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## Compounded goat and sheep feed — Specification

PUBLIC REVIEW DRAFT



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This Draft Uganda Standard, DUS DARS 1830: 2023, *Compounded goat and sheep feed — Specification*, is identical with and has been reproduced from an African Standard, DARS 1830: 2023, *Compounded goat and sheep feed — Specification*, and adopted as a Uganda Standard.

The committee responsible for this document is Technical Committee UNBS/TC 210, *Animal feeds and feeding stuffs*.

Wherever the words, "African Standard" appear, they should be replaced by "Uganda Standard".

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**Compounded goat and sheep feed - Specification**



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## Foreword

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This African Standard was prepared by ARSO/TC 17, *Animal feeding, feeds and feeding stuffs*.

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## **Introduction**

To achieve efficient animal production, all nutrients should be provided in amounts necessary to meet the animal's requirements. The formulation of balanced diets that provide the correct amounts and proportions of these nutrients is essential to support the requirements for maintenance and production. Nutrient requirements become defined accurately through research trials so as to formulate diets more precisely. The standards presented in this document give the restrictions required for the prevention of poor animal performance.

To effectively achieve and increase animal production capacity, all nutrients must be provided in sufficient amounts formulated to meet maintenance and production needs. This standard contains the technical requirements on safety and quality of feeds for feeding goats and sheep.

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## Compounded goat and sheep feeds - Specification

### 1 Scope

This African standard specifies the requirements, methods of sampling and test for compounded goat and sheep feeds.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARSO XXXXX Code of good practice on animal feeding

ISO 2591-1, *Test sieving — Part 1: Methods using test sieves of woven wire cloth and perforated metal plate*

ISO 5984:2002, *Animal feeding stuffs — Determination of crude ash*

ISO 5985, *Animal feeding stuffs — Determination of ash insoluble in hydrochloric acid*

ISO 6490-1, *Animal feeding stuffs — Determination of calcium content — Part 1: Titrimetric method*

ISO 6491, *Animal feeding stuffs — Determination of phosphorus content — Spectrometric method*

ISO 6492, *Animal feeding stuffs — Determination of fat content*

ISO 6496, *Animal feeding stuffs — Determination of moisture and other volatile matter content*

ISO 6497, *Animal feeding stuffs — Sampling*

ISO 6654, *Animal feeding stuffs — Determination of urea content*

ISO 6865, *Animal feeding stuffs — Determination of crude fibre content — Method with intermediate filtration*

ISO 6866, *Animal feeding stuffs — Determination of free and total gossypol*

ISO 6867, *Animal feeding stuffs — Determination of vitamin E content — Method using high-performance liquid chromatography*

ISO 6869, *Animal feeding stuffs — Determination of the contents of calcium, copper, iron, magnesium, manganese, potassium, sodium and zinc — Method using atomic absorption spectrometry*

ISO 14565, *Animal feeding stuffs — Determination of vitamin A content — Method using high-performance liquid chromatography*

ISO 14718, *Animal feeding stuffs — Determination of aflatoxin B<sub>1</sub> content of mixed feeding stuffs — Method using high-performance liquid chromatography*

ISO 16634-1, *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*

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ISO 17375, *Animal feeding stuffs — Determination of aflatoxin B<sub>1</sub>*

ISO 27085, *Animal feeding stuffs — Determination of calcium, sodium, phosphorus, magnesium, potassium, iron, zinc, copper, manganese, cobalt, molybdenum, arsenic, lead and cadmium by ICP-AES*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **feed**

feed stuff

feeding stuff

single or multiple materials, whether processed, semi-processed or raw, and whether or not containing additives, for oral animal feeding

### 3.2

#### **crude protein**

**CP**

total protein content of a feed which is determined by analysing the nitrogen content of feed and multiplying the result by a factor

Note 1 to entry: This factor is generally equal to 6,25. However, it may differ in some categories of *feed materials*, such as grains due to difference in the quality of amino acids constituents of protein.

Note 2 to entry: The reference method for analysing the crude protein content on the basis of the nitrogen content is the Kjeldahl method.

Note 3 to entry: Crude protein includes true protein and other nitrogen-containing substances, such as ammonia, amino acids and nitrates.

