AFRICAN STANDARD

DARS 1836

First Edition 2024

Poultry feeds — Specification

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TABLE OF CONTENTS

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

This standard is designed to:

a) ensure that poultry, used either as poultry meat or for the production of eggs used for human food, are fed rations, which are appropriate for the category of bird; and
b) help ensure the safety of food for human consumption through adherence to good poultry feeding practice at farm level and good manufacturing practices during procurement, handling, storage, processing and distribution of poultry feeds and feed ingredients.

Poultry feeds — Specification

1 Scope

This Draft African Standard specifies the requirements, sampling and test methods for feed used for feeding poultry.

This standard applies to feed for feeding the following classes of poultry:

a) chicken:
b) turkey:
c) goose;
d) duck;
e) ostrich;
f) guinea fowl; and
g) quail.

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.

DARS 2139, Code of practice on good animal feeding

DARS 1828, Animal feeds — Code of practice for production, processing, storage, transport, and distribution

AOAC Official Method 977.26, Clostridium botulinum and its toxins in foods — Microbiological method

AOAC Official Method 994.12, Amino acids in feeds — Performic acid oxidation with acid hydrolysis — Sodium metabisulfite method

AOAC Official Method 996.06, Fat (total, saturated, and unsaturated) in foods — Hydrolytic extraction gas chromatographic method

AOAC Official Method 999.13, Lysine, methionine, and threonine in feed grade amino acids and premixes

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

ISO 5510, Animal feeding stuffs — Determination of available lysine

ISO 5984, 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 6869, Animal feeding stuffs — Determination of the contents of calcium, copper, iron, magnesium, manganese, potassium, sodium and zinc — Method using atomic absorption spectrometry

ISO 7937, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of Clostridium perfringens — Colony-count technique

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

ISO 13903, Animal feeding stuffs — Determination of amino acids content

ISO 13904, Animal feeding stuffs — Determination of tryptophan content
ISO 14718, Animal feeding stuffs — Determination of aflatoxin B_1 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

ISO 17375, Animal feeding stuffs — Determination of aflatoxin B_1

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

ISO/TS 17764-2, Animal feeding stuffs — Determination of the content of fatty acids — Part 2: Gas chromatographic method

ISO 15213-2, Microbiology of the food chain — Horizontal method for the detection and enumeration of Clostridium spp. Part 2: Enumeration of Clostridium perfringens by colony-count technique

AOAC 2001.04-2001, Fumonisins B1 and B2 in corn and corn flakes.

3 Terms and definitions

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

3.1
chick feed
feed suitable for providing all nutritional requirements for chicks and which are intended for meat production, from day old until eight weeks of age

3.2
duck/goose starter feed
feed suitable for providing all nutritional requirements for ducklings and goosling and which are intended for meat production, from day old until 8 weeks of age

3.3
turkey pre-starter feed
animal feed fed to turkey poults, 0 to 4 weeks of age

3.4
turkey starter feed
feed suitable for providing all nutritional requirements for turkey poults from 4 to 8 weeks of age

3.5
turkey grower feed
means animal feed fed to growing turkeys, 8 to 20 weeks of age

3.6
turkey breeding feeds
animal feed fed to turkeys over 20 weeks of age

3.7
poultry grower feed
feed suitable for providing all nutritional requirements for growing poultry other than meat type birds after brooding till point of laying eggs

3.8
layers feed
feed suitable for providing all nutritional requirements under normal conditions for egg production from 2 weeks before point of lay and throughout the laying period

3.9
layer feed for phase I
ration to be fed to laying birds from 21 to 45 weeks

3.10
layer feed for phase II
ration to be fed to laying birds from 46 to 72 weeks. Phase I and II feed in layer cycle is necessary because there are changes in production, egg size, requirement of calcium, efficiency of digestion, age, etc.

