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DRAFT EAST AFRICAN STANDARD

Compounded fish feed — Specification – Part 1: Tilapia and catfish feeds

EAST AFRICAN COMMUNITY

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Contents

Page

Foreword

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

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

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

The committee responsible for this document is Technical Committee EASC/TC 001, *Animal feeding, feeds and feeding stuffs*. .

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

Introduction

Fish feeds are essential for semi-intensive and intensive aquaculture farming systems. Fish nutrition has therefore become one of the most important subjects in aquaculture. Aquaculture nutrition and feeding is concerned with the supply of dietary nutrients to fish either directly in the form of an exogenous 'artificial' diet or indirectly through the increased production of natural live food organisms within the water body in which the fish are cultured. Natural food organisms, play a crucial role in the nutrition of fish within extensive and semiintensive pond culture systems. In the intensive culture systems, with high stocking density natural food organisms play little or no role in the nutrition of the farmed species. The nutrition and feeding of fish within each culture system must be considered as being unique and evaluated on its own merits.

Additionally, the nutrient requirements for fish feeds will inevitably vary between omnivorous and carnivorous fish. Omnivorous fish will eat almost anything from vegetable and plant matter, insects, crustaceans and meat proteins while carnivorous fish eat meat only.

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

Compounded fish feed — Specification – Part 1: Tilapia and catfish feeds

1 Scope

This Draft East African Standard specifies requirements, method of sampling and test for compounded fish feed for tilapia and catfish feeds.

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.

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

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 6865, *Animal feeding stuffs — Determination of crude fibre content — Method with intermediate filtration*

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 14718, *Animal feeding stuffs — Determination of aflatoxin B_1 content of mixed feeding stuffs — Method using high-performance liquid chromatography*

ISO 17375, *Animal feeding stuffs — Determination of aflatoxin B_1*

3 Terms and definitions

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

3.1
fish meal
commercial product made from fish, bones, and offal from processed fish

3.2
fry
stage of fish growth from yolk sac up to 1 g to 2 g

3.3
fingerling
stage of fish growth from 2 g to 10 g

3.4
juvenile
stage of fish growth from the time the fish morphologically resembles the adult (10 to 25 grams)

3.5
adult
stage of fish growth from 25 g to market weight

3.6
starter feed
feed designed to provide nutritional requirements for fry and fingerlings fish

3.7
grower feed
feed designed to provide nutritional requirements for juvenile fish

3.8
finisher feed
feed designed to provide nutritional requirements for adult fish

3.9
brood stock feed
feed designed to provide nutritional requirements for fish meant for reproduction

3.10
compounded feed
mixture of at least two feed materials, whether or not containing feed additives, for oral animal feeding in the form of a complementary feed or a complete feed

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 East African 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 fish feeds.

4.1.2 Ingredients of animal origin shall be sterilised 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 trypsin inhibitor

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

4.1.5

Urea or any other **non protein** nitrogen substances shall not be added to or included in any fish feed except such true protein and amino acids as required in this standard

4.1.6 Fish feed shall be either in the form of a meal, flakes, crumbs or pellets.

4.1.7 If the feed is in the form of pellet, the pellets shall be of the following size and floating time as given in Table 1.

Table 1 — Pellets size and floating time for fish feed

S/N	Parameter	Starter feed	Grower feed	Finisher feed	Brood stock feed
	Tilapia				
i.	Pellet size(mm) max.	2	5	6	5
	Catfish				
ii.	Pellet size(mm), max	2.5	5	6	5
	Duration of pellet floating in water				
iii.	Floating time (minutes-minimum)	2	2	2	2

4.1.8 Compounded fish feeds shall:

a) be free from harmful levels of substances such as metallic objects, and adulterants.

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

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

4.2 Specific requirements for compounded fish feed

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

4.2.2 Compounded fish feed shall meet the requirements of the nutrients and digestible energy in Table 2 and Table 3. Compounded fish feed may contain additional micronutrients and when added shall comply with the limits provided in Annex C.

Table 2 — Specific nutritional requirements for compounded tilapia feed

S/N	Parameter	Starter feed	Grower feed	Finisher feed	Brood stock feed	Test method
i.	Moisture content of pellets, %, max.	10	10	10	10	ISO 6496
ii.	Crude protein, %, min.	35	30	25	35	ISO 5983-1
iii.	Energy (DE) Kcal/Kg, min.	2 500	2 750	2 900	2 800	ISO 9831
iv.	Lysine, %, min.	2.1	1.7	1.7	1.7	ISO 13903
v.	Methionine, %, min.	0.9	0.8	0.8	0.8	
vi.	Methionine + cysteine, %, min.	1.4	1.1	1.1	1.1	
vii.	Crude fibre, %, max.	5	10	10	10	ISO 6865
viii.	Crude fat, %	5 - 8	5 - 12	5 - 12	5 - 12	ISO 6492
ix.	Calcium, %,	1.0 - 2.5	1.0 - 2.5	1.0 - 2.5	1.0 - 2.5	ISO 6490-1
x.	Phosphorus, %	0.6 - 2.0	0.6 - 2.0	0.6 - 2.0	0.6 - 2.0	ISO 6491
xi.	Sodium chloride, %	0.25 - 0.4	0.25 - 0.4	0.25 - 0.4	0.25 - 0.4	ISO 6495

