



DRAFT EAST AFRICAN STANDARD

Cattle feeds — Specification

EAST AFRICAN COMMUNITY

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that “Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose”.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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Introduction

To achieve efficient animal production, all nutrients should be provided in amounts necessary to meet the animal's nutritional 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.

Feeds may be produced by mixing various feeding stuffs or ingredients which may themselves vary in composition. The choice of raw materials mixtures will depend on locality, season and availability, economics, prices, quality and safety of the product. The chemical composition of feedstuffs plays an important role in formulation of balanced and economical rations for various classes of animals. This is only possible when knowledge of the chemical composition of feedstuffs is available. Studies on the nutritive value of feedstuffs available in the East African region show differences between analytical values.

Cattle feeds — Specification

1 Scope

This Draft East African Standard specifies requirements and method of sampling and test for the cattle feeds which include feeds for calf, dairy beef and draught cattle

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 5983-1, *Animal feeding stuffs — Determination of nitrogen content and calculation of crude protein content — Part 1: Kjeldahl method*

ISO 5983-2, *Animal feeding stuffs — Determination of nitrogen content and calculation of crude protein content — Part 2: Block digestion/steam distillation method*

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 6495, *Animal feeding stuffs — Determination of water-soluble chlorides content*

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

ISO 6497, *Animal feeding stuffs — Sampling*

ISO 6498, *Animal feeding stuffs — Preparation of test samples*

ISO 6651, *Animal feeding stuffs — Semi-quantitative determination of aflatoxin B₁ — Thin-layer chromatographic method*

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 9831, *Animal feeding stuffs, animal products, and faeces or urine — Determination of gross calorific value — Bomb calorimeter method*

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

ISO 14718, *Animal feeding stuffs — Determination of aflatoxin B₁ content of mixed feeding stuffs — Method using high-performance liquid chromatography*

ISO 17375, *Animal feeding stuffs — Determination of aflatoxin B₁*

ISO 16050 *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 Terms and definitions

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

3.1

dairy cattle

cattle especially bred and kept for milk production

3.2

beef cattle

cattle bred and kept for meat production

3.3

draught cattle

cattle kept for work

3.4

calf starter feed

feed suitable for non-ruminating and not fully ruminating calves; it is designed to be complimentary to whole milk or whole milk substitute in conjunction with limited intakes of hay or grazing. It may be used as a weaning ration

3.5

calf feed

feed suitable for fully ruminating calves and young growing cattle, gradually replacing calf starter feed after recovery from the stress of weaning.

3.6

dairy feed

feed suitable for lactating dairy cows and designed to provide the nutritional requirements for milk production

3.17

beef feed

feed designed for beef animal for the purposes of fattening

4 Requirements

4.1 Ingredients for cattle feeds

4.1.1 All ingredients and raw materials shall be not decomposed or deteriorated and shall comply with the relevant East Africa standards.

Bone meal, blood meal and meat meal from ruminants shall not be used in cattle feed. Other animal origin ingredients shall be sterilised before use

4.1.2 Where soy bean meal is used, it shall have been subjected to adequate heat treatment to reduce the activity of trypsin inhibitor

4.1.3 Vitamin preparations added to feed shall be in stabilised form.

4.2 General quality requirements

4.2.1 Cattle feeds may be in form of a meal, cubes or pellets.

4.2.2 Cattle feeds shall be free from harmful levels of substances such as metallic objects, and adulterants

4.2.3 Cattle feed shall be free from fungi, pathogenic microorganisms or insect infestation.

4.2.4 Cattle feed shall not be musty, rancid and shall not have any objectionable odours.

4.3 Composition of cattle feed

4.3.1 General

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

4.3.1.2 Cattle feed shall meet the requirements of the nutrients and metabolizable energy given in Table 1. Tolerances for the variations that are acceptable in feed formulation are given in Annex A.

4.3.2 Specific requirements for cattle feed

Nutrient and quality requirements of cattle feed shall be as given in Table 1.

