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DRAFT ZIMBABWE STANDARD FOR
POULTRY FEEDS

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All comments should be sent to the Committee Secretary **Ms E Pindura** at the address shown below.

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AMENDMENTS

No.	MD No.	Date of Issue	Text affected

Zimbabwe Standards are revised, when necessary, by issuing either amendments or revised editions. Suggestions for improvements will be welcome at all times.

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Foreword

This Zimbabwe Standard ZWS 517:2024: Poultry feeds, is the fifth revision of ZWS 517. The standard was revised by technical committee AG 005: Animal Feeding Stuffs, which falls under the Food and Agriculture (FA) Standards Sector.

First published September, 1959 as CAS N3,
First revision 1972 as CAS N3,
Second revision 1996 as ZWS 517,
Third revision 2005 as ZWS 517,
Fourth revision 2022 as ZWS 517,
Fifth revision 2024 as ZWS 517.

The Standards Approval Committee approved the standard.

This standard makes reference to the following publications. For dated references, only the editions cited apply. For undated references, the latest edition of the referenced document including any amendments shall apply.

Caricom Regional Standard (CRS) 29: 2011: Specification for poultry feed and feed ingredients

Codex Code of Practice on Good Animal Feeding (CAC/RCP 54-2004)

Fertilizer, Farm Feed and Remedies Act (18:12) of 1996

Statutory Instrument 162 of 2014 (Farm Feeds)

WOAH, World Organization for Animal Health

ZWS 530 : Animal feeding stuffs - Sampling and preparation of test samples

Introduction

Animal feed is a critical component of the food chain that has a direct impact on animal health and welfare and also on food safety and public health. Stockfeeds are derived from the mixing of grains and other additives, and these are fed to animals to enable efficient production of milk, meat or eggs as well as feeding companion and recreational animals such as dogs, cats and equines for their welfare and maintenance.

The animal feed industry and its stakeholders have put a lot of emphasis on improving productivity of livestock. This will be achieved by formulation and production of stockfeeds which meet the nutritional requirements of the animals and at the same time not have negative effects on animal and human health.

The animal feed trade is governed by the Fertilizer Farm Feed and Remedies Act (18:12) of 1996 and the Statutory Instrument 162 of 2014 (Farm Feeds). The Act is administered by the Department of Research and Specialist Services under the Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement.

Good quality feed is essential for high standards of animal production, health and welfare. It also ensures production of wholesome and safe products for human consumption. The feed standards form useful guidelines for good manufacturing practices for feeding poultry under varied conditions. However, with the ever changing genetic make-up of poultry and market demand for poultry products, these standards also need to be reviewed from time to time.

ZIMBABWE STANDARD SPECIFICATION

FOR

POULTRY FEEDS

(Fifth Revision of ZWS 517)

1. **Scope**

- a) The objective of this standard is to ensure that poultry animals, 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) To help ensure the safety of food for human consumption through adherence to recommended poultry feeding practice at the farm level and good best practices during the procurement, handling, storage, processing and distribution of poultry feed and feed ingredients.

This standard is meant to control the production and trade of farm feeds in Zimbabwe.

1.1 This Zimbabwe Standard specifies requirements for the following types of poultry diets:

- a) **Commercial Broiler Diets**
 - i) Broiler Pre-starter
 - ii) Broiler Starter
 - iii) Broiler Grower
 - iv) Broiler Finisher
 - v) Broiler Post Finisher
- b) **Broiler Breeder Diets**
 - i) Breeder Pre-starter
 - ii) Breeder Starter
 - iii) Breeder Grower
 - iv) Breeder Pre-Lay
 - v) Breeder phase 1 Feed
 - vi) Breeder phase 2 Feed
- c) **Commercial Layer Diets**
 - i) Chick Pre-starter
 - ii) Chick Starter
 - iii) Pullet Developer/Grower

- iv) Pullet Pre-Lay
- v) Layers phase 1 Feed
- vi) Layers phase 2 Feed
- vii) Layers phase 3 Feed
- d) ***Layer Breeder Diets***
 - i) Breeder Pre-starter
 - ii) Breeder Starter
 - iii) Breeder Grower
 - iv) Breeder Pre-Lay
 - v) Breeder phase 1 Feed
 - vi) Breeder phase 2 Feed
- e) ***Free Range Diets***
 - i) Starter
 - ii) Grower/Finisher
 - iii) Pre-Lay
- f) ***Turkey Diets (Meat Type)***
 - i) Pre-starter
 - ii) Starter
 - iii) Grower
 - iv) Finisher
- g) ***Duck Diets (Meat Type)***
 - i) Pre-starter
 - ii) Starter
 - iii) Grower
 - iv) Finisher
- h) ***Quail Diets (Meat Type)***
 - i) Starter
 - ii) Finisher

1.2 Where this Zimbabwe Standard conflicts in any way with the relevant Government Acts and Regulations, the requirements of Government Acts and Regulations take precedence over those in this standard.

