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Poultry feed concentrates — Specification

TANZANIA BUREAU OF STANDARDS

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Magito Company Limited
Tanzania Livestock Research Institute (TALIRI)

Tanzania Bureau of Standards
P O Box 9524
Dar es Salaam
Tel: +255 (22) 2450206/2450949/2450298
Fax: +255 22 2450298
E-mail: info@tbs.go.tz
Website: www.tbs.go.tz

Poultry feed concentrates — Specification

0 Foreword

The expansion of poultry industry in Tanzania has resulted in a corresponding increase in poultry feed demand and production. The use of concentrates to produce compounded poultry feeds has become popular among feed millers to mitigate shortage of poultry feeds. Therefore, it is necessary to prepare this standard, laying down specifications for poultry feed concentrates, so as to guarante*e* safety and quality of compounded poultry feeds produced and or traded in Tanzania.

In the preparation of this Tanzania standard assistance was drawn from;

Tanzania-based stakeholders producing concentrated feeds for livestock and poultry.

In reporting, the results of a test or analysis made in accordance with this standard, if the final value observed or calculated, is to be rounded off, it shall be done in accordance with TZS 4 (see clause 2).

1 Scope

This Tanzania Standard specifies requirements, sampling and test methods for poultry feed concentrates used to develop compounded poultry feeds. This standard shall apply to concentrates for the following categories of chicken and turkey feeds:

a) chicks and poults;
b) growers;
c) broilers — Starters and finishers;
d) layers; and
e) breeders;

2 Normative references

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

TZS 4, Rounding off numerical values.

TZS 76, General method for determination of Arsenic silver diethyldithiocarbamate photometric method

TZS 122-1, Microbiology of food and animal feeding stuffs – Horizontal method for the detection of Salmonella spp.

TZS 268, General atomic absorption spectrophotometric method for determination of lead in food stuffs

TZS 538, Labelling of pre-packaged foods — General requirements

TZS 730-1, Microbiology of food and animal feeding stuffs – Horizontal method for the detection of Escherichia coli

TZS 799, Food stuffs – Determination of aflatoxin B1 and the total content

TZS 821, Animal feeding stuffs – Preparation of test samples

TZS 1486, Infant formula – Determination of phosphorus content by Spectrophotometric method

TZS 1581-2: 2013, Determination of cadmium content – Method flame atomic absorption spectrometry

TZS 2470, Animal feeding stuffs - Determination of lysine, methionine and threonine in commercial amino acid products and premixtures

TZS 2472, Animal feeding stuffs – Determination of acid detergent fibre (ADF) and acid detergent lignin (ADL) Contents

TZS 2473, Animal feeding stuffs - Determination of crude ash

TZS 2477-1 – Animal feeding stuffs - Determination of water-soluble chlorides content

TZS 2478, Animal feeding stuffs – Determination of moisture and other volatile matter content

TZS 2480, Animal feeding stuffs - Determination of nitrogen content and calculation of crude protein content - Part 1: Kjeldahl method

TZS 2482, Animal feeding stuffs, animal products, and faeces or urine - Determination of gross calorific value - Bomb calorimeter method

TZS 2487, Animal feeding stuffs - Determination of the contents of calcium, copper, iron, magnesium, manganese, potassium, sodium and zinc - Method using atomic absorption spectrometry

TZS 2488, Animal feeding stuffs – Sampling

TZS 2616, Foodstuffs – Determination of mercury by flameless atomic absorption spectrophotometric method

3 Terms and definitions

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

3.1 poultry feed concentrate

mixture of ingredients that supply protein, minerals and vitamins in sufficient concentration, that when mixed with grains and/or other ingredients in accordance with the mixing instructions will produce a complete or balanced feed for the specified class and age of poultry.

3.2 adulterants

any substance which is not a feed ingredient or an approved additive and which is likely to be harmful to poultry.

3.3 package

any receptacle, container, wrapper, box, bag or sack in which poultry feed Concentrate is packed for distribution or for sale.