3.11
broiler breeder chick feed
ration to be fed to chicks, intended for broiler breeding, as recommended by the breeder farm

3.12
broiler breeder grower feed
ration to be fed to chickens, intended for broiler breeding, as recommended by the breeder farm

3.13
breeder layer feed for broiler
ration to be fed to laying birds, intended for broiler breeding, as recommended by the breeder farm

3.14
breeder broiler feed for male
feed intended for layer breeding, from 5 to 22 weeks

3.15
breeder layer feed
ration to be fed to male birds, intended for broiler breeding, as recommended by the breeder farm

3.16
chick feed for layer breeder
ration to be fed to chicks, intended for layer breeding, from 0 to 4 weeks

3.17
grower feed for layer breeder
ration to be fed to laying birds, intended for layer breeding, from week 23 onwards

3.18
breeder layer feed for male
ration to be fed to male birds, intended for layer breeding, from week 23 onwards

3.19
poultry concentrate
compounded mixture of protein, minerals and vitamins, which when mixed with an energy source and one or 2 other materials of normal composition in the proportions stated by the manufacturer produces a resultant feed equal in all respects to the feed of relevant designation in poultry feeding

3.20
ducklings
young ducks up to 6 – 8 weeks of age

3.21
poults
young turkeys up to approximately 6 weeks of age

3.22
chicks
young laying or breeding chickens up to 6 – 8 weeks of age

3.23
growers
laying or breeding chickens from 6 weeks of age up to the point of laying

3.24
layers
poultry producing eggs for consumption

3.25
breeders
chickens producing fertile eggs

3.26
broilers
chickens specially bred for meat

3.27
broiler pre-starter feed
ration to be fed to chicks, intended for meat production and to be used from 1 to 7 days

3.28
broiler starter feed
feed suitable for providing all nutritional requirements for meat type chickens from one to four weeks of age

3.29
broiler finisher feed
feed suitable for providing all nutritional requirements for meat type chickens from four weeks of age until slaughter

3.30
crude fibre
residue obtained after acid and alkaline digestion of a poultry feed sample that contains cellulose, hemicellulose and lignin

3.31
crude fat
total fat content of poultry feed determined by a laboratory test

3.32
metabolizable energy
ME
amount of the useful energy in poultry feed that represents that portion of the feed gross energy not lost in feaces, urine and gaseous products of fermentation (calculated from chemical composition)

3.33
total ash
inorganic part of poultry consisting of mineral elements determined in a laboratory by incineration at a high temperature and weighing the residue

3.34
acid insoluble ash
part of the total ash remaining after treatment with hydrochloric acid

3.35
minerals
measure of the content of individual minerals in poultry feed

3.36
moisture content
mass fraction of substances lost on drying the sample by using the accredited procedure

3.37
feed ingredient
component part or constituent of any combination or mixture making up a feed, whether or not it has a nutritional value in the animal's diet, including feed additives. Ingredients are of plant, animal , aquatic origin, other organic and inorganic substances

3.38
undesirable substances
substances or product, with the exception of pathogenic agents, that is present in and /or on the product intended for poultry and causes a potential danger to poultry or human health or to the environment or could adversely affect poultry production.

4 Requirements

4.1 General requirements

4.1.1 Poultry feed shall be in the form of pellets, crumbs or meal/mash.

4.1.2 Poultry feed shall be free from:

a) metallic and glass objects;
b) adulterants;
c) physical moulds;
d) pathogens or insect infestation;
e) mustiness;
f) rancidity; and
g) any objectionable odours.

4.2 Feed ingredients

4.2.1 All feed ingredients shall be of high quality and not deteriorated. Ingredients listed in Annex B and common feedstuffs described in Annex C may be used in the manufacture of compounded poultry feeds.

4.2.2 Ground raw soybean seed or soybean meal which has not been subjected to adequate heat treatment, shall not be used in compounded poultry feed.

4.2.3 Urea or any other non-protein nitrogen (NPN) shall not be added to or included in any poultry feed.

4.3 Specific requirements

4.3.1 The level of free fatty acids in feed shall not exceed 15 % of the crude fat content at the time of manufacture when tested in accordance with the requirements of ISO/TS 17764-2.

4.3.2 Decorticated, delinted and solvent extracted cotton seed cake may be used in compounded poultry feed and the feed shall not contain more than 0.02 % gossypol, when tested in accordance with the requirements of ISO 6866.

4.4.3 The specific nutrient requirements for modern, developed poultry strains should be taken into consideration when formulating compounded poultry feed.