Note. The titles of the publications referred to in this standard are listed in the Foreword.

2. **Definitions**

For the purpose of this Zimbabwe Standard, the following definitions shall apply:

2.1 **Approved**

Approved by the purchaser but in relation to the use of the certification mark, approved by the Standards Association of Zimbabwe.

2.2 **Commercial Broiler Diet**

A diet intended for feeding as a mash, crumble or pellet to meat type chickens.

2.3 **Broiler Breeder Diet**

A diet intended for feeding as a mash, crumble or pellet to broiler breeder type chickens.

2.4 **Commercial Layer Diet**

A diet intended for feeding as a mash, crumble or pellet to layer type chickens.

2.5 **Layer Breeder Diet**

A diet intended for feeding as a mash, crumble or pellet to layer breeder type chickens.

2.6 **Free Range Diet**

A diet intended for feeding as a mash, crumble or pellet to multi-purpose free range chickens.

2.7 **Turkey (Meat Type) Diet**

A diet intended for feeding as a mash, crumble or pellet to meat type turkeys.

2.8 **Duck (Meat Type) Diet**

A diet intended for feeding as a mash, crumble or pellet to meat type ducks.

2.9 **Quail (Meat Type) Diet**

A diet intended for feeding as a mash, crumble or pellet to meat type quails.

2.10 **Semi-complete Feed**

A concentrate intended for mixing with stated feed raw material(s) in a defined mixing proportion to produce a complete mash, as defined in Clause 2.10.

2.10 **Mash**

A feed in the form of a meal.

2.11 **Adulterant**

This is a substance added to the product that lessens the purity/ effectiveness of the product, usually added to increase quantity and reduce manufacturing costs.

2.12 **Contamination**

Means the unwanted presence of a material, infectious agent or product in a feed or feed ingredient that is potentially harmful to animal or public health or restricted under current regulations.

2.13 **Feed**

Any material (single or multiple), whether processed, semi-processed or raw, which is intended to be fed directly to terrestrial animals (except bees). The control of hazards of animal health and public health importance in animal feed.

2.14 **Feed Additive**

Any intentionally added ingredient not normally consumed as feed by itself, whether or not it has nutritional value or other effect on the animal, which affects the characteristics of feed or of the animal products. Microorganisms, enzymes, pH regulators, trace elements, vitamins and other products fall within the scope of this definition depending on the purpose of use and method of administration. This excludes veterinary drugs.

2.15 **Feed Ingredient**

A 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 (including aquatic plants) or terrestrial or aquatic animal origin, or other organic or inorganic substances.

2.16 **Medicated Feed**

Any feed containing anti-microbials, anthelmintics or chemicals for the purposes of prevention or treatment of diseases, promoting growth and good health according to authorized usage.

2.17 **Competent Authority**

2.17.1 ***Competent authority department of research and specialist services.*** For the purposes of registration of farm feeds, regulation and restriction of importation and exportation, sale of farm feeds and certain remedies, the Competent authority is the Director or anyone authorized by him/her.

2.17.2 ***Competent authority on registration of farm feeds.*** For the purposes of registration of farm feeds, regulation and restriction of importation and exportation, sale of farm feeds and certain remedies, the Competent authority is the Director of the Department of Research and Specialist Services and anyone authorized by him/her.

2.17.3 ***Competent authority on animal and veterinary public health.*** For the purpose of addressing animal and veterinary public health, the competent authority is the Director of the Department of Veterinary Services and anyone authorized by him/her.

2.17.4 ***Competent authority on veterinary medicinal products.*** For the purpose of addressing animal and veterinary public health, the competent authority is the Director, the

Medicines Control Authority of Zimbabwe in case of medicated feeds and anyone authorized by him/her.

3. Moisture Content

The moisture content of the feed shall be stated on the label.

4. Growth Stimulants, Antibiotics and Related Compounds

4.1 General

Anti-microbials, medicinal ingredients and related compounds added to a feed, shall be used at the levels accepted by the Medicines Control Authority of Zimbabwe, and the registration number shall be quoted on application for Mark Certification. (Include an annex see CARICOM Regional Standard).