Table 1 —Nutritional requirements for cattle feed

Requirements	calf starter	Calf ²⁾	Weaners	Dairy ^{2) 3)}	Beef	Draught	Test method
Moisture content %, max	13	13	13	13	13	13	ISO 6496
Metabolizable energy MJ/Kg dm	12	12	11.5	11.5	10.5	10.5	ISO 9831
Crude protein, %, min	18	16	17	16	14	14	ISO 5983-1,
Crude fat, %, max	- 8-	- 8-	8	- 8-	- -8	8	ISO 6492
Crude fibre, %, max	5	5	12	10	10	10	ISO 6865
calcium, %	0.7- 1	0.9- 1	1- 1.2	1- 1.2	0.8 - 1	0.8 -1	ISO 6490-1
phosphorus, %	0.5- 0.7	0.60- 0.7	0.6- 0.7	0.6- 0.7	0.6- 0.7	0.6 -0.7	ISO 6491
sodium chloride, %	0.5- 1	0.5- 1	0.5- 1	0.5- 1	0.5- 1	0.5- 1	ISO 6495

Requirements	calf starter	Calf ²⁾	Weaners	Dairy ^{2) 3)}	Beef	Draught	Test method
Acid insoluble ash, %, max.	4	4	4	4	4	4	
<p>Note 1) The calcium/phosphorus ratio shall be maintained between 1.3 and 1.5.</p> <p>Note 2) Non-protein nitrogen shall not contribute more than the equivalent of 5 % of the total crude protein of high energy urea feed (ISO 6654)</p> <p>3. Cattle feeds shall contain not more than 0.02 % of gossypol (ISO 6866, ISO 6866)</p> <p>Note: If micro-minerals, vitamins or additives are added into the feed, requirements given in Annex E shall be complied with and labelled as such.</p>							

5 Feed additives and provisions related to their use

5.1 General requirements on additives

All the additives, preservatives etc. used in the feeds shall be only the ones recommended by the OIE.

Additives in the following categories may be used in cattle feeds:

- a) antioxidants;
- b) emulsifiers;
- c) stabilisers,
- d) thickeners and gelling agents;
- e) binders;
- f) enzymes
- g) anti-caking agents and coagulants; and
- h) aromatic and appetising substances;

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 percentage by weight) of the complete feed which conform to the provisions of this standard should be stated in the label (see also Clause 7).

No antibiotic, hormone substance, drug or mineral may be added to or included in a feed other than such ingredients required to satisfy this standard and approved by World organization for animal health (OIE)

Where a consignment or a batch of feed or concentrate is prepared specifically for a consumer or group of consumers, substances may be added upon the express written instructions of the consumers provided that

- a) such additions are made in accordance with the provisions of the Competent Authority, and
- b) the nature and quantities of such additions are clearly stated upon each and every container of the feed or concentrate.

Recommended additives are given in Annex F

When additives given in Annex F are used, they shall comply with limits given in the Annex.

6 Contaminants

6.1 Aflatoxins

Cattle feeds shall comply with the maximum aflatoxin limits stated in the table 6.

Table 6--Maximum tolerable limits for aflatoxin in cattle feeds

S/N	Aflatoxin	Maximum limit (µg/kg)	Test method
1	Total aflatoxin, mkg/	100 for calves 300 for other cattle	ISO 16050
II	Aflatoxin B1, mkg/	5 for dairy cattle 10 for calves 50 for others	ISO 6651, ISO 14718, ISO 17375

6.2 Pesticide residues

Cattle feeds shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for the ingredient used in cattle feed

6.3 Heavy metals

Cattle feeds shall be free from heavy metals in amounts which may represent a hazard to cattle

Cattle feeds shall comply with the maximum limits of heavy metals as specified in the table 7

S/N	Heavy metal	Maximum limit (mg/kg)	Test method
i	Arsenic	2.0	ISO 27085
ii	Lead	5.0	
iii	Cadmium	0.5	
iv	Mercury	0.1	

7 Weights and measures

The fill of cattle feeds shall comply with Weights and Measures regulations of Partner States or equivalent legislation.

8 Packaging

Cattle 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.

9 Labelling

Each package of cattle feed shall be legibly and indelibly labelled with the following:

- a) name of the feed example “calf starter”, “dairy meal”
- b) name and address or contact information of manufacturer
- c) declared proportions of crude protein, crude fibre, crude fat, phosphorus and calcium, net weight in kilograms
- d) directions and precautions for use lot identification;
- e) manufacturing date;
- f) Storage instruction and
- g) “Use before” or expiry date.