4.4 Nutrient requirements for broilers

4.4.1 Feed for broilers shall comply with the nutrient requirements specified in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Specific Nutrient requirements for broilers

S/N	Parameter	Broiler			Test method
		Starter	Grower	Finisher	
i.	Moisture max., %	13			ISO 6496
ii.	Metabolizable energy, (kcal/kg), min	2950			Annex A
iii.	Crude protein, min. %	23	20	18	ISO 16634-1
iv.	Crude fibre, max., %	3,5	5	5	ISO 6865
v.	Acid insoluble ash, max., %	2,5	2,5	2,5	ISO 5985
vi.	Crude fat, min, %	3,0	3,5	4	ISO 6492
vii.	Lysine, min, %	1,3	1,2	1	ISO 5510
viii.	Methionine % min.	0,5	0,5	0,45	ISO 13903
ix.	Methionine and cysteine % min.	0,95	0,9	0,8	ISO 13903;
x.	Calcium % min.	1,0	0,9	0,8	ISO 27085
xi.	Available Phosphorus % min.	0,48	0,45	0,40	ISO 6491
xii.	Sodium chloride % max.	0,5			ISO 6495

4.5 Nutrient requirements for layer feeds

Feed for layers shall comply with the nutrient requirements specified in Table 2 when tested in accordance with the test methods specified therein.

Table 2 — Specific nutrient requirements for layer feeds

S/N	Parameter	Layer feeds					Test method
		Chick	Grower	Pre-lay	Layer	Breeder	
i.	Moisture % max.	13					ISO 6496
ii.	Metabolizable energy, kcal/kg, min.	3 200	3 200	2 850	3 000	3 000	Annex A
iii.	Crude protein, min., %	21	16	14	17	17	ISO 16634-1
iv.	Crude fibre, max., %	7	9	9	10	10	ISO 6865
v.	Acid insoluble ash, max., %	4	4	4	4,5	4,5	ISO 5985
vi.	Crude fat, max., %.	0					ISO 6492
vii.	Lysine, min., %.	1.0	0.75	0.64	0.75	0.75	ISO 5510
viii.	Methionine, min., %	0.5	0.45	0.44	0.37	0.37	ISO 13903

ix.	Methionine and cysteine, min., %	0.85	0.75	0.65	0.65	0.65	ISO 13903;
x.	Calcium, min., %	1.0	0.8	0.8	3.5	3.3	ISO 27085
xi.	Available phosphorus, min., %	0.48	0.42	0.42	0.42	0.4	ISO 6491
xii.	Sodium chloride, max., %	0.5	0.5	0.25	0.25	0.25	ISO 6495

4.6 Nutrient requirements for turkey

Feed for turkey shall comply with the nutrient requirements specified in Table 3 when tested in accordance with the test methods specified therein.

Table 3 — Specific Nutrient requirements for growing turkey (% or Unit/kg; moisture at 13% for all the phases)

S/N	Parameter	Pre-starter		Starter		Grower		Test method
		Starter	Growers 1	Grower 2	Developer 1	Developer 2	Finisher	
i.	Moisture max. %	13	13	13	13	13	13	ISO 6496
ii.	Metabolizable energy, min Kcal/kg	2 850	2 900	3 050	3 200	3 250	3 325	Annex A
iii.	Crude protein, min., %	28.0	26.0	23.0	21.0	18.0	16.0	ISO 16634-1
iv.	Crude fibre, max. %	5.0	7.5	7.5	7.5	7.5	7.5	ISO 6865
v.	Acid insoluble ash max. %,	4	4	4	4	4	4	ISO 5985
vi.	Crude fat, max. %	5	5	5	5	5	5	ISO 6492
vii.	Lysine min. %	1.70	1.60	1.45	1.30	1.12	1.00	ISO 5510
viii.	Methionine, min. %	0.62	0.56	0.52	0.48	0.42	0.35	AOAC 999.13; ISO 13903
ix.	Methionine and cysteine, min. %	1.05	0.93	0.84	0.75	0.68	0.58	ISO 13903; AOAC 994.12
x.	Calcium, min. %	1.40	1.25	1.15	1.05	0.95	0.85	ISO 27085
xi.	Available phosphorus, min. % (non phytate phosphorus)	0.75	0.70	0.65	0.60	0.55	0.48	ISO 6491
xii.	Sodium chloride, max. %	0.5	0.5	0.5	0.5	0.5	0.5	ISO 6495

4.7 Nutrient requirements for ducks

Feed for ducks shall comply with the nutrient requirements specified in Table 4 when tested in accordance with the test methods specified therein.