### 3.3

#### **crude fibre**

**CF**

residue obtained after acid and alkaline digestion of a feed sample that contains cellulose, hemicellulose, lignin and pectin

Note 1 to entry: Crude fibre has been replaced by acid detergent fibre and *neutral* detergent fibre in ruminant nutrition but it is still reported for monogastric nutrition.

Note 2 to entry: The cellulose, hemicellulose, lignin and pectin that form the plant cell wall are known as “structural carbohydrates” or “fibre”.

### 3.4

#### **crude fat**

total fat content of a feed determined by a laboratory test

Note 1 to entry: crude fat includes some waxes, pigments and other lipids to a minor degree in addition to true fats.

### 3.5

#### **metabolizable energy**

**ME**

amount of the useful energy in a feed that represents that portion of the feed gross energy not lost in faeces, urine and eructated gas

**3.6**  
**total digestible nutrients**  
**TDN**

sum of the digestible fibre, protein, lipid and carbohydrate content of feed, which expresses the energy value of feed as calculated using formulae and not reported as measured values

Note 1 to entry: TDN is directly related to digestible energy and is often calculated based on acid detergent fibre

**3.7**  
**total ash**  
crude ash

inorganic part of a feed consisting of mineral elements determined in a laboratory by incineration at a high temperature and weighing the residue

**3.8**  
**moisture content**  
moisture and other volatile matter content

mass fraction of substances lost on drying the sample by using the accredited procedure

Note 1 to entry: The moisture and other volatile matter content is expressed as a mass fraction in percent [formerly given as % (m/m)].

**3.9**  
**feed additives**

substance intentionally added to feed and/or water, not consumed as feed by itself, whether or not it has a nutritional value, that affects the characteristics of feed including organoleptic properties, animal products, animal production or performance or welfare, or the environment

**3.10**  
**total mixed ration**  
**TMR**

homogenous mixture of all ration ingredients (e.g. forages, grains, feed supplements) that is supplied to an animal for a 24-hour period

Note 1 to entry: In practice, the 24-hour allotment of the mixture may be offered in one or more feedings.

## **4 Requirements**

### **4.1 General Requirement**

**4.1.1** Goat and sheep feeds shall be in the form of a meal, cubes, pellets or bale.

**4.1.2** Goat and sheep feeds shall be free from harmful constituents such as

- i. metallic and glass objects
- ii. adulterants
- iii. physical moulds
- iv. pathogens or insect infestation
- v. mustiness,
- vi. rancidity
- vii. any other objectionable odours.

**4.1.3** Goat and sheep feeds shall be palatable.

**4.1.4** Non - protein nitrogen (NPN) sources shall not be used in compounding feeds for lambs and kids.

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4.1.5 Non – protein nitrogen (NPN) sources may be used in compounded feed for both yearlings and matured sheep and goat and shall not exceed 1. 5% if used.

### 4.2 Ingredients for goat and sheep feed

4.2.1 All ingredients and raw materials shall be of high quality and shall be of sound condition and not decomposed or deteriorated.

4.2.2 Ingredients of non-ruminant animal origin shall be sterilized before use.

4.2.3 Where standards have been declared for ingredients or raw materials, such ingredients or raw materials shall conform to such standards.

4.2.4 Vitamin preparations added to feed shall be in a stabilized form.

### 4.3 Nutrient requirements for compounded goat and sheep feeds

4.3.1 The level of free fatty acids in feeds shall not exceed 15 % of the crude fat content at the time of manufacture.

4.3.2 Corticated cottonseed shall not be used for feed for young lambs and kids.

4.3.3 The moisture content shall not exceed 14% in goat and sheep feed when tested in accordance with ISO 6496. In the case of use of total mixed ration (TMR) the level of moisture shall be increased up to 50%.

4.3.4 Compounded goat and sheep feeds shall comply with the nutrients and metabolizable energy requirements stated in Table 1 when tested in accordance with the test methods specified therein.

