed.

C-4.4 Cool, dissolve, and neutralize with hydrochloric acid (1 + 2.5) and add 5 ml excess.

C-4.5 Filter through Whatman filter paper No. 40. Heat the filtrate to boiling and add 5 ml to 10 ml of 10 percent barium chloride solution, dropwise.

C-4.6 Evaporate to approximately 100 ml, let stand overnight, filter and wash with hot water.

C-4.7 Ignite the material along with the filter paper in muffle at 550 °C ± 10 °C for 30 min.

C-4.8 After cooling weigh the barium sulphate precipitate.

C-4.9 Carry out a blank determination simultaneously using the same quantities of the reagents.

C-5 CALCULATION

$$\text{Sulphur, percent by mass} = \frac{13.74 \times (M_1 - M_2)}{M}$$

where

M_1 = mass, in g, of the barium sulphate precipitate obtained from the material;

M_2 = mass, in g, of the barium sulphate precipitate obtained from the blank; and

M = mass, in g, of the material taken for the test.

ANNEX D

(*Clause* 4.2.1)

INSTRUCTION FOR USE OF UREA MOLASSES BLOCK AS RUMINANT FEED SUPPLEMENT

1 The wrapper of block should be removed before it is kept in front of the animal for licking.

2 A block should be in front of the animal so that it can lick as and when it desires.

3 A fresh block should be kept on the previous one when it becomes too small to lick.

4 A separate block should be kept for individual animals.

5 Enough straw/dry fodder should be offered when block is fed.

6 A block should not be removed once the animal starts licking

7 Care should be taken that no water falls on block. Animals should not be allowed to drink block rinsed water.

8 Block should not be ground and mixed with any other feed.

9 Block should not be offered to calves below 3 months of age.

10 Care should be taken that block is not soiled with dust, dung or urine.

11 Care should be taken that urea is being fed from one source only.

12 Animal should have access to clear drinking water *ad Libitum.*

13 A dispenser/holder should be used to avoid soiling.

14 Use the block as a lick only. To prevent its biting and over-ingestion by the animal, a dispenser with a rod in middle should be used.

15 Do not spray water on the block for licking.

16 The block should be used within six months of the date of manufacture.

ANNEX E

(*Foreword*)

COMMITTEE COMPOSITION

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