4.2 Coccidiostats, Anti-oxidants and Yolk Colouring Compounds

Where coccidiostats are incorporated, a statement of their nature shall be included on the label. Yolk colouring compounds and anti-oxidants may be used in poultry feeds.

Table 1 - Commercial Broiler Diets

		Starter		Grower		Finisher 1		Finisher 2		Finisher 3	
Age Fed	days	0-10		11 – 24		25 – 39		40 – 46		47 – Market	
Energy	kcal	3 000		3 100		3200		3225		3225	
	MJ	12.55		12.97		13.39		13.49		13.49	
AMINO ACIDS		Total	Digest ¹	Total	Digest ¹	Total	Digest ¹	Total	Digest ¹	Total	Digest ¹
Lysine	%	1.44	1.28	1.29	1.15	1.15	1.02	1.08	0.96	1.04	0.93
Methione + Cystine	%	1.08	0.95	0.99	0.87	0.90	0.80	0.85	0.75	0.82	0.73
Methione	%	0.56	0.51	0.51	0.47	0.47	0.43	0.44	0.40	0.42	0.39
Threonine	%	0.97	0.86	0.88	0.77	0.78	0.68	0.73	0.64	0.71	0.62
Valine	%	1.10	0.96	1.00	0.87	0.89	0.78	0.86	0.75	0.83	0.73
Osoleucine	%	0.97	0.86	0.89	0.78	0.80	0.70	0.75	0.66	0.73	0.64
Arginine	%	1.52	1.37	1.37	1.23	1.21	1.09	1.15	1.04	1.12	1.00
Tryptophan	%	0.23	0.20	0.21	0.18	0.18	0.16	0.17	0.15	0.17	0.15
Leucine	%	1.58	1.41	1.42	1.27	1.26	1.12	1.19	1.06	1.15	1.02
Crude Protein ²	%	23.0		21.5		19.5		18.0		17.5	
MINERALS											
Calcium	%	0.96		0.87		0.78		0.74		0.73	
Available phosphorus	%	0.480		0.435		0.390		0.370		0.365	
Magnesium	%	0.05 – 0.50		0.05 – 0.50		0.05 – 0.50		0.05 – 0.50		0.05 – 0.50	
Sodium	%	0.16 – 0.23		0.16 – 0.23		0.16 – 0.20		0.16 – 0.20		0.16 – 0.20	
Chloride	%	0.16 – 0.23		0.16 – 0.23		0.16 – 0.23		0.16 – 0.23		0.16 – 0.23	
Potassium	%	0.40 – 1.00		0.40 – 1.90		0.40 – 1.90		0.40 – 1.90		0.40 – 1.90	
ADDED TRACE MINERAL PER KG											
Copper	Mg	16		16		16		16		16	

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Iodine	Mg	1.25		1.25		1.25		1.25		1.25	
Iron	Mg	20		20		20		20		20	
Manganese	Mg	120		120		120		120		120	
Selenium	Mg	0.30		0.30		0.30		0.30		0.30	
Zinc	Mg	110		110		110		110		110	
ADDED VITAMIS PER KG		Wheat based feed	Maize based feed	Wheat based feed	Maize based feed	Wheat based feed	Maize based feed	Wheat based feed	Maize based feed	Wheat based feed	Maize based feed
Vitamin A	IU	13.000	12.000	11.000	10.000	10.000	9000	10.000	9000	10.000	9000
Vitamin D3	IU	5000	5000	5000	4500	4500	4000	4000	4000	4000	4000
Vitamin E	IU	80	80	65	65	55	55	55	55	55	55
Vitamin K (Menadione)	Mg	3.2	3.2	3.0	3.0	2.2	2.2	2.2	2.2	2.2	2.2
Thlamin (B1)	Mg	3.2	3.2	2.5	2.5	2.2	2.2	2.2	2.2	2.2	2.2
Riboflavin (B2)	Mg	8.6	8.6	6.5	6.5	5.4	5.4	5.4	5.4	5.4	5.4
Niacin	Mg	60	65	55	60	40	45	40	45	40	45
Pantothenic Acid	Mg	17	20	15	18	13	15	13	15	13	15
Pyridoxine(B6)	Mg	5.4	4.3	4.3	3.2	3.2	2.2	3.2	2.2	3.2	2.2
Biotin	Mg	0.30	0.22	0.25	0.18	0.20	0.15	0.20	0.15	0.20	0.15
Folic Acid	Mg	2.20	2.20	1.90	1.90	1.60	1.60	1.60	1.60	1.60	1.60
Vitamin B12	Mg	0.017	0.017	0.017	0.017	0.011	0.011	0.011	0.011	0.011	0.011
MINIMUM SPECIFICATION											
Choline per kg	Mg	1700		1600		1500		1450		1400	
Linoleic Acid	%	1.25		1.20		1.00		1.00		1.00	

Digest¹ = Digestible

Crude Protein² = Formulation priority is to meet the recommended minimum essential amino acid levels. These crude protein levels are not requirements per se, but instead are levels which will likely occur when achieving the fore mentioned essential amino acid minimums.