Table 4 — Specific nutrient requirements for duck feed

S/N	Parameter	Duck feed				Test method
		Starter	Grower/Finisher	Holding	Breeder (Adult)	
i.	Moisture, max. %	13	13	13	13	ISO 6496
ii.	Metabolizable energy, min. Kcal/kg	2 950	3 100	2 750	2 850	Annex A
iii.	Crude protein, min., %	22	18	14	16	ISO 16634-1

iv.	Crude fibre, max., %	6.0	6.0	7.0	7.0	ISO 6865
v.	Acid insoluble ash %, max.	5	5	5	5	ISO 5985
vi.	Crude fat, max., %	5	5	5	5	ISO 6492
vii.	Lysine, min., %	1.15	0.90	0.70	0.80	ISO 5510
viii.	Methionine, min., %	0.48	0.38	0.30	0.40	ISO 13903
ix.	Methionine and cysteine, min., %	0.85	0.66	0.58	0.68	ISO 13903 AOAC 994.12
x.	Calcium, min, %	0.85	0.75	0.75	3.00	ISO 27085
xi.	Available phosphorus, min. %	0.40	0.38	0.35	0.38	ISO 6491
xii.	Sodium chloride, max., %	0.5	0.5	0.5	0.5	ISO 6495

4.8 Nutrient requirements for ostrich

Feed for ostrich shall comply with the nutrient requirements specified in Table 5 when tested in accordance with the test methods specified therein.

Table 5 — Nutrient requirements for ostrich feed

S/N	Parameters	Pre-starter	Starter	Grower	Finisher	Maintenance	Breeder	Method of test
i.	Moisture, max., %	13.0	13.0	13.0	13.0	13.0	13.0	ISO 6496
ii.	Metabolizable energy, min., Kcal/kg	2 988	2 749	2 510	2 200	1 816	1 099	Annex A
iii.	Crude protein, min., %	23.0	22.0	19.0	14.0	10.0	15.0	ISO 16634-1
iv.	Crude fibre, max., %	6.0	6.0	10.0	15.0	15.0	15.0	ISO 6865
v.	Acid insoluble ash, max., %	4	4	4	4	4	4	ISO 5985
vi.	Crude fat, max., %	5	5	5	5	5	5	ISO 6492
vii.	Lysine, min., %	1.60	1.50	1.30	1.00	0.50	0.60	ISO 5510
viii.	Methionine, min., %	0.36	0.36	0.40	0.35	0.20	0.30	AOAC 999.13; ISO 13903
ix.	Methionine and cysteine, min., %	0.70	0.70	0.70	0.65	0.40	0.62	ISO 13903; AOAC 994.12
x.	Calcium, min., %	1.40	1.00	1.2	1.2	0.80	2.4	ISO 27085
xi.	Available Phosphorus, min., %	0.70	0.60	0.55	0.55	0.50	0.45	ISO 6491
xii.	Sodium chloride, max., %	0.5	0.5	0.5	0.5	0.4	0.5	ISO 6495

4.9 Nutrient requirements for goose

Feed for goose shall comply with the nutrient requirements specified in Table 6 when tested in accordance with the test methods specified therein.

Table 6 — Specific nutrient requirements for goose

S/N	Item	Starter	Grower	Holding	Breeder	Test method
i.	Moisture, max., %	13	13	13	13	ISO 6496
ii.	Metabolizable energy, min Kcal/kg	2 850	2 950	2 600	2 750	Annex B
iii.	Crude protein, min., %	21.0	17.0	14.0	15.0	ISO 16634-1
iv.	Crude fibre, max., %	6.0	6.0	7.0	7	ISO 6865
v.	Acid insoluble ash, max. %,	5	5	5	5	ISO 5985
vi.	Crude fat, max., %,	5	5	5	5	ISO 6492
vii.	Lysine, min., %	1.05	0.90	0.60	0.66	ISO 5510
viii.	Methionine, min., %	0.48	0.40	0.25	0.38	AOAC 999.13 ISO 13903
ix.	Methionine and cysteine, min., %	0.85	0.66	0.48	0.64	ISO 13903 AOAC 994.12
x.	Calcium, min., %	0.85	0.75	0.75	2.80	ISO 27085
xi.	Available phosphorus, min., %	0.40	0.38	0.35	0.38	ISO 6491
xii.	Sodium chloride, max., %	0.5	0.5	0.5	0.5	ISO 6495

4.10 Nutrient requirement for Guinea fowl

Feed for guinea fowl shall comply with the nutrient requirements specified in Table 7 when tested in accordance with the test methods specified therein.