10 Sampling

Samples shall be drawn in accordance with ISO 6497 and the preparation of test samples shall be in accordance with ISO 6498

Annex A (normative)

Tolerance limits on analytical constituents in cattle feeds

Analytical constituents	Limits of variation (% by weight except where otherwise stated)
Ash	<p>If present in excess</p> <ul style="list-style-type: none"> • 2 % for declaration of 10 % or more • 20 % for the amount stated for declarations 5 % or more but less than 10 % • 1 % for declarations of less than 5 %. <p>If present is deficient</p> <ul style="list-style-type: none"> • 3 % for declaration of 10 % or more • 30 % for the amount stated for declarations 5 % or more but less than 10 % • 1.5 % for declarations of less than 5 %.
Calcium	<p>If present in excess</p> <ul style="list-style-type: none"> • 3.6 % for declaration of 16 % or more • 22.5 % for the amount stated for declarations 12 % or more but less than 16 % • 2.7 % for declarations of 6 % or more but less than 12 %. • 45 % for the amount stated for declarations 1 % or more but less than 6 % • 0.45 % for declarations of less than 1 %. <p>If present is deficiency</p> <ul style="list-style-type: none"> • 1.2 % for declaration of 16 % or more • 7.5 % for the amount stated for declarations 12 % or more but less than 16 % • 0.9 % for declarations of 6 % or more but less than 12 %. • 15 % for the amount stated for declarations 1 % or more but less than 6 % • 0.15 % for declarations less than 1 %.
Cystine	In case of deficiency 20 % of the amount stated
Fibre	<p>If present in excess:</p> <p>1.8 % for all declarations</p> <p>If deficient:</p> <p>45 % of the amount stated</p>
Lysine	<p>In case of deficiency 15 % of the amount stated</p> <p>If present in excess</p> <ul style="list-style-type: none"> • 4.5 % for declaration of 1 % or more • 30 % of the amount stated for declarations 7.5 % or more but less than 15 % • 2.25 % for declarations of 5 % or more but less than 7.5 %. • 45 % for the amount stated for declarations 0.75 % or more but less than 5 % • 0.3 % for declarations of less than 0.7 %.
Methionine	In case of deficiency 15 % of the amount stated

Analytical constituents	Limits of variation (% by weight except where otherwise stated)
	<p>If present in excess</p> <ul style="list-style-type: none"> • 1 % for declaration of 10 % or more • 10 % of the amount stated for declarations 5 % or more but less than 10 % • 0.5 % for declarations of less than 5 %.
Oil	<p>In case of deficiency</p> <ul style="list-style-type: none"> • 1.5 % for declarations of 15 % or more • 10 % of the amount for declarations of 8 % or more but less than 15 % <p>If present in excess</p> <ul style="list-style-type: none"> • 3 % for declaration of 15 % or more • 20 % of the amount stated for declarations 8% or more but less than 15 % • 0.8 % for declarations less than 8 %
Phosphorus	<p>If present in excess</p> <ul style="list-style-type: none"> • 3.6 % for declaration of 16 % or more • 2.25 % of the amount stated for declarations 12 % • 45 % of the amount stated for declarations 1 % or more but less than 6 % • 0.45 % for declarations of less than 1 %. <p>In case of deficiency</p> <ul style="list-style-type: none"> • 1.2 % for declaration of 16% or more • 7.5 % of the amount stated for declarations of 12 % or more but less than 16 % • 0.9 % of the amount stated for declarations of 6 % or more but less than 12 % • 15 % of the amount stated for declarations of 1 % or more but less than 6 % • 0.15 % for declarations 1 % less than 1 %
Sodium	<p>If present in excess</p> <ul style="list-style-type: none"> • 4.5 % for declaration of 15 % or more • 30 % of the amount stated for declarations 7.5 % or more but less than 15 % • 2.25 % of the amount stated for declarations 5 % or more but less than 7.5 % • 0.45 % for declarations of 0.7 % or more but less than 5 %. <p>In case of deficiency</p> <ul style="list-style-type: none"> • 1.5 % for declaration of 15% or more • 10 % of the amount stated for declarations of 7.5 % or more but less than 15 % • 0.75 % of the amount stated for declarations of 5 % or more but less than 7.5 % • 15 % of the amount stated for declarations of 0.7 % or more but less than 5 % • 0.1 % for declarations less than 0.7 %
Starch and total sugar	<p>If present in excess</p> <ul style="list-style-type: none"> • 5 % for declaration of 25 % or more • 20 % of the amount stated for declarations 10 % or more but less than 25 % • 2 % of the amount stated for declarations less than 10 %. <p>In case of deficiency</p> <ul style="list-style-type: none"> • 2.5 % for declaration of 25 % or more