3.4 feed (or feed stuff)

any substance or product, including additives, whether processed, partially processed or unprocessed, intended to be used for oral feeding to animals, single or multiple materials, whether processed, semi-processed or raw, and whether or not containing additives, for oral poultry feeding

3.5 broiler starter feed

is a high protein feed provided to young meat type chicks for the first few weeks of age

3.6 broiler finishing feed

feed suitable for providing all nutritional requirements for meat type chickens from the broiler starter phase until slaughter

3.7 chick feed

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

3.8 poultry grower feed

feed suitable for providing all nutritional requirements for growing poultry other than meat type birds from eight weeks of age until two weeks before point of laying eggs

3.9 layers feed

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

3.10 breeder feed

diet to be fed to breeding hens from 20 weeks onwards providing all the nutritional requirements.

4 Requirements

4.1 General quality requirements

4.1.1 All ingredients and raw materials shall not be decomposed or deteriorated and shall comply with the relevant Tanzania standards. The common feed stuffs described in Annex A and their nutrient composition provided in Annex B may be used for purposes of formulating compounded poultry feeds.

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

4.1.3 Ingredients of animal origin shall be sterilized before use.

4.1.4 Vitamin preparations added to feed shall be in stabilized form.

4.1.5 Urea or any other nitrogenous substances shall not be added to or included in any poultry feed concentrate except such true protein and amino acids as required in this standard.

4.1.6 Poultry feed concentrates shall:

a) be assessed based on ingredients used and the processing procedure applied. It is appropriate that the formulation matrix be maintained to accurately reflect the appropriate nutritional values of all ingredients used;

b) be free from harmful levels of substances such as metallic objects, and adulterants;

c) not be, musty, rancid and shall not have any objectionable odours; and

d) be free from fungi, pathogenic microorganisms or insect infestation.

4.2 Specific requirements

4.2.1 Poultry feed concentrate shall comply with the specific requirements given in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Specific requirements for poultry feed concentrate

Parameter	Broiler starter feed concentrate		Broiler grower feed concentrate		Broiler finisher feed concentrate		Chick starter feed concentrate		Grower feed concentrate		Layer feed concentrate		Test method
	min	max	min	max	min	max	min	max	min	max	min	max	
Dosage %	40		35		30		35		20		20		
Crude protein, %	41		40		40		41		40		42		TZS 2480
Moisture content %		12		12		12		12		12		12	TZS 2478
Crude fibre, %		8.0		8.0		8.0		8.0		8.0		8.0	TZS 2472
Ash, %		20		20		20		20		25		15	TZS 2473
Total Calcium, %	2.0	3.0	2.0	3.5	2.0	4.0	2.0	3.0	2.0	3.0	15	20	TZS 2487
Total Phosphorus, %	1.0		1.0		1.0		1.0		1.0		1.0		TZS 1486
Sodium chloride (Nacl), %	1.0	2.5	1.0	3.0	1.0	4.0	1.0	2.5	1.0	3.5	1.0	3.0	TZS 2477-1
Lysine %	3.2		3.2		3.2		2.5		2.0		2.5		TZS 2470
Methionine, %	1.6		1.6		1.6		1.3		1.0		1.3		TZS 2470
Note: For varieties with added phytase (specified on the label), total phosphorus is allowed to be reduced by 0.12; the lower limit of Calcium is reduced by 0.20% accordingly. For feeds with a specified amount of digestive enzymes (specified on the label) to improve the digestibility and utilization of amino acids, crude protein is allowed to be reduced by 1.0%.													

5 Feed additives

5.1 Additives in the following categories may be used in poultry feed concentrates and if used, they shall comply with the requirements given in Annex C.

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

NOTE — Materials intended for mixing with animal feed as additives for use as feeding stuffs 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 conform to the provisions of this standard should be stated in the label (see Clause 9.)

5.2 No antibiotic, hormone substance or drug shall 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 (WOAH).

6 Hygiene

6.1 The production of poultry feed concentrates shall observe Good Manufacturing Practice (GMP) and other food and feed safety guidelines such as Hazard Analysis and Critical Control Points (HACCP) and Codex Code of Practice on Good animal feeding.

6.2 The poultry feed concentrates shall comply with the limits provided in Table 2 when tested in accordance with the methods specified therein.