Table 7 — Specific nutrient requirements for Guinea fowl

S/N	Item	Starter	grower	breeder	Test method
i.	Moisture, max., %	13	13	13	ISO 6496
ii.	Metabolizable energy, min., Kcal/kg	2 900	2 950	2 900	Annex A
iii.	Crude protein, min., %	26	18	16	ISO 16634-1
iv.	Crude fibre, max., %	6	6	7	ISO 6865
v.	Acid insoluble ash, max., %	4	4	4	ISO 5985
vi.	Crude fat, max., %	3	3	3	ISO 6492
vii.	Lysine, min., %	1.3	0.9	0.85	ISO 5510
viii.	Methionine, min., %	0.55	0.48	0.41	AOAC 999.13 ISO 13903
ix.	Methionine and cysteine, min., %	0.92	0.82	0.75	ISO 13903 AOAC 994.12
x.	Calcium, min., %	1.2	0.95	3.0	ISO 27085
xi.	Available Phosphorus, min., %	0.5	0.42	0.4	ISO 6491
xii.	Sodium chloride, max., %	0.5	0.5	0.5	ISO 6495

4.11 Nutrient requirements for quail

Feed for quail shall comply with the nutrient requirements specified in Table 8 when tested in accordance with the test methods specified therein.

Table 8 — Specific nutrient requirements for quail

S/N	Items	Starter	Grower	breeder	Test method
i.	Moisture, max., %	13			ISO 6496
ii.	Metabolizable energy, min., Kcal/kg	2 900	2 900	2 950	Annex A
iii.	Crude protein, min., %	28	17	18	ISO 16634-1
iv.	Crude fibre, max., %	6	6	7	ISO 6865
v.	Acid insoluble ash, max. %	4	4	4	ISO 5985
vi.	Crude fat, max., %	3	3	3	ISO 6492
vii.	Lysine, min., %	1.3	1.1	3.1	ISO 5510
viii.	Methionine, min., %	0.6	0.51	0.52	AOAC 999.13; ISO 13903
ix.	Methionine and cysteine, min., %	1.1	0.8	0.82	ISO 13903; AOAC 994.12
x.	Calcium, min., %	1.3	1.1	3.1	ISO 27085
xi.	Available phosphorus, min., %	0.6	0.48	0.45	ISO 6491
xii.	Sodium chloride, max., %	0.5	0.5	0.5	ISO 6495

5 Feed additives and provisions related to their use

5.1 General requirements on additives

5.1.1 Additives in the following categories may be used in poultry feeds:

a) antioxidants;
b) colourants;
c) emulsifiers;
d) stabilisers;
e) thickeners and gelling agents;
f) binders;
g) anti-caking agents and coagulants;
h) aromatic and appetising substances; and
i) 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 percent by weight) of the complete feed which conforms to the provisions of this standard should be stated in the label.

5.1.2 No antibiotic substance, drug or mineral may be added to or included in a feed or concentrate other than such ingredients required to satisfy this standard.

5.1.3 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/or World Organization for Animal Health (WOAH); and
b) the nature and quantities of such additions are clearly stated upon each and every container of the feed or concentrate.

5.1.4 Recommended additives and their limits are given in Annex D.

6 Contaminants

6.1 Mycotoxin

Compounded poultry feeds shall comply with those maximum limits for mycotoxins as specified in Table 9 when tested in accordance with the methods specified therein.

Table 9 — Maximum limits of mycotoxins for poultry feed

S/N	mycotoxin	Maximum limit ug/kg	Test method
i.	Total Aflatoxin	20	ISO 16050
ii.	Aflatoxin B1	10	ISO 14718 ISO 17375
iii.	Ochratoxin A	5	ISO 15141
iv.	Fumonisin	5	AOAC 2001.04-2001

6.2 Pesticide residue

Compounded poultry feeds shall not exceed the limits of pesticide residues established in the Codex Alimentarius Commission on contaminants

6.3 Heavy metals

Compounded poultry feeds shall comply with the limits of heavy metals as specified in Table 10 when tested in accordance with the methods specified therein

Table 10 — Maximum metals limits for compounded poultry feeds

S/N	Heavy metal	limit mg/kg	Test method
i.	Arsenic	2.0	ISO 27085
ii.	Lead	5.0	
iii.	Cadmium	1.0	
iv.	Mercury	0.1	

6.4 Microbiological limits

Compounded poultry feeds shall comply with the microbiological limits specified in Table 11 when tested with the methods specified therein.