Analytical constituents	Limits of variation (% by weight except where otherwise stated)
	<ul style="list-style-type: none"> 10 % of the amount stated for declarations of 10 % or more but less than 25 % 1 % for declarations less than 1 %
Total sugar expressed as sucrose	<p>If present in excess</p> <ul style="list-style-type: none"> 4 % for declaration of 20 % or more 20 % of the amount stated for declarations 10 % or more but less than 20 % 2 % of the amount stated for declarations less than 10 %. <p>In case of deficiency</p> <ul style="list-style-type: none"> 2 % for declaration of 20 % or more % of the amount stated for declarations of 10 % or more but less than 20 % 1 % for declarations less than 10 %
Ash insoluble in hydrochloric acid	<p>If present in excess</p> <ul style="list-style-type: none"> 10 % for declaration of more than 3 % 0.3 % of the amount stated for declarations of 3 % or less
Carotene	In case of deficiency, 30 % of the amount stated
Chlorides expressed as NaCl	<p>If present in excess</p> <ul style="list-style-type: none"> 10 % for declaration of more than 3 % 0.3 % of the amount stated for declarations of 3 % or less
Magnesium	<p>In case of deficiency</p> <ul style="list-style-type: none"> 1.5 % for declaration of 15 % or more 10 % of the amount stated for declarations of 2 % or more but less than 15 % 0.2 % for declarations less than 2 %
Minerals	
Cobalt	± 50 % of the amount stated for declarations above 200 mg/kg
Copper	± 30 of the amount stated for declarations above 200 mg/kg ± 50 of the amount stated for declarations up to an including 200 mg/kg
Iodine	± 50 % of the amount stated for declarations of 250 mg/kg or more
Iron	± 50 % of the amount stated for declarations less than 250 mg/kg
Manganese	± 50 % of the amount stated
Molybdenum	± 50 % of the amount stated
Selenium	± 50 % of the amount stated
Zinc	± 50 % of the amount stated
Vitamins	
Vitamin D2 and D3	± 30 of the amount stated for declarations above 4000 IU/kg ± 50 of the amount stated for declarations up to an including 4000 IU/kg
Vitamins other than D2 and D3	In case of deficiency ± 30 % of the amount stated

Annex C (informative)

Description of common feedstuffs

Product	Description	Main nutritional constituent
1. Alfalfa meal	Alfalfa as grown, dried and processed, and to which no other matter has been added	Crude protein, Crude fibre
2. 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
3. Bean meal	The meal obtained by grinding commercially pure leguminous beans (other than soya bean).	Crude protein, Crude fibre
4. Blood meal	The meal has been dried out to which no other matter has been added	Crude protein
5. 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
6. 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
7. Cassava, dried	The dried root of the species <i>Manihot esculanta</i>	starch
8. Clover meal	Clover as grown, dried and processed and to which no other matter has been added	Crude protein, Crude fibre
9. Coconut cake	The residue resulting after part removal of oil and of cortex from commercially pure coconut kernels	Crude protein Crude fibre
11. Cotton seed cake	The residue resulting after part removal of oil and of cortex from commercially pure cotton seed	Crude protein, Crude fibre
12. 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, starch
13. 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.
14. 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
15. 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
16. Maize	Maize kernel or crushed maize kernel as grown for commercial purposes	Crude protein, starch