Table 2 — Microbiological limits for poultry feed concentrate

S/No.	Parameter Microorganism (cfu/g)	Maximum Limits	Test methods
i)	*Escherichia coli*	1.0×10^3	TZS 730-1
ii)	*Salmonella* spp	1.0×10^2	TZS 122-1

7 Contaminants

7.1 Heavy metals

Poultry feeds concentrates shall comply with the limits of heavy metals as specified in the Table 3 when tested in accordance with the methods specified therein.

Table 3 — Heavy metals limits for poultry feed concentrate

S/N	Heavy metal	Maximum limit, mg/kg	Test method
i.	Arsenic	2.0	TZS 76
ii.	Lead	5.0	TZS 268
iii.	Cadmium	1.0	TZS 1581-2
iv.	Mercury	0.1	TZS 2616

7.2 Pesticide residues

Poultry feed concentrates shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for the ingredient used in compounded poultry feeds.

7.3 Aflatoxins

Poultry feed concentrates shall comply with the maximum aflatoxin limits stated in Table 4 when tested in accordance with the methods specified therein.

Table 4 – Aflatoxin limits for poultry feed concentrate

S/No.	Aflatoxin	Limits (µg/kg, max)	Method of test
i)	Total aflatoxin	20	TZS 799
ii)	Aflatoxin B_1	10	TZS 799

8 Sampling and tests

8.1 Sampling

Sampling of poultry feed concentrates shall be done according to TZS 821 (see clause 2).

8.2 Tests

Testing of poultry feed concentrates shall be done according to test methods prescribed in Tables 1, 2, 3 and 4 (see clause 2).

9 Packaging, marking and labeling

9.1 Packaging

Poultry feeds concentrates shall be packaged in suitable 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.

9.2 Marking and Labelling

9.2.1 In addition to the provisions of the TZS 538, each package of poultry feed concentrates shall be legibly and indelibly labelled with the following:

a) type of poultry feed Concentrate example “broiler concentrate”;
b) name and physical address of the manufacturer;
c) additives if included shall be declared;
d) Nutritional composition and Concentration of the main nutrient (protein) net weight in metric units;
e) directions and precautions for use, the proportion which in it is to be mixed with the basal ingredient;
f) batch number /lot identification;
g) manufacturing date;
h) storage instruction;
i) expiry date; and
j) Marking should include for ‘Animal Use Only”

9.2.2 The containers may also be marked with the TBS Standards Mark of Quality

NOTE — The TBS Standards Mark of Quality may be used by the manufacturers only under licence from TBS. Particulars of conditions under which the licences are granted, may be obtained from TBS

Annex A
(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 *Manihot esculenta*	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
10. Cotton seed cake	The residue resulting after part removal of oil and of cortex from commercially pure cotton seed	Crude protein, crude fibre
11. 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
12. 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
13. Grass, meal	Any product which, (i) is obtained by artificially drying any of the following: grass, clover, 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
14. 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
15. Maize	Maize kernel or crushed maize kernel as grown for commercial purposes	Crude protein, starch

Product	Description	Main nutritional constituent
16. Maize germ meal	Consisting mainly of embryo of kernel not less than 10 % oil, and not more than 5 % ash	Crude protein, starch
17. Maize and cob meal	Ground maize on the cob	Crude protein, oil, crude fibre
18. Maize meal	Milled whole maize	Crude protein, oil, starch
19. Maize gluten meal	A by-product resulting from removal of a bran starch and germ from maize	Crude protein, oil,
20. 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,
21. Milk powder	Dried milk from which a substantial amount of fat has been removed and to which no other substance is added	Crude protein
22. Millet	Finger millet of the species *Eleusine coracana*	Crude protein, orude fibre, starch
23. 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
24. Molasses	A concentrated syrup product obtained in the manufacture of sugar from sugar cane to which no other matter has been added	Sugar as sucrose
25. Oats, ground	The product obtained by grinding commercially pure oats	Crude protein, crude fibre
26. Pea meal	The meal obtained by grinding or crushing commercially pure peas including pods	Crude protein, crude fibre
27. Rice bran	The outside husk or rice kernel to which no other matter has been added	Crude protein, crude fibre, oil, starch
28. 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
29. Rice polishings	The product obtained when polishing kernels after the removal of hulls and bran	Crude protein, oil, crude fibre, starch
30. Sesame cake	The residue resulting after the part removal of oil from commercially pure simsim kernels	Crude protein, oil, crude fibre
31. Soya bean meal	The residue resulting after the part removal of oil from commercially pure soya bean seeds	Crude protein, oil, crude fibre
32. Sweet potatoes	The dried tubers of the species *Ipomea batatas*	Crude protein, crude fibre, starch
33. 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
34. wheat bran	Outside husk of what kernel to which no other matter was added	Crude protein, crude fibre, starch
35. 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
36. Yeast dried	The product obtained by drying of yeast or yeast residues, and to which no other matter has been added.	Crude protein