Table 11 — Limits for compounded poultry feed

S/N	Parameter	Limit	Test method
i.	*Salmonella spp.* in 25 g	absent	ISO 6579-1
ii.	*Eschericia coli* cfu/g	absent	ISO 16654
iii.	*Clostrodium*	absent	ISO 15213-2

7 Hygiene, storage and transportation

7.1 Compounded poultry feed shall be processed and handled in accordance with the requirements of FDARS 2139.

7.2 Compounded poultry feed shall be produced, transported, received and stored in accordance with the procedure described in the appropriate sections of FDARS 1828.

8 Packaging and labelling

8.1 Packaging

Poultry 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. The mouth of each bag shall be securely stitched

8.2 Labelling

Each package of compounded poultry feeds shall be legibly and indelibly marked with the following information:

a) name and type of the poultry feed;
b) name and address or contact information of manufacturer;
c) designation of the feed or concentrate;
d) nutrient composition;
e) weight in SI units;
f) batch or Code number;
g) directions and precautions for use, if a concentrate, the proportion which in it is to be mixed; with the basal ingredient;
h) list of feed ingredients;
i) date of manufacture;
j) best before date; and
k) directions for use.

9 Sampling

Sampling shall be done in accordance with the requirements of ISO 6497.

Annex A
(Normative)

Metabolizable energy for poultry

Metabolizable energy (ME), Kcal/Kg DM = 1.549 + 0.0102CP + 0.0275 EE + 0.0148NFE – 0.0034CF

Annex B
(informative)

Ingredients for chicken poultry feeds

B.1 In the compounding of chicken feeds a variety of ingredients is used. This Annex gives a list of such ingredients.

B.1.1 Grain and seeds

a) Pearl millet [*Pennisetum glaucum* (L.) R.Br.]
b) Barley grains *(Hordeum vulgare)*
c) Sorghum grains *(Sorghum vulgare)*
d) Oats *(Avena sativa)*
e) *Cassia tora*
f) Finger millet grains *(Eleusine coracana)*
g) Yellow maize *(Zea mays)*
h) Wheat grains *(Triticum sativum)*
i) Maize grains *(zea mays L.)*
j) Rice grains (*Oryza sativa)*

B.1.2 Grain by-products

a) maize coarse flour, maize bran, maize gluten and maize gluten feed;
b) rice bran or solvent extracted rice bran and polishings;
c) wheat bran; and
d) pollard.

B.1.3 Oil cakes and meals

a) Copra cake, coconut cake (expeller-pressed or solvent extracted)
b) Cottonseed oil cake (decorticated) (expeller-pressed or solvent extracted)
c) Groundnut oil cake (expeller-pressed or solvent extracted)
d) Cluster bean (Guar seeds) (*Cyamopsis tetragonoloba*)
e) Maize germ oil cake
f) Mustard and rapeseed cake
g) Sal seed meal, solvent extracted
h) Safflower (*Carthamus tinetorius)* cake (expeller-pressed or solvent extracted)
i) Sesamum *(Sesamun indicum orientale)* cake (expeller-pressed or solvent extracted)
j) Soyabean (solvent extracted)
k) Sunflower oilcake (decorticated or undecorticated)
l) Linseed oilcake or meal (*Linum usitatissium*)

B.1.4 Animal products

a) blood meal;
b) fish meal;
c) liver residue;
d) meat meal and meat scrap;
e) meat cum bone meal;
f) herring meal;
g) liver meal;
h) dried skimmed milk; and
i) whole milk powder.

B.1.5 Minerals, vitamins and supplements

a) bonemeal (steamed);
b) common salt;
c) dicalcium phosphate;
d) limestone;
e) oyster shells; and
f) vitamins (mineral-stabilized).

B.1.6 Waste materials and industrial by-products

a) brewers' grains;
b) dried yeast and yeast sludge;
c) mango seed kernel;
d) mahua flower residue;
e) cane molasses;
f) penicillin mycelium residue; and
g) dried silkworm pupae.