17. Maize germ meal	Consisting mainly of embryo of kernel not less than 10 % oil, and not more than 5 % ash	Crude protein, starch
18. Maize and cob meal	Ground maize on the cob	Crude protein, Oil, crude fibre
19. Maize meal	Milled whole maize	Crude protein, Oil, starch
20. Maize gluten meal	A by-product resulting from removal of a bran starch and germ from maize	Crude protein, Oil,
21. 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, have been preliminarily treated for the removal of fat	Crude protein, Oil,
22. Milk powder	Dried milk from which a substantial amount of fat has been removed and to which no other substance is added	Crude protein
23. Millet	Finger millet of the species <i>Eleusine coracana</i>	Crude protein, Crude fibre, starch
24. Mineral mixture	Mixture of substances used whether in the form powder or licks and purporting to be essential for livestock	Percent of the mineral and trace elements
25. 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
26. Oats, ground	The product obtained by grinding commercially pure oats	Crude protein, Crude fibre
27. Pea meal	The meal obtained by grinding or crushing commercially pure peas including pods	Crude protein, Crude fibre
28. Rice bran	The outside husk or rice kernel to which no other matter has been added	Crude protein, Crude fibre, oil, starch
29. 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, starch
30. Rice polishings	The product obtained when polishing kernels after the removal of hulls and bran	Crude protein, oil, Crude fibre, starch
31. Sesame cake	The residue resulting after the part removal of oil from commercially pure simsim kernels	Crude protein, oil, Crude fibre
32. Soya bean meal	The residue resulting after the part removal of oil from commercially pure soya bean seeds	Crude protein, oil, Crude fibre
33. Sweet potatoes	The dried tubers of the species <i>Ipomea batatas</i>	Crude protein, Crude fibre, starch
34. 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, starch
35. wheat bran	Outside husk of what kernel to which no other matter was added	Crude protein, Crude fibre, starch
36. 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, starch
37. Yeast dried	The product obtained by drying of yeast or yeast residues, and to which no other matter has been added.	Crude protein
38. Other feedstuffs	As may be described by the Department of Animal Resources from time to time	

Annex E (informative)

Micro-minerals and vitamins requirements for cattle feeds

The table below indicates Micro-minerals and vitamins requirements for cattle feeds

Table 1 — Nutrient requirements of cattle

Nutrient	Dry calf starter feed		Calf feed ²⁾		Dairy feed ²⁾ ³⁾		Beef feed	
	Min	Max	Min	Max	Min	Max	Min	Max
Magnesium, mg/kg	700		700		700		700	
Iron, mg/kg	100	200	100	200	100	200	100	
Manganese, mg/kg	20	100	20	100	20	100	20	100
Copper, mg/kg	10	20	10	20	10	20	10	20
Cobalt, mg/kg	0.1	1	0.10	1	0.1	1	0.1	1
Iodine, mg/kg	0.1		0.1		0.1		0.1	
Selenium, mg/kg	0.1	0.5	0.1	0.5	0.1	0.5	0.1	0.5
Fluorine, mg/kg		20	30	30		30		50
Vitamin A, IU/kg	6000		10000		10000		6000	
Thiamine, mg/kg	4							
Riboflavin, mg/kg	7							
Niacin, mg/kg	25							
Pantothenic acid, mg/kg	12							
Pyridoxine, mg/kg	5							
Biotin, mg/kg	0.1							
Choline, mg/kg	400							
Vitamin B ₁₂ , mg/kg	0.02							
Vitamin D ₃ , mg/kg	600		1000		1000		600	
Vitamin E, mg/kg	3		3		3			

Nutrient	Dry calf starter feed		Calf feed ²⁾		Dairy feed ²⁾ ³⁾		Beef feed	
	Min	Max	Min	Max	Min	Max	Min	Max
Vitamin C, mg/kg	350							
Antioxidant (BHT) ¹⁾ , mg/kg	125	150	125	150	125	150	125	150

Annex F (informative)

Requirements for additives used in Cattle feeds

F.1 Requirements for antioxidants in cattle feed

Cattle feed shall contain no added antioxidant other than an antioxidant of a name or description specified in the first column of the table below, where an antioxidant if added should not exceed the maximum content, if any, specified in the second column of the Table 2.

Table 2 — Requirements for antioxidants in cattle feeds

Name of additive	Maximum content in complete feedstuff, mg/kg
L-Ascorbic acid Sodium L-ascorbate Calcium di (L-ascorbate) 5,6-Diacetyl-L-ascorbic acid 6-Palmitoyl-L-ascorbic acid Tocopherol-rich extracts of a natural origin Synthetic alpha-tocopherol Synthetic gamma-tocopherol Synthetic delta-tocopherol	GMP
Propyl gallate Octyl gallate Dodecyl gallate	100, singly or in combination
Butylated hydroxyanisole (BHA)	150

F.2 Requirements for emulsifiers, stabilisers, thickeners and gelling agents

F.2.1 General

Cattle feed shall contain no added emulsifier, stabiliser, thickener or gelling agent other than an emulsifier, stabiliser, thickener or gelling agent of a name or description, specified hereunder.