Annex B
(informative)

Nutrient composition of common feed ingredients

Ingredients	DM%	CP%	CF%	Ca%	P%	ME Kcal/kg	Lysine %	Methionine %
Maize	88	8	12	0.17	0.55	3000	0.53	0.29
Maize bran	88	9.4	13	0.04	1.03	2200	0.18	0.21
Maize/cob meal	88	7	8	-	0.30	-	-	-
Rice bran	88	13.5	6.5	0.06	1.43	3000	0.5	0.22
Cassava meal	88	2.8	4.0	0.3	0.05	3000	-	-
Molasses	75	3.0	-	0.75	0.08	2330	-	-
Millet	88	10.5	2.0	0.05	0.40	1392	0.2	0.27
Sorghum	88	9.0	2.1	0.03	0.28	3250	0.2	0.12
Fish meal	88	60.0	1.0	4.37	2.53	2310	4.08	1.70
Blood meal	92	72.9	1.7	0.28	0.22	1177	7.0	0.9
Cotton seed cake	88	40.0	14	0.20	1.20	968	1.6	0.52
Soya bean meal	88	43.0	6	0.53	0.64	2800	2.84	0.65
Limestone	98	-	-	38.0	-	-	-	-
Oyster shells	98	-	-	35.0	-	-	-	-
Wheat pollard	98	15.0	-	-	-	-	0.60	0.35
Wheat bran	91.4	15.0	12.5	-	1.20	-	0.60	0.35
Sunflower cake	92	35.0	26.7	-	-	-	1.80	1.20
Groundnut cake	93	40.0	7.3	-	-	-	2.00	1.80
Rice polishings	92.5	12.0	4.2	-	-	-	4.0	0.40
Bone meal	94	24	1.5					
Dicalcium phosphate	-	-	-	24	18	-	-	-
Tricalcium phosphate	-	-	-	38	19	-	-	-
Meat meal	-	60.0	-	-	-	-	0.50	1.0
Alfalfa hay	87.5	18.9	33.1	-	-	-	-	-
Sugarcane bagasse	90.5	1.7	50.3	-	-	-	-	-
Sesame cake	93	36.1	6.7	-	-	-	-	-
Sugarcane tops	33.5	6.2	29.5	-	-	-	-	-
Whey	90	13.0	1.3	0.97	0.76	3100	-	0.2

Annex C
(normative)

Recommended additives used in 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 WOAH, where an antioxidant if added should not exceed the maximum content, if any, specified in the second column of the Table D.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	GMP
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 in D.2.2 and D.2.3 or any other emulsifier, stabiliser, thickener or gelling agent as shall be approved by OIE.

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; 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.2.3 Sucrose esters or fatty acids

D.2.3.1 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;
j) polyoxyethylene (20) sorbitan tricleate, polyoxyethylene (8) sorbitan stearate; and
k) polyoxyethylene (40) stearate.

D.2.3.2 The additives listed shall conform to the requirements in Table D.2.

Table D.2 — Specifications for emulsifiers, stabilisers, thickeners and gelling agents

Name or description	Maximum content in complete feed, mg/kg
Poly (ethylene glycol) (M.W 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 feeds 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 feeds shall contain no added aromatic or appetising substance other than an aromatic or appetising substance of a name or description specified in Table D.3 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	GMP