**Table 1 - Nutrient requirements for compounded goat and sheep feeds**

	<b>TDN %</b>	<b>ME Kcal/ kg DM</b>	<b>CP %</b>	<b>Ca g/kg DM</b>	<b>P g/kg DM</b>
Creep feeding formula	80	2800	16 - 25	4 - 8	2,5 - 4
Early Weaned Lambs and kids					
Maintenance	55 - 56	2000	7,5 - 9,5	2	1,8
Flushing ration	60	2110	9,5	3,5	2
Non-lactating first 15 weeks of gestation	55	2000	9,5	2,5	2
Last 4 weeks of gestation	60	2100	11	3,7	3
Lactating animal	65	2350	16	4,3	3
Replacement ewe	58 - 65	2100 - 2300	9 -15	3 - 5,5	1,8 - 2,1
Replacement rams	61- 63	2300	9 -14	3 - 4,5	1,6 - 2
Lambs Finishing — 4 to 7 Months Old	72 - 77	2600 - 2750	15	3,5 - 5	1,8 - 2,5

NOTE: TDN – Total Digestible Nutrients, ME – Metabolizable Energy, CP – Crude Protein, Ca – Calcium, P – Phosphorus, DM – Dry matter

## 5 Contaminants

### 5.1 Aflatoxins

Compounded goat and sheep feeds shall comply with those maximum limits for aflatoxin specified in CODEX STAN 193 and in particular those listed in Table 2.

**Table 2 - Aflatoxin limits for compounded goat and sheep feed**

S/N	Aflatoxin	Maximum limits ppb	Test method
(1)	Total aflatoxin	20	ISO 16050
(2)	Aflatoxin B1	10	ISO 17034

## 5.2 Heavy metals

Compounded goat and sheep feed shall comply with the maximum limits of heavy metals as specified in the Table 3.

**Table 3 - Heavy metal limits for compounded goat and sheep feed**

S/N	Heavy metals	Maximum limits mg/kg	Test method
i	Arsenic	4,0	ISO 27085
ii	Lead	3,0	
iii	Cadmium	1,0	
iv	Mercury	0,1	

## 5.3 Pesticide residues

Compounded goat and sheep feeds shall not exceed the limits of pesticide residues established in the Codex Alimentarius Commission on Contaminants

## 6 Feed additives and provisions related to their uses.

**6.1** Additives in the following categories may be used in goat and sheep feeds: antioxidants, colourants, emulsifiers, stabilizers, enzymes, thickeners and gelling agents, binders, anti-caking agents and coagulants, growth promoters, aromatic and appetising substances, and preservatives.

**NOTE** Material intended for mixing with animal feed as additives for use as feeding stuff should specify the kind of and, if appropriate the age group of the animal for which the feed is intended. In addition, the quantity in grams per kilogram (or % by weight) of the complete feed.

## 7 Hygiene, Storage, Receiving and transportation

**7.1** Compounded goat and sheep feeds shall be produced, transported, received and stored in accordance with the procedure described in the appropriate sections of ARS XXXX 2023 – Code of practice for production, processing, storage, transportation and distribution of animal feeds.

**7.2** The product shall be processed and packed under hygienic conditions in licensed premises as imposed by the competent authorities in accordance with the local government by laws, public health legislation and codes of practice.

## 8 Packaging and Labelling

### 8.1 Packaging



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Compounded goat and sheep feeds for sale shall be packaged in containers that are of sufficient strength, and sufficiently sealed so as to withstand reasonable handling without tearing, bursting or falling open. The containers shall be clean and not previously used.

### 8.2 Labelling

In addition to the labelling requirement in ARS 56, each package of compounded goat and sheep feed shall be legibly and indelibly marked with the following information.

- i. Name and type of the feed
- ii. Name, physical address or contact information of manufacturer / producer;
- iii. Declared proportions of moisture, crude protein, crude fibre, crude fat, phosphorus, calcium, total ash, Total digestible nutrients (TDN) and Metabolizable energy (ME)
- iv. Net weight in SI units
- v. Batch / lot or Code identification;
- vi. Directions and precautions for use, if a concentrate is added, the proportion in which it is to be mixed with the basal ingredient;
- vii. Urea per cent, if present;
- viii. Date of manufacture;
- ix. Best before date
- x. Instruction for storage

## 9 Sampling

Sampling shall be done in accordance with ISO 6497.