F.2.2 Name or description

Lecithins; Alginic acid; Sodium alginate; Potassium alginate; Ammonium alginate Calcium alginate; Propylene glycol alginate (propane- 1,1-diol alginate) Agar; Carrageenan; Furcellaran; Locust bean gum (carob gum); Tamarind seed flour Gurar gum (gua flour); Tragacanth; Acacia (gum Arabic); Zanthan gum; D-glucitol (sorbitol); mannitol; Glycerol; Pectins; microcrystalline cellulose; Methylcellulose; Ethylcellulose; Hydroxypropyl cellulose;Hydroxypropylmethylcellulose;

Ethylmethlcellulose; Carboxymethylcellulose;sodium salt; Sodium, potassium and calcium salts or edible fatty acids alone or in mixtures, derived from edible fat or distilled fatty acids Monoacyl and diacylglycerols esterified with the following acids: (a) acetic (b) lactic (c) citric (d) tartaric (e) monoacetylartaric and (f) diacetylartaric.

F.2.3 Sucrose esters or fatty acids

The following sucrose esters fatty acids may be added to cattle feeds:

- a) mixture of sucrose esters of monocyl and diacylglycerols (sucroglycerides, polyglycerides);
- b) polyglycarol esters of nonpolymerised edible fatty acids;
- c) propylene glycol esters of fatty acids (propane -1,2- diol esters of fatty acids);
- d) stearoyl-2-lactylic acid; Sodium stearoyl-1,2-lactylate; calcium stearoyl-1,2-lactylate;
- e) stearoyl-1-tartrate; glycerol poly (ethylene glycol) ricinolcate; dextrans; sorbitan monostearate;
- f) sorbitan tristearate; sorbitan monolaurate; sorbitan mono-eleate; sorbitan monopalmitate;
- g) partial polyglycerol esters of polycondensed fatty acids of castor oil (polyglycerol polyricinoleate) polyoxyethylene (20) sorbitan monolaurate;
- h) polyoxyethylene (20) sorbitan monopalmitate, polyoxyethylene (20) sorbitan monostearate;
- i) polyoxyethylene (20) sorbitan tristearate;
- j) polyoxyethylene (20) sorbitan monocleate;
- k) polyoxyethylene (20) sorbitan tricleate;;
- l) polyoxyethylene (8) sorbitan stearate; and
- m) polyoxyethylene (40) stearate

The emulsifiers, stabilisers, thickeners and gelling agents listed in Table 4 shall conform to the requirements in Table 4.

Table 4 — Requirements for emulsifiers, stabilisers, thickeners and gelling agents in cattle feeds

Name or description	Kind of Animal	Maximum content in complete feed, mg/kg
Pontst sodium triphoshate	Calves	5 000
Polyethlene glycol esters of fatty acids from soya oils	Calves	6 000 in milk replacer* feeds only
Polyoxyethylated glyceride of tallo fatty acids	Calves	5 000 in milk replacer ¹ feeds only
Ester of polyglycerol and of alcohols obtained by the reduction of oleic and palmitic acids	Calves	5 000 in milk replacer
Poly (ethylene glycol) 6 000 Polyoxypropylene- Polyoxyethelene	All animals	300

Polymers (M.W 6 800-9 000)	All animals	50
Propane -1,2-diol	Dairy cows,	12 000
	Cattle for fattening, calves	36 000
* "Milk replacer feed" means a manufactured feed used as a substitute for natural milk.		

F.3 Requirements for binders, anti-caking agents and coagulants

F.3.1 General

Cattle feed shall contain no added binder, anti-caking agent or coagulant other than a binder, anti-caking agent or coagulant of a name or description specified in 5.5.2.

F.3.2 Name or description

Lignosulphonates; Colloidal silica; Silicic acid, precipitate and dried; Sodium aluminosilicate, Sodium, potassium and calcium stearate; Kaolin and Kaslinitic clays free of asbestos- natural accruing mixtures of minerals containing at least 65 % complex hydrated aluminium silicates whose main constituent in Kasolinite; Bentonite and other montmerillonitee clays; Vermiculite-hydrated silicate of magnesium, aluminium and iron; Citric acid; Kieselguhr (diatomaceous earth, purified); Calcium silicate (synthetic); Natural mixtures of steatite and chlorite free of asbestos.

F.4 Requirements for aromatic and appetising substances

Cattle feed shall contain no added aromatic or appetising substance other than an aromatic or appetising substance of a name or description specified in Table 5 and taking account of any such substance which is naturally present, without exceeding the maximum content specified.

Table 5: — Requirements for aromatic and appetising substances

Name or description	Maximum content in complete feed, mg/kg
Saccharin All natural products and corresponding synthetic products	GMP

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