Note. These feed specifications should be used as a guide. They require adjustment for local conditions and markets. A withdrawal feed should be fed to meet local requirements for drug withdrawal times. This can be formulated to the same standards as the final feed listed above.

Table 2 - Broiler Breeder Diets

Phase	Pre-Starter		Starter		Pullet		Transition		Breeder I		Breeder II		Male	
Age (days)	0 – 10		11 – 35		35 – 147		147 – 5 % lay		224 to 315		315 to cull		147 to cull	
Kcal/kg	2850		2750		2650		2750		2800		2775		2650	
MJ/kg	11.90		11.50		11.10		11.50		11.70		11.60		11.10	
Min. amino-acids	Tot	Dig	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.	Tot.	Dig.
Lysine	1.08	0.97	1.02	0.91	0.70	0.61	0.76	0.67	0.74	0.66	0.72	0.64	0.68	0.59
Methione	0.46	0.41	0.43	0.39	0.34	0.29	0.36	0.32	0.36	0.33	0.35	0.31	0.33	0.28
Methione and Cystine	0.83	0.74	0.77	0.69	0.58	0.51	0.53	0.55	0.64	0.57	0.62	0.55	0.57	0.49
Valine	0.74	0.66	0.70	0.61	0.54	0.46	0.59	0.50	0.61	0.54	0.59	0.52	0.53	0.45
Isoleucine	0.75	0.64	0.69	0.61	0.53	0.45	0.58	0.49	0.58	0.51	0.57	0.49	0.52	0.44
Arginine	1.14	1.02	1.05	0.94	0.73	0.62	0.78	0.66	0.81	0.69	0.79	0.67	0.71	0.60
Tryptophan	0.21	0.18	0.20	0.17	0.17	0.14	0.19	0.16	0.19	0.16	0.18	0.15	0.17	0.14
Threonine	0.74	0.64	0.70	0.61	0.50	0.42	0.54	0.45	0.54	0.46	0.52	0.45	0.49	0.41
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Crude protein, %	18.50	19.00	17.50	18.00	14.50	15.00	15.00	15.50	15.75	16.25	15.25	15.75	15.50	14.00
Crude fibre, %	2.50	3.50	2.50	3.50	3.50	8.00	3.00	6.00	3.00	6.00	3.50	6.50	3.50	6.50
Calcium, %	1.00	1.05	1.00	1.05	0.90	0.95	1.25	1.40	3.10	3.30	3.30	3.50	0.90	0.95
Av. Phosphorus, %	0.46	0.48	0.41	0.44	0.37	0.40	0.39	0.41	0.39	0.41	0.35	0.37	0.37	0.40
Sodium, %	0.16	0.22	0.16	0.20	0.16	0.20	0.16	0.20	0.16	0.20	0.16	0.20	0.16	0.20
Chloride, %	0.18	0.25	0.18	0.22	0.16	0.22	0.16	0.22	0.16	0.22	0.18	0.22	0.16	0.22
Potassium, %	0.70	0.80	0.65	0.75	0.55	0.70	0.55	0.75	0.60	0.75	0.55	0.70	0.55	0.70
Crude fat, %	3.00	4.50	3.00	4.00	2.50	4.00	3.00	4.00	4.00	4.50	3.50	4.00	2.50	4.00
Linoleic acid, %	1.30	1.40	1.10	1.40	1.00	1.20	1.20	1.30	1.60	1.80	1.30	1530	1.30	1.50