B.1.7 Root crops

a) Cassava meal *(Manihot utilissima)*
b) Sweet potatoes *(Ipomoea batatas)*
c) Irish potatoes *(Solanum tuberosum)*

B.1.8 Dried green fodder crops

a) Lucerne meal *(Medicago sativa L.)*
b) Clover meal *(Trifolium spp)*

B.1.9 Vitamins and minerals

a) dicalcium phosphate;
b) limestone;
c) salt (NaCl); and
d) vitamin and trace elements premixes.

B.1.10 Feed additives

Coccidiostat

Annex C
(informative)
Description of common feedstuffs

S/N	Product	Description	Main nutritional constituent
i.	Alfalfa meal	Alfalfa as grown, dried and processed, and to which no other matter has been added	Crude protein, Crude fibre
ii.	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
iii.	Bean meal	The meal obtained by grinding commercially pure leguminous beans (other than soya bean).	Crude protein, Crude fibre
iv.	Blood meal	The meal has been dried out to which no other matter has been added	Crude protein, Dry matter
v.	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
vi.	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
vii.	Cassava, dried	The dried root of the species *Manhot esculanta*	Crude fibre, Crude protein
viii.	Clover meal	Clover as grown, dried and processed and to which no other matter has been added	Crude protein, Crude fibre
ix.	Coconut cake	The residue resulting after part removal of oil and of cortex from commercially pure coconut kernels	Crude protein Crude fibre
x.	Cotton seed cake	The residue resulting after part removal of oil and of cortex from commercially pure cotton seed	Crude protein, Crude fibre
xi.	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
xii.	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.
xiii.	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
xiv.	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
xv.	Maize	Maize kernel or crushed maize kernel as grown for commercial purposes	Crude protein
xvi.	Maize germ meal	Consisting mainly of embryo of kernel not less than 10 % oil, and not more than 5 % ash	? Crude protein, starch
xvii.	Maize and cob meal	Ground maize on the cob	Crude protein, Oil, crude fibre
xviii.	Maize meal	Milled whole maize	Crude protein, Oil, crude fibre

S/N	Product	Description	Main nutritional constituent
xix.	Maize gluten meal	A by-product resulting from removal of a bran starch and germ from maize	Crude protein, Oil, crude fibre
xx.	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, crude fibre
xxi.	Milk powder	Dried milk from which a substantial amount of fat has been removed and to which no other substance is added	Crude protein
xxii.	Millet	Finger millet of the species *Eleusine coracana*	Crude protein, Crude fibre
xxiii.	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
xxiv.	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
xxv.	Oats, ground	The product obtained by grinding commercially pure oats	Crude protein, Crude fibre
xxvi.	Pea meal	The meal obtained by grinding or crushing commercially pure peas including pods	Crude protein, Crude fibre
xxvii.	Rice bran	The outside husk or rice kernel to which no other matter has been added	Crude protein, Crude fibre, oil
xxviii.	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
xxix.	Rice polishings	The product obtained when polishing kernels after the removal of hulls and bran	Crude protein, oil, Crude fibre
xxx.	Sesame cake	The residue resulting after the part removal of oil from commercially pure simsim kernels	Crude protein, oil, Crude fibre
xxxi.	Soya bean meal	The residue resulting after the part removal of oil from commercially pure soya bean seeds	Crude protein, oil, Crude fibre
xxxii.	Sweet potatoes	The dried tubers of the species *Ipomea batatas*	Crude protein, Crude fibre
xxxiii.	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
xxxiv.	Wheat bran	Outside husk of what kernel to which no other matter was added	Crude protein, Crude fibre
xxxv.	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
xxxvi.	Yeast dried	The product obtained by drying of yeast or yeast residues, and to which no other matter has been added.	Crude protein

Annex D
(informative)

Recommended additives for poultry feeds

D.1 Requirements for antioxidants

Poultry feeds shall contain no added antioxidant other than an antioxidant of a name or description specified in the first column of the table below or any other antioxidant as shall be approved by OIE, where an antioxidant if added should not exceed the maximum content, if any, specified in the second column of the Table C.1.

Table D.1 — Requirements for antioxidants

Name or description	**Maximum content in complete feed stuff** 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	According to the recommendation of GMPs
Propyl gallate Octyl gallate Dodecyl gallate	100, singly or in combination
Butylated hydroxyanisole (BHA)	150

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

D.2.1 General

Poultry 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.

