AFDC 9 (2943) DTZS

ICS 65.120

# DRAFT TANZANIA STANDARD

## Pig feed concentrates — Specification



TANZANIA BUREAU OF STANDARDS

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# Pig feed concentrates — Specification

## 0 Foreword

Increased demand of pork in Tanzania has resulted in a corresponding increase in pig feed demand and production. It is necessary to prepare this standard, laying down specifications for pig feed concentrates, so as to guarantee the safety and quality of compounded pig feeds produced and or traded in Tanzania.

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

*Tanzania based stakeholders producing concentrated feed 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 pig feed concentrates used to develop a compounded pig feeds. This standard shall apply to concentrates for the following categories of pig feeds:

a) pig starter;
b) pig growers;
c) pig finisher;
d) lactating sow and
e) Gestating sow.

## 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 34-1, Animal feeds and feeding stuffs – Sampling and general methods*

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

## 3 Terms and definitions

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

**3.1 pig feed concentrate**

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

**3.2 adulterant**

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

**3.3 package**

any receptacle, container, wrapper, box, bag or sack in which pig feed concentrate is packed for distribution or for sale

**3.4 feed (or feed stuff)**

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

**3.5 gestating sow feed**

pig feed suitable for feeding pregnant pigs

**3.6 pig starter feed**

feed suitable for growing pigs up to 20 kg live body weight

**3.7 pig grower feed**

feed suitable for growing pigs up to 55 kg live body weight

**3.8 pig finishing feed**

feed suitable for fattening pigs weighing over 55 kg live body weight

**3.9 lactating sow feed**

feed suitable for lactating sows

## 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 pig feed concentrates.

**4.1.2** Ingredients of animal origin shall be sterilized before use.

**4.1.3** Where soy bean meal is used, it shall have been subjected to adequate heat treatment to reduce the activity of antinutrional factor.

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

**4.1.5** Pig 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.

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

**4.2 Specific requirements**

Pig feed concentrates shall comply with the specific requirements given in Table 1 and Annex **C** when tested in accordance with the test methods specified therein.

**Table 1 — Specific requirements for pig feed concentrates**

| Parameter | Pig starter | | Pig grower | | Pig finisher | | Lactating | | Gestating /boar | | Test method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | min | max | min | max | min | max | min | max | min | max | |
| Dosage % | 35 | | 30 | | 15 - 25 | | 30 | | 20 -30 | | |
| Crude protein, % | 42 | | 40 | | 38 | | 34 | | 34 | | TZS 2480 |
| Moisture content % | | 12 | | 12 | | 12 | | 12 | | 12 | TZS 2478 |
| Crude fibre, % | | 12 | | 12 | | 12 | | 12 | | 15 | TZS 2472 |
| Ash | | 20 | | 20 | | 20 | | 20 | | 20 | TZS 2473 |
| Total Calcium, % | 2.0 | 4.0 | 2.0 | 4.0 | 2.0 | 4.0 | 2.0 | 4.0 | 2.0 | 4.0 | TZS 2487 |
| Total Phosphorus, % | 1.0 | | 1.0 | | 1.0 | | 0.8 | | 0.8 | | TZS 1486 |
| Sodium chloride (Nacl),% | 1.0 | 3.5 | 1.0 | 3.5 | 1.0 | 3.5 | 1.0 | 3.5 | 1.0 | 3.5 | TZS 2477-1 |
| Lysine,% | 3.2 | | 3.0 | | 2.9 | | 2.5 | | 2.0 | | TZS 2470 |
| Methionine,% | 1.6 | | 1.5 | | 1.5 | | 1.3 | | 1.0 | | 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 pig feed concentrates and if used, they shall comply with the requirements given in Annex D.

a) antioxidants;
b) colourants;
c) emulsifiers;
d) stabilisers;
e) thickeners and gelling agents;
f) binders;

g) anti-caking agents and coagulants;
h) aromatic and appetizing substances;
i) enzymes; and
j) preservatives.

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 percentage by weight) of the complete feed which conform to the provisions of this standard should be stated in the label (see also Clause10.

**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 Anti-nutritive factors

Pig feed concentrates shall not contain anti-nutritive factors beyond the limits as prescribed by the World Organization for Animal Health (WOAH).

## 7 Hygiene

**7.1** The production of pig 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.

**7.2** The pig 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 pig feed concentrates**

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

## 8 Contaminants

### 8.1 Heavy metals

Pig feed 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 metal limits for pig feed concentrates**

| 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 |

### 8.2 Pesticide residues

Pig feed concentrates shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for the ingredient used in pig feed concentrate.

### 8.3 Aflatoxins

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

**Table 4 – Aflatoxin limits for pig feed concentrates**

| S/No. | Aflatoxin | Limits(µ/kg, max) | Method of test |
|---|---|---|---|
| i) | Total aflatoxin | 20 | TZS 799 |
| ii) | Aflatoxin B1 | 10 | TZS 799 |

## 9 Sampling and tests

### 9.1 Sampling

Sampling of pig feed concentrate shall be done according to TZS 34-1 and TZS 821 (see clause 2).

### 9.2 Tests

Testing of pig feed concentrate shall be done according to test methods prescribed in Table 1, 2, 3 and 4(see clause 2).