Table 3 - Commercial Layer Diets

Diet type		Starter 1-3 weeks	Grower 4-8 weeks	Developer 9-16 weeks	Pre-Layer 17 wk. to 5 % prod.
Metabol. Energy	kcal	2900	2750 - 2800	2750 - 2800	2750 - 2800
Minimum	MJ	12.00	1140	11.40	11.40
Crude Protein	%	20.00	18.50	14.50	17.50
Methionine	%	0.48	0.40	0.34	0.36
Dig. Methionine	%	0.39	0.33	0.28	0.29
Methyl cysteine	%	0.83	0.70	0.60	0.68
Dig. MIC	%	0.68	0.57	0.50	0.56
Lysine	%	1.20	1.00	0.65	0.85
Dig. Lysine	%	0.98	0.82	0.53	0.70
Valine	%	0,89	0,75	0,53	0,64
Dig. Valine	%	0,76	0,64	0,46	0,55
Tryptophan	%	0.23	0.21	0.16	0.20
Dig. Tryptophan	%	019	0.17	0.13	0.16
Threonine	%	0.80	0.70	0.50	0.60
Dig. Threonine	%	0.65	0.57	0.40	0.49
Isoleucine	%	0.83	0.75	0.60	0.74
Dig. Isoleucine	%	0.68	0.62	0.50	0.61
Calcium	%	1.05	1.00	0.90	2.00
Phosphorus tot.	%	0.75	0.70	0.58	0.65
Phosphorus avail.	%	0.48	0.45	0.37	0.45
Sodium	%	0.18	0.17	0.16	0.16
Chlorine	%	0.20	0.19	0.16	0.16
Linoleic Acid	%	2.00	1.40	1.00	1.00

Table 4 - Layer Breeder Diets

Nutrient		Diet Type			
		Starter 0-3 weeks	Grower 1-10 weeks	Developer 11-16 weeks	Pre-Layer 17 wk. to 5 % prod.
Metabol. Energy	kcal	2900	2750 - 2800	2750 - 2800	2750 - 2800
	MJ	12.00	1140	11.40	11.40
Crude Protein	%	20.00-21.0	18.00-19.00	14.50-15.5	16.5-17.50
Methionine	%	0.48	0.40	0.34	0.36
Dig. Methionine	%	0.39	0.33	0.28	0.29
Methyl Cysteine	%	0.83	0.70	0.60	0.68
Dig. MIC	%	0.68	0.57	0.50	0.56
Lysine	%	1.20	1.00	0.65	0.85
Dig. Lysine	%	0.98	0.82	0.53	0.70
Valine	%	0.89	0.75	0.53	0.64
Dig. Valine	%	0.76	0.64	0.46	0.55
Tryptophan	%	0.23	0.21	0.16	0.20
Dig. Tryptophan	%	0.19	0.17	0.13	0.16
Threonine	%	0.80	0.70	0.50	0.60
Dig. Threonine	%	0.65	0.57	0.40	0.49
Isoleucine	%	0.83	0.75	0.60	0.74
Dig. Isoleucine	%	0.68	0.62	0.50	0.61
Calcium	%	1.05	1.00	0.90	2.00
Phosphorus tot.	%	0.75	0.70	0.58	0.65
Phosphorus avail.	%	0.48	0.45	0.37	0.45
Sodium	%	0.18	0.17	0.16	0.16
Chlorine	%	0.20	0.19	0.16	0.16
Linoleic Acid	%	2.00	1.40	1.00	1.00

Table 5 – Free Range Diets

Nutrient		Diet Type		
		Starter 0-8 weeks	Grower/ Finisher 8-16 weeks	Layer 17 weeks till depletion
Metabol. Energy	kcal	2900	2750 - 2800	2750 - 2800
	MJ	11.8	11.40	11.40
Crude Protein	%	18.50-20.00	15.00-17.00	14.00-16.00
Methionine	%	0.54	0.46	0.35
Dig. Methionine	%	0.51	0.43	0.32
Methyl Cysteine	%	0.87	0.75	0.61
Dig. <i>MIC</i>	%	0.78	0.68	0.55
Lysine	%	1.18	0.98	0.75
Dig. Lysine	%	1.07	0.90	0.68
Valine	%	0.91	0.78	0.70
Dig. Valine	%	0.8	0.69	0.62
Tryptophan	%	0.22	0.18	0.16
Dig. Tryptophan	%	0.20	0.17	0.15
Threonine	%	0.86	0.71	0.55
Dig. Threonine	%	0.74	0.62	0.47
Isoleucine	%	0.81	0.68	0.60
Dig. Isoleucine	%	0.72	0.62	0.54
Calcium	%	0.92	0.63	3.00
Phosphorus tot.	%	0.6	0.47,	0.65
Phosphorus avail.	%	0.48	0.45	0.45
Sodium	%	0.18	0.16	0.19
Chlorine	%	0.35	0.25	0.19
Linoleic Acid	%	1.46	1.7	2.1

TABLE 6 - Turkey^a Diets (Meat Type)