D.2.2 Name or description

Lecithins; Alginic acid; Sodium alginate; Potassium alginate; Ammonium alginate Calcium alginate; Prophylene 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; Hydroxylpropyl cellulose; Hydorxyprophylmethylcellulose; 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) monoacetylatartaric and (f) diacetyltartaric.

D.2.3 Sucrose esters or fatty acids

The following sucrose esters fatty acids may be added to goats and sheep feeds:

a) mixture of sucrose esters of monocyl and diacylglycerols (sucroglycerides, polyglycerides);
b) polyglycerol esters of non-polymerised 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-lacylate; calcium stearoyl-1,2-lactylate;
e) stearoyl-1-tartrate; glycerol poly (ethylene glycol) ricinolcate; dextrans; sorbitan monostearate;
f) sorbitan tristearte; 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, polyoxyethylene (20) sorbitan monocleate;
j) polyoxyethylene (20) sorbitan tricleate, polyoxyethylene (8) sorbitan stearate; and
k) polyoxyethylene (40) stearate.

D.3 Requirements for emulsifiers, stabilisers, thickeners and gelling agents

D.3.1 General

Poultry 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.

D.3.2 Name or description

Lecithins; Alginic acid; Sodium alginate; Potassium alginate; Ammonium alginate; Calcium alginate; Prophylene 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; Hydroxylpropyl cellulose; Hydroxyprophylmethylcellulose; Ethylmethylcellulose; 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) monoacetylatartaric and (f) diacetyltartaric.

D.3.3 Sucrose esters or fatty acids

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

a) mixture of sucrose esters of monocyl and diacylglycerols (sucroglycerides, polyglycerides);
b) polyglycerol esters of non-polymerised 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-lacylate; calcium stearoyl-1,2-lactylate;
e) stearoyl-1-tartrate; glycerol poly (ethylene glycol) ricinolcate; dextrans; sorbitan monostearate;
f) sorbitan tristearte; 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, polyoxyethylene (20) sorbitan monocleate; and
j) polyoxyethylene (20) sorbitan tricleate, polyoxyethylene (8) sorbitan stearate.

Table D 2 — Requirements for emulsifiers, stabilisers, thickeners and gelling agents in goats and sheep feeds

Name or description	Maximum content in complete feed mg/kg
Poly (ethylene glycol) 6 000	300
Polyoxypropylene-Polyoxyethelene polymers (M.W 6 800-9 000)	50
Propane-1,2-diol	36 000

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

D.3.1 General

Poultry 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 D.3.2.

D.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.

D.4 Requirements for aromatic and appetising substances

Poultry feed shall contain no added aromatic or appetising substance other than an aromatic or appetising substance of a name or description specified in Table D3 and taking account of any such substance which is naturally present, without exceeding the maximum content specified.

Table D.3 — Requirements for aromatic and appetising substances

Name or description	**Maximum content in complete feed** mg/kg
Saccharin All natural products and corresponding synthetic products	According to the recommendation of GMPs

D.5 Permitted preservatives

Poultry feed shall contain no added preservatives other than a preservative of a name or description specified hereunder.

a) sorbic acid, sodium sorbate, potassium sorbate, calcium sorbate;
b) folic acid;
c) ammonium formate, sodium formate, calcium formate;
d) acetic acid, potassium acetate, sodium diacetate;
e) lactic acid, sodium lactate, potassium lactate, ammonium lactate, calcium lactate;
f) propionic acid, sodium propionate, potassium propionate;
g) L-Tartaric acid;
h) citric acid, sodium citrates, calcium citrates;
i) orthophosphoric acid;
j) fumaric acid;
k) DL-Malic acid; and
l) hydrochloric acid or sulphuric acid for use in silage only.

D.6 Undesirable substances

D.6.1 The presence in poultry feed and feed ingredients of undesirable substances such as industrial and environmental contaminants, pesticides, radionuclides, persistent organic pollutants, pathogenic agents and toxins such as mycotoxins shall be identified, controlled and minimized.

D.6.2 Animal products that could be a source of the Bovine Spongiform Encephalopathy (BSE) agent should not be used for feeding directly to, or for feed manufacturing for ruminants.

D.6.3 Control measures applied to reduce unacceptable level of undesirable substances shall be assessed in terms of their impact on food safety.

Bibliography

EAS 90: 2023, Compounded poultry feeds — Specification
Nigerian Industrial Standard (NIS) 259 – Standard for Poultry feeds