## 10 Packaging, marking and labelling

### 10.1 Packaging

In addition to the provisions of the TZS 538, pig feed 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.

**10.2 Marking and labelling**

10.2.1 Each package of pig feed concentrate shall be legibly and indelibly labelled with the following:

a) type of pig feed Concentrate example “pig starter 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).
e) net weight in metric units;
f) directions and precautions for use, the proportion which in it is to be mixed with the basal ingredient;
g) batch number /lot identification;
h) manufacturing date;
i) storage instruction; and
j) expiry date.
k) Marking should include for ‘Animal Use Only

**10.2.2** 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,<br>(i) is obtained by artificially drying any of the following: grass, clover, lucerne, green cereal, or any mixture consisting of any of them, and<br>(ii) is otherwise as grown (that is to say including any growths harvested there with | Crude protein, crude fibre |

| Product | Description | Main nutritional constituent |
|---|---|---|
| | but with no other substance added thereto), and contains not less than 13 % crude protein calculated on the assumption that it contain 10 % moisture. | |
| 14. Groundnut cake | The residue resulting after part removal of oil and part of non-removal of cortex from commercially pure groundnuts | Crude protein,<br>Oil, crude fibre |
| 15. Maize | Maize kernel or crushed maize kernel as grown for commercial purposes | Crude protein, starch |
| 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 | Crude protein, oil, crude fibre |

| Product | Description | Main nutritional constituent |
|---|---|---|
| | of oil from commercially pure soya bean seeds | |
| 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)

**Micronutrients requirements for pig feeds**

| Parameter | Pig starter feed | | Grower feed | | Finishing feed | | Lactating sow feed | |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Min | Max | Min | Max |
| Selenium, mg/kg | 0.20 | 5 | 0.20 | 5 | 0.20 | 5 | 0.20 | 5 |
| Manganese, mg/kg | 20 | - | 20 | - | 20 | - | 20 | - |
| Iodine, mg/kg | 1.00 | - | 1.00 | - | 0.50 | - | 1.00 | - |
| Zinc, mg/kg | 50 | - | 100 | - | 100 | - | 100 | - |
| Iron, mg/kg | 100 | 120 | 80 | - | 125 | - | 80 | - |
| Copper, mg/kg | 200 | 400 | 20 | | 20 | 180 | 20 | - |
| Cobalt, mg/kg | 5 | - | 0.3 | 0.6 | 0.3 | 0.6 | 0.3 | 0.6 |
| Riboflavin, mg/kg | 15 | - | 5 | - | 5 | - | 5 | - |
| Pantothenic acid, mg/kg | 10 | - | 10 | - | 10 | - | 10 | - |
| Niacin, mg/kg | 15 | - | 15 | - | 15 | - | 15 | - |
| Biotin, mg/kg | 0.50 | - | 0.05 | - | 0.50 | - | 0.05 | - |
| Folic acid, mg/kg | 0.15 | - | 0.15 | - | 0.15 | - | 0.15 | - |
| Vitamin $B_{12}$, mg/kg | 0.01 | - | 0.015 | - | 0.01 | - | 0.015 | - |
| Vitamin A, IU/kg | 10000 | - | 12000 | - | 8000 | - | 12000 | - |
| Vitamin $D_3$, IU/kg | 2000 | - | 2400 | - | 1600 | - | 2400 | - |
| Vitamin E, IU/kg | 5 | - | 5 | - | 5 | - | 5 | - |
| Vitamin K, mg/kg | 2 | - | 3 | - | 1 | - | 3 | - |
| Tryptophan, % | 1.20 | - | 1.25 | - | 1.25 | - | 1.25 | - |

# Annex D
# (normative)

**Recommended additives used in pig feeds**

## D.1 Requirements for antioxidants in pig feeds

Pig feeds shall contain no added antioxidant other than an antioxidant of a name or description specified in the first column of Table D.1 or any other antioxidant as shall be approved by OIE. Where an antioxidant is 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 in pig feeds**

| Name or description | Maximum content in complete feed stuff, mg/kg |
|---|---|
| L-Ascorbic acid<br>Sodium L-ascorbate<br>Calcium di (L-ascorbate)<br>5,6-Diacetyl-L-ascorbic acid<br>6-Palmitoyl-L-ascorbic acid<br>Tocopherol-rich extracts of a natural origin<br>Synthetic alpha-tocopherol<br>Synthetic gamma-tocopherol<br>Synthetic delta-tocopherol | GMP |
| Propyl gallate<br>Octyl gallate<br>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

Pig feeds 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 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;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

**D.2.3.1** The following sucrose esters fatty acids may be added to pig 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 emulsifiers, stabilisers, thickeners and gelling agents listed in Table D.2 shall conform to the requirement therein.

**Table D.2 — Requirements for emulsifiers, stabilisers, thickeners and gelling agents in pig feeds**

| Name or description | Maximum content in complete feed, mg/kg |
|---|---|
| Poly (ethylene glycol) 6 000 | 300 |
| Polyoxypropylene-polyoxyethelene polymer (M.W 6 800 - 9 000) | 50 |
| Propane -1-2-diol | 12 000 |
| | 36 000 |

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

### D.3.1 General

Pig 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

Pig 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<br>All natural products and corresponding synthetic products | GMP |