Table 3 — Specific nutritional requirements for compounded catfish feeds

S/N	Parameter	Starter feed	Grower feed	Finisher feed	Brood stock feed	Test method
i.	Moisture content of pellets, %, max.	10	10	10	10	ISO 6496
ii.	Crude protein, %, min.	45	35	30	35	ISO 5983-1
iii.	Energy (DE) Kcal/Kg, min.	3 000	3 000	3 000	3 000	ISO 9831
iv.	Lysine, %, min.	2.1	1.7	1.7	1.7	ISO 13903
v.	Methionine, %, min.	0.9	0.8	0.8	0.8	
vi.	Methionine+cysteine, %, min.	1.4	1.1	1.1	1.1	
vii.	Crude fibre, %, max.	5	10	10	10	ISO 6865
viii.	Crude fat, %	5 -12	5 - 15	5 -15	5 - 15	ISO 6492
ix.	Calcium, %	1.0 - 2.5	1.0 - 2.5	1.0 - 2.5	1.0 - 2.5	ISO 6490-1
x.	Phosphorus, %	0.6 - 2.0	0.6 - 2.0	0.6 - 2.0	0.6 - 2.0	ISO 6491

5 Feed additives and provisions related to their use

5.1 Additives in the following categories may be used in fish feeds 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 appetising 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 percent by weight) of the complete feed which conform to the provisions of this standard should be stated in the label.

5.2 No antibiotic, hormone substance, drug or mineral 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 (OIE).

6 Contaminants

6.1 Aflatoxins

Fish feeds shall comply with the maximum aflatoxin requirements stated in the Table 4 when tested in accordance with the methods specified therein.

Table 4 — Maximum tolerable limits for aflatoxin

S/N	Aflatoxin	Type of fish feed	Maximum limit, µg/kg	Test method
i.	Total aflatoxin	Starter feed, grower feed, finisher feed, brood stock feed	20	ISO 16050
ii.	Aflatoxin B1	Starter feed, grower feed, finisher feed, brood stock feed	10	ISO 14718 ISO 17375

6.2 Pesticide residues

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

6.3 Heavy metals

Fish feeds shall comply with the limits of heavy metals as specified in the Table 5 when tested in accordance with the methods specified therein.

Table 5 — Heavy metal limits for fish feeds

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

7 Packaging

Fish feeds for sale 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.

8 Labelling

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

a) name of the feed for example “tilapia grower feed” or “catfish finisher feed”;

b) name and physical address of the manufacturer;

c) declared proportions of crude protein, crude fibre, crude fat, phosphorus, calcium, ,lysine, and methionine;

d) additives if included shall be declared;

e) net weight in metric units;

f) directions for use;

g) information about the species or category of animals for which the feed is intended;

h) floating pellets feeds shall be labelled as “floating feeds”;

i) batch number/ lot identification;

j) manufacturing date;

k) storage instructions; and

l) expiry date.

9 Sampling

Representative samples shall be drawn in accordance with ISO 6497.

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 anddistillery 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, is obtained by artificially drying any of the following: grass, clover, lucerne, green cereal, or any mixture consisting of any of them, and 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

Product	Description	Main nutritional constituent
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/ milk replacer	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
(informative)

Micronutrients requirements for fish

C.1 Micronutrients requirements for tilapia

S/N	Parameter	Starter feed	Grower feed	Finisher feed	Brooder feed
i)	Vitamin A IU/Kg	3000	1500	3000	3000
ii)	Thiamine mg/Kg	18	9	18	18
iii)	Copper mg/Kg	6	3	6	6
iv)	Zinc mg/Kg	100	50	100	100
v)	Manganese mg/Kg	50	25	50	50
vi)	Iodine mg/Kg	6	3	6	6
vii)	Iron mg/Kg	60	30	60	60
viii)	Vitamin B_{12} mg/Kg	0.015	0.0075	0.015	0.015
ix)	Vitamin A IU/Kg	3000	1500	3000	3000
x)	Vitamin D IU/Kg	1500	750	1500	1500
xi)	Choline mg/Kg	1200	600	1200	1200
xii)	Vitamin E mg/Kg	120	60	120	120
xiii)	Riboflavin mg/Kg	24	12	24	24
xiv)	Pyridoxine mg/Kg	18	9	18	18
xv)	Pantothenic mg/Kg	48	24	48	48
xvi)	Biotin mg/Kg	0.2	0.1	0.2	0.2
xvii)	Ascorbic acid mg/Kg	300	150	300	300
xviii)	Institol mg/Kg	150	75	150	150
xix)	Thiamine mg/Kg	18	9	18	18

C.2 Micronutrients requirements for catfish

S/N	Parameter	Starter feed	Grower feed	Finisher feed	Brooder feed
i)	Vitamin A IU/Kg, min	900	900	900	900
ii)	Ascorbic acid mg/Kg, min	60	60	60	60
iii)	Copper mg/Kg	4.8	4.8	4.8	4.8
iv)	Zinc mg/Kg	20	20	20	20
v)	Manganese mg/Kg	2.4	2.4	2.4	2.4
vi)	Iron mg/Kg	20	20	20	20
vii)	Vitamin A IU/Kg	900	900	900	900
viii)	Vitamin D IU/Kg	220	220	220	220
ix)	Choline mg/Kg	400	400	400	400
x)	Vitamin E mg/Kg	23	23	23	23
xi)	Niacin mg/kg	14	14	14	14
xii)	Riboflavin mg/Kg	9	9	9	9
xiii)	Pyridoxine mg/Kg	3	3	3	3
xiv)	Pantothenic mg/Kg	15	15	15	15
xv)	Ascorbic acid mg/Kg	60	60	60	60
xvi)	Thiamine mg/Kg	1	1	1	1

Annex D
(normative)

Recommended additives used in fish feed

D.1 Requirements for antioxidants

No feeds shall contain any 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 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

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

Fish 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 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; Dglucitol (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.

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

Table D.2 — Requirements 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

D.2.3 Sucrose esters or fatty acids

The following sucrose esters fatty acids may be added to fish 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 binders, anti-caking agents and coagulants

D.3.1 General

Fish 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

Fish 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