Male:	Age (wk)							Holding	Breeding hens
	0-4	4-8	8-12	12-16	16-20	20-24			
Female	0-4	4-8	8-11	11-14	14-17	17-20			
Energy base kcat ME/kg diet ^b	2.800	2.900	3.000	3.100	3.200	3.300	2.900	2.900	
Protein	28.0	26	22	19	16.5	14	12	14	
Arginine	1.6	1.4	1.1	0.9	0.75	0.6	0.5	0.6	
Glycine + serine	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.5	
Histidine	0.58	0.5	0.4	0.3	0.25	0.2	0.2	0.3	
Isoleucine	1.1	1.0	0.8	0.6	0.5	0.45	0.4	0.5	
Leucine	1.9	1.75	1.5	1.25	1.0	0.8	0.5	0.5	
Lysine	1.6	1.5	1.3	1.0	0.8	0.65	0.5	0.6	
Methionine	0.55	0.45	0.4	0.35	0.25	0.25	0.2	0.2	
Methionine + cystine	1.05	0.95	0.8	0.65	0.55	0.45	0.4	0.4	
Phenylalanine	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.55	
Phenylalanine+ tyrosine	1.8	1.6	1.2	1.0	0.9	0.9	0.8	1.0	
Threonine	1.0	0.95	0.8	0.75	0.6	0.5	0.4	0.45	
Tryptophan	0.26	0.24	0.2	0.18	0.16	0.13	0.1	1.13	
Valine	1.2	1.1	0.9	0.8	0.7	0.6	0.5	0.58	

^a Requirements are listed as percentages of diet.

^b These are typical ME concentrations for corn-soya diets. Different ME values may be appropriate if other ingredients predominate.

Table 7 - Duck ^a Diets (Meat Type)

	Starting (0-2 wk)	Growing (2-7 wk)	Breeding
Energy base kcal ME/kg diet ^b	2.900	3.000	2.900
Protein (%)	22	16	15
Arginine (%)	1.1	1.0	-
Lysine (%)	0.9	0.65	0.6
Methionine + cystine (%)	0.7	0.55	0.5
Calcium (%)	0.65	0.6	2.75
Phosphorus, available, (%)	0.40	0.30	0.30
Sodium (%)	0.15	0.15	0.15
Chlorine (%)	0.12	0.12	0.12
Magnesium (mg)	500	500	500
Manganese (mg)	50	-	-
Zinc (mg)	60	-	-
Selenium (mg)	0.2	-	-
Vitamin A (IU)	2.500	2.500	4.000
Vitamin D (IU)	400	400	900
Vitamin K (mg)	0.5	0.5	0.5
Riboflavin (mg)	4	4	4
Pantothenic acid (mg)	11	11	11
Niacin (mg)	55	55	55
Pyridoxine (mg)	2.5	2.5	3.0
^a Requirements are listed as percentages of diet.			
^b These are typical dietary energy concentrations.			

TABLE 8 – Quail ^a Diets (Meat Type)

Energy base kcal ME/kg diet ^b	Starting 2.800	Growing 2.800	Breeding 2.800
Protein (%)	20	20	24
Glycine + serine (%)	–	–	–
Lysine (%)	–	–	–
Methionine + cystine (%)	1.0	0.75	0.90
Linoleic acid (%)	1	1	1
Calcium (%)	0.65	0.65	2.4
Phosphorus. available (%)	0.45	0.30	0.7
Sodium (%)	0.15	0.15	0.15
Chlorine (%)	0.11	0.11	0.11
Iodine (mg)	0.3	0.3	0.3
Riboflavin (mg)	3.8	3.0	4.0
Pantothenic acid (mg)	12	9	15
Niacin (mg)	30	30	20
Choline (mg)	1.500	1.500	1.000
<p>a Requirements are listed as percentages or as mg/kg of diet. For values not listed, see requirements of laying hens</p> <p>b These are typical dietary energy concentrations.</p>			

Note 1. Dig. = digestible, Metabol = metabolic, Meth.lCysteine = Methylcysteine, tot = total, avail = Av = available; MIC = Minimum Inhibitory Concentration

Note 2. These feed specifications and feeding regimes should be used as a guide. Broilers producers are not prescribed to use all the stated feeding phases but will adjust according to their flock sizes and specific needs.

5. Health and Welfare


5.1 The Control of Hazards of Animal Health and Public Health Importance in Animal Feed

5.1.1 *General principles*

5.1.1.1 *Roles and responsibilities.* The Competent Authority has the legal power to set and enforce regulatory animal feeding requirements, and has final responsibility for verifying that these requirements are met.