**Annex A**  
**(informative)**

**Nutrient composition of common feed ingredients**

Studies on nutritive value of feedstuffs show differences between analytical values and those which are already tabulated in various feeding standards. Chemical composition of feedstuffs play an important role in formulation of balanced and economical rations for various classes of animals. It is only possible when exact knowledge of chemical composition of feedstuffs are available. This table presents values of some chemical composition of common feedstuffs.

Ingredients	DM %	CP %	CF %	Ca %	P %	ME Kcal/kg	Lysine %	Methionine %
Maize	88	8	12	0,17	0,55	3000	0,53	0,29
Maize bran	88	9,4	13	0,04	1,03	2200	0,18	0,21
Maize/cob meal	88	7	8		0,30			
Rice bran	88	13,5	6,5	0,06	1,43	3000	0,5	0,22
Cassava meal	88	2,8	4,0	0,3	0,05	3000	-	-
Molasses	75	3,0		0,75	0,08	2330	-	-
Millet	88	10,5	2,0	0,05	0,40	1392	0,2	0,27
Sorghum	88	9,0	2,1	0,03	0,28	3250	0,2	0,12
Fish meal	88	60,0	1,0	4,37	2,53	2310	4,08	1,70
Blood meal	92	72,9	1,7	0,28	0,22	1177	7,0	0,9
Cotton seed cake	88	40,0	14	0,20	1,20	968	1,6	0,52
Soya bean meal	88	43,0	6	0,53	0,64	2800	2,84	0,65
Limestone	98	-	-	38,0	-	-	-	-
Oyster shells	98	-	-	35,0	-	-	-	-
Wheat pollard	98	15,0					0,60	0,35
Wheat bran	91,4	15,0	12,5		1,20		0,60	0,35
Sunflower cake	92	35,0	26,7				1,80	1,20
Groundnut cake	93	40,0	7,3				2,00	1,80
Rice polishings	92,5	12,0	4,2				4,0	0,40
Bone meal	94	24	1,5					
Dicalcium phosphate				24	18			
Tricalcium phosphate				38	19			
Meat meal		60,0					0,50	1,0
Alfalfa hay	87,5	18,9	33,1					
Sugarcane bagasse	90,5	1,7	50,3					
Sesame cake	93	36,1	6,7					
Sugarcane tops	33,5	6,2	29,5					
Whey	90	13,0	1,3	0,97	0,76	3100		0,2

## Annex B (informative)

### Description of common feedstuffs

Product	Description	Main nutritional constituent
Alfalfa meal	Alfalfa as grown, dried and processed, and to which no other matter has been added	Crude protein, Crude fibre
Barley meal	The meal obtained by grinding barley, as grown, which shall be the whole grain together only with such other substances as may reasonably be expected to have become associated with the grain in the field.	Crude protein, Crude fibre
Bean meal	The meal obtained by grinding commercially pure leguminous beans (other than soya bean).	Crude protein, Crude fibre
Bone meal	Commercially pure steamed bone, raw or degreased, which has been ground or crushed and which contains phosphorus not less than 4.5% phosphorus.	Crude protein, Phosphorus, Calcium
Brewery and distillery grains	The product obtained by drying the residue from distillery mash-tube, and to which no other matter has been added	Crude fibre, Crude protein
Cassava, dried	The dried root of the species <i>Manihot esculanta</i>	Crude fibre, Crude protein
Clover meal	Clover as grown, dried and processed and to which no other matter has been added.	Crude protein, Crude fibre
Coconut cake	The residue resulting after part removal of oil and of cortex from commercially pure coconut kernels	Crude protein Crude fibre
Cotton seed cake	The residue resulting after part removal of oil and of cortex from commercially pure cotton seed	Crude protein, Crude fibre
Sorghum meal	The meal obtained by grinding sorghum as grown which shall be the whole grain together only with such substances as may reasonably be expected to have become associated with the grain in the field.	Crude protein, Crude fibre
Fish meal	A product, which may contain an added antioxidant but to which no other matter has been added, obtained by drying and grinding or otherwise treating fish or fish waste.	Crude protein, Oil, total ash.
Grass, meal	Any product which, (i) Is obtained by artificially drying any of the following: grass, clover, lucerne, green cereal, or any mixture consisting of any of them, and (ii) Is otherwise as grown (that is to say including any growths harvested there with but with no other substance added thereto), and contains not less than 13% crude protein calculated on the assumption that it contain 10% moisture.	Crude protein, Crude fibre
Groundnut cake	The residue resulting after part removal of oil and part of non-removal of cortex from commercially pure groundnuts	Crude protein, Oil, crude fibre
Maize	Maize kernel or crushed maize kernel as grown for commercial purposes	Crude protein
Maize germ meal	Consisting mainly of embryo of kernel not less than 10% oil, and not more than 5% ash	
Maize and cob meal	Ground maize on the cob	Crude protein, Oil, crude fibre
Maize meal	Milled whole maize	Crude protein, Oil, crude fibre
Maize gluten meal	A by-product resulting from removal of a bran starch and germ from maize	Crude protein, Oil, crude fibre
Meat and bone meal	A product, which may contain an added antioxidant but to which no other matter has been added, containing not less than 65% protein, obtained by drying and grinding animal carcasses of portions thereof but excluding hair,	Crude protein, Oil, crude fibre

	have been preliminarily treated for the removal of fat	
Milk powder	Dried milk from which a substantial amount of fat has been removed and to which no other substance is added	Crude protein
Millet	Finger millet of the species <i>Eleusine coracana</i>	Crude protein, Crude fibre
Mineral mixture	Mixture of substances used wither in the form powder or licks and purporting to be essential for livestock	Percent of the mineral and trace elements
Molasses	A concentrated syrup product obtained in the manufacture of sugar from sugar cane to which no other matter has been added	Dry matter, sugar as sucrose
Oats, ground	The product obtained by grinding commercially pure oats	Crude protein, Crude fibre
Pea meal	The meal obtained by grinding or crushing commercially pure peas including pods	Crude protein, Crude fibre
Rice bran	The outside husk or rice kernel to which no other matter has been added	Crude protein, Crude fibre, oil
Rice meal	The product obtained by grinding commercially pure rice after the removal of hulls and to which no other substance is added	Crude fibre, Crude protein, oil
Rice polishings	The product obtained when polishing kernels after the removal of hulls and bran	Crude protein, oil, Crude fibre
Sesame cake	The residue resulting after the part removal of oil from commercially pure simsim kernels	Crude protein, oil, Crude fibre
Soya bean meal	The residue resulting after the part removal of oil from commercially pure soya bean seeds	Crude protein, oil, Crude fibre
Sweet potatoes	The dried tubers of the species <i>Ipomea batatas</i>	Crude protein, Crude fibre
Wheat meal	The meal obtained by grinding commercially pure wheat as grown and to which no other substance has been added	Crude protein, Crude fibre
Wheat bran	Outside husk of what kernel to which no other matter was added	Crude protein, Crude fibre
Wheat pollard	A by-product of wheat separated during production of flour not mentioned otherwise in this schedule containing not more than 4% of other than wheat vegetable substances	Crude protein, Crude fibre
Yeast dried	The product obtained by drying of yeast or yeast residues, and to which no other matter has been added.	Crude protein
Other feedstuffs	As may be described by the Department of Animal Resources from time to time	

**Annex C**  
**(informative)**

**Guide for vitamin requirements for compounded goat and sheep feed**

	<b>Vitamin A, 1000 IU/kg DM</b>	<b>Vitamin E, IU/kg DM</b>
Creep feeding formula	1-1,6	15
Early Weaned Lambs and kids		
Maintenance	1,5	15
Non-lactating first 15 weeks of gestation	2,6	15
Last 4 weeks of gestation	3,5	15
Lactating animal	3	15
Flushing ration	2,5	15
Replacement ewe	1,1-1,5	15
Replacement rams	1,1-1,5	15
Lambs Finishing — 4 to 7 Months Old	1,1-1,5	15

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**Annex D**  
**(informative)**

**Guide for concentrate / roughage ratio for goat and sheep rations**

	Concentrate / roughage percent, %	
	90	10
Creep feeding formula	90	10
Early Weaned Lambs and kids		
Maintenance	0	100
Non-lactating first 15 weeks of gestation	0	100
Last 4 weeks of gestation	35	65
Lactating animal	35	65
Flushing ration	15	85
Replacement ewe	35	65
Replacement rams	30	70
Lambs Finishing — 4 to 7 Months Old	60	40

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