- i) The Competent Authority may establish regulatory requirements for relevant parties to provide it with information and assistance in accordance with the WOAH World Organization for Animal Health Code.
- ii) Those involved in the production and use of animal feed and feed ingredients have the primary responsibility to ensure that these products meet regulatory requirements.
- iii) Records and, as appropriate, contingency plans should be in place to enable tracing and recall of non-compliant products.
- iv) All personnel involved in the manufacture, storage and handling of feed and feed ingredients should be adequately trained and aware of their role and responsibility in preventing the introduction or spread of hazards.
- v) Manufacturing equipment, storage and transport facilities should be adequate and maintained in good working order and in a sanitary condition.
- vi) Those providing specialist services to producers and to the feed industry (e.g. private veterinarians, nutritionists and laboratories) may be required to meet specific regulatory requirements pertaining to the services they provide (e.g. disease reporting, quality standards, transparency).

5.1.1.2 *Regulatory safety standards.* All feed and feed ingredients should meet regulatory safety standards.

 Scientific evidence, including the sensitivity of analytical methods and on the characterization of risks, should be taken into account in defining limits and tolerances for hazards.

5.1.1.3 *Risk analysis (risk assessment, risk management and risk communication)*

- i) Internationally accepted principles and practices on risk analysis in line with the WOAH World Organization for Animal Health Code and relevant Codex texts should be used in developing and applying the regulatory framework.

- ii) Application of a generic framework should provide a systematic and consistent process for managing all biosecurity risks, while recognizing the different risk assessment methodologies used in animal and public health.

5.1.1.4 *Good practices*

- i) Where national guidelines exist, good agricultural practices and good manufacturing practices (including good hygienic practices) should be followed.
- ii) In the absence of such guidelines, the Competent Authority together with Competent authorities for production and manufacturing standards are encouraged to develop them or adopt suitable international standards or recommendations.
- iii) Where appropriate, Hazard Analysis and Critical Control Point (HACCP) principles should be followed to control hazards that may occur in the manufacture, distribution and feeding of feed, feed additives and feed ingredients.

5.1.1.5 *Geographic and environmental considerations.* Epidemiological links between potential sources of hazards for animal health or food safety should be considered when assessing water sources, land or facilities for suitability for the production of animal feed and feed ingredients.

- i) Animal health considerations include factors such as disease status, location of quarantined premises and existence of zones/compartments of specified health status.
- ii) Food safety considerations include factors such as industrial operations that generate pollutants and waste treatment plants.

5.1.1.6 *Zoning and compartmentalization.* Feed is an important component of biosecurity and needs to be considered when defining a compartment or zone in accordance with the WOA World Organization for Animal Health Code, on the control of hazards of animal health and public health importance in animal feed

5.1.1.7 *Design and management of inspection programmes*

- i) In meeting animal and public health objectives prescribed in national legislation or required by importing countries, Competent Authorities contribute through the inspection or through the auditing of animal and public health activities conducted by other agencies or the private sector.
- ii) Feed and feed ingredients business operators and other relevant parts of industry should practice self-regulation to secure compliance with required standards for procurement, handling, storage, processing, distribution and use. Operators have full responsibility for implementing systems for quality control.

- iii) The Competent Authority should verify that process control systems and safety standards achieve all regulatory requirements.

5.1.1.8 *Assurance and certification*

- i) Feed business operators are responsible for demonstrating the safety of the establishments under their control.
- ii) Competent Authorities are responsible for providing assurances domestically and to trading partners that regulatory safety standards have been met.
- iii) For international trade in animal product based feeds, Veterinary Services are required to provide international veterinary certificates.

5.1.1.9 *Hazards associated with animal feed*

- a) *Biological hazards.* Biological hazards that may occur in feed and feed ingredients include agents such as bacteria, viruses, fungi and parasites.
- b) *Chemical hazards.* Chemical hazards that may occur in feed and feed ingredients include naturally occurring chemicals (such as mycotoxins and gossypol), industrial and environmental contaminants (such as dioxins and PCBs), residues of veterinary drugs and pesticides and also radionuclides.

The list in the table below includes common substances and their maximum safe levels in the feed and any level greater than these in poultry feed are liable to render them

Table 9 - Maximum Safety Levels

Common Substance	Maximum permissible safe level	Referenced Standards
Aflatoxins	20 ppb	CRS 29
Arsenic	100 ppm	CRS 29
Cadmium	5 ppm	CRS 29
Cobalt	30 ppm	CRS 29
Copper	500 ppm	CRS 29
Cyano-genetic glycosides	none	CRS 29
Fluorine	350 ppm	CRS 29
Glucosinolates	none	CRS 29
Gossypol	none	CRS 29
Iodine	2500 ppm	CRS 29
Iron	2400 ppm	CRS 29
Lead	68 ppm	CRS 29
Magnesium	8900 ppm	CRS 29

Manganese	4800 ppm	CRS 29
Mercury	20 ppm	CRS 29
Molybdenum	10 ppm	CRS 29
Nickel	700 ppm	CRS 29
Selenium	10 ppm	CRS 29
Vanadium	120 ppm	CRS 29
Zinc	3000 ppm	CRS 29

- c) *Physical hazards.* Physical hazards that may occur in feed and feed ingredients include foreign objects (such as pieces of glass, metal, plastic or wood).

5.1.1.9 Contamination

- i) Methods to derive scientific evidence, including the sensitivity of analytical methods and on the characterization of risks will be as per internationally accepted standards.
- ii) Procedures, such as flushing, sequencing and physical clean-out, should be used to reduce the likelihood of contamination between batches of feed or feed ingredients during the production, processing, storage, distribution (including transport) and use of feed and feed ingredients.

5.1.1.10 Antimicrobial resistance

- i) Antimicrobial agents are essential drugs for human and animal health and welfare. In animals, antimicrobial agents are essential for treating and controlling diseases. Continued access to effective antimicrobial agents is therefore essential. Antimicrobial resistance is a growing global concern arising out of the usage of antimicrobials agents in humans, animals and elsewhere. The responsible and prudent use of antimicrobial agents in animals preserves their therapeutic efficacy and prolongs their use in both humans and animals by slowing down the development antimicrobial resistance by reducing its emergence, selection and spread antimicrobial-resistant micro-organisms. The following standards are drawn from the WOAHA World Organization for Animal Health Code on the use of antimicrobial agents and antimicrobial resistance management (WOAHA World Organization for Animal Health Code - The control of hazards of animal health and public health importance in animal feed)
- ii) Animal feeds can potentially be contaminated with antimicrobial-resistant microorganisms such as Salmonella and should therefore be subjected to regular sampling and testing within surveillance systems for antimicrobial resistance.

- iii) At least 25 g of feed sample should be collected in a sampling regime linked to pathogen surveillance programs.
- iv) The supply of medicated feed containing antimicrobial agents to farmers keeping food producing animals by animal feed manufacturers should only be allowed on the prescription of a veterinarian or other authorized person under the supervision of a veterinarian.
- iii) Animal feed manufacturers preparing medicated feed should do so following rules put in place by the competent authority in accordance with the national legislation.
- iv) All medicated feed and medicated premixes should be appropriately labeled
- v) The regulations and recommendations on the responsible and prudent use of Veterinary Medicinal Product (VMP) containing antimicrobial agents should be reinforced by feed manufacturers who should keep detailed records.
- vi) Animal feed manufacturers preparing medicated feeds should ensure that only approved sources of medications are added to feed at a level, and for a species and purpose as permitted by the drug premix label or a veterinary prescription.
- vii) Animal feed manufacturers preparing medicated feeds should ensure that medicated animal feeds are labeled with the appropriate information such as level of medication, approved claim, intended species, directions for use, warning, cautions, so as to ensure effective and safe use by the producer.
- viii) Animal feed manufacturers preparing medicated feeds should implement appropriate production practices to avoid unnecessary carry over and unsafe cross contamination of unmedicated feed.
- ix) Concerning the use of antimicrobials in animal feed refer to the WOAH World Organization for Animal Health Code - The control of hazards of animal health and public health importance in animal feed.

5.1.1.11 *Management of information.* The Competent Authority should establish clear requirements for the provision of information by the private sector as this relates to regulatory requirements.

Records should be maintained in a readily accessible form regarding the production, distribution and use of feed and feed ingredients. These records are required to facilitate the prompt trace-back of feed and feed ingredients to the immediate previous source, and trace-forward to the next subsequent recipients, to address identified animal health or public health concerns (see Section 4.3 of CAC/RCP 54-2004).

6. **Sampling and Preparation of Test Samples**

Methods of sampling animal feeding stuffs and the preparation of test samples, shall be in accordance with internationally accepted standards.

7. **Packaging**

Poultry feeds shall be packed in material that is sound and clean and which shall preferably be non-returnable.

8. **Marking**

Labelling shall be informative, unambiguous, legible and conspicuously placed on the package if sold in package form and on the waybill and other sales documents if sold in bulk, un-packaged form, and shall comply with regulatory requirements. All claims made on a label shall be stated in such a way as to make it possible to substantiate them.

Every container of poultry feed purporting to comply with this standard shall bear the following informative details as specified in the prevailing regulatory requirement (Fertilizer, Farm Feed and Remedies Act).

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