

DRAFT STANDARD FOR ORGANIC AQUACULTURE FEEDS

1 Scope

This Standard applies to the formulation and preparation of nutritionally adequate complete organic aquaculture feeds or *aquafeeds*, farm-made or commercial, for culture of aquatic animals such crustaceans, fish and mollusks. This also covers organic *aquafeeds* that are custom-mixed, organic feed ingredients and additives, and other feed products claimed organic.

2 References

The titles of the standards and publications referred to in this Standard are listed on the inside back cover.

3 Definition of terms

For the purpose of the standard, the following terms shall mean:

3.1

adulterant

refers to any biological or chemical agent, foreign matter and other substances intentionally added to feed during the production, manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such feed which may compromise feed safety, or suitability. It may be added to more expensive substances to increase visible quantities and reduce manufacturing costs, or for some other deceptive or malicious purpose.

3.2

aflatoxins

refers to a group of highly toxic mycotoxins produced by fungi of the genus *Aspergillus*.

3.3

ash

refers to the mineral matter of a feed or feed ingredient remaining after burning off the dry matter.

3.4

batch number

refers to a designation in numbers or letters or combination thereof assigned by the manufacturer to a particular batch of feed or feed ingredient produced during a given cycle of manufacture/production that identifies the batch and permits the tracing or tracking of the batch.

3.5

complete feed

refers to a mixture or combination of feed ingredients supplements and additives by specific formula to be fed directly as sole ration to animals which is capable of furnishing the nutritional needs or requirements of the animal in order to maintain life, promote growth, production and reproduction without any additional substance except water.

3.6**commercial organic aquafeeds**

refers to those manufactured by companies, whose primary business is aquatic animal feedstuff production.

3.7**contaminant**

refers to any substance not intentionally added to food or feed for food-producing animals, which is present in such food or feed as a result of the production (including operations carried out in crop husbandry, animal husbandry and veterinary medicine), manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food or feed, or as a result of environmental contamination. The term does not include insect fragments, rodent hairs and other extraneous matter.

3.8**crude fat or ether extract**

refers to the fats, oils, waxes and similar components found in feeds and feed ingredient, which are extracted with warm ether in chemical analysis.

3.9**crude fiber**

refers to the coarse, fibrous and indigestible portion of feeds and feed ingredients, relatively low in digestibility and nutritive value such as cellulose, hemi-cellulose and lignin.

3.10**crude protein**

refers to the proteins and all other nitrogenous compounds in feeds and feed ingredients.

3.11**custom-mixed feed**

refers to a feed which is compounded or mixed according to the specifications of the final buyer or user for his own use/consumption or for use of a limited clientele and not intended for sale to the general public.

3.12**farm-made organic**

aquafeed refers to small-scale *aquafeed* manufactured encompassing everything from simple hand-formed doughballs to small feed production units (New, 1992); those made for the exclusive use of a particular farming activity, not for a commercial scale or profit; feeds made by individuals or groups of individuals who are primarily farmers.

3.13**feed additive**

refers to an ingredient or combination of ingredients which is added to the basic mixed feed to fulfill a specific need which include, but not limited to, duly registered acidifiers, antioxidants, aromatics, deodorizing agents, flavor enhancers, mold inhibitors, pellet binders, preservatives, sweeteners, toxin binders, artificial color attractants, astaxanthin, etc. It is usually used in micro quantities and requires careful handling and mixing. A feed additive may have no nutritive value but is added to the feed to improve its quality and efficacy.

3.14**feed digestibility**

refers to the percentage of the dry matter or particular nutrient in the diet that the animal absorbs into the body through the digestive tract. (BAFS/PNS 84:2010)

3.15**feed fines**

refer to fine feed particles produced after pelleting at plant. (BAFS/PNS 84:2010)

3.16**feed ingredient**

refers to 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 ore of plant, animal or aquatic origin, or other organic substances.

3.17**feed stability**

refers to an ability of feed to maintain its integrity in the water thus becoming available to aquatic animals.

3.18**label**

refers to any written, printed or graphic matter attached, affixed to or found in any package, bag, bale, sack, barrel, bin, can, canister or any other container of mixed feeds, feed ingredients, feed supplements, feed additives, base mixes, concentrates, specialty feeds, special feed nutrient preparations and/or other feed products.

3.19**lot number**

refers to a designation in numbers or letters or combination thereof assigned to a particular feed product produced under the same raw material source with the same formulation assigned by the manufacturer.

3.20**mesh size**

refers to the number of openings per square inch of mesh (e.g. number 4-4 openings per square inch; 16-16 openings per square inch).

3.21**moisture content**

refers to the water content of the feed.

3.22**organic**

refers to the particular farming and processing systems, described in the standards and not in the classical chemical sense. The term "organic" is synonymous in other languages to "biological" or "ecological".

3.23**organic aquafeed**

refers to any duly certified complete feed prepared on farm or manufactured by duly certified organic and registered feed mill/processing plant, distributed and traded for consumption by aquatic animals, which are raised for human consumption.

3.24**package**

refers to a sack, bag, barrel, box, bin, can, canister or any other container for feeds and/or feed ingredients.

3.25**proximate Analysis**

refers to the process of determining the major constituents of feed partitioning nutrients into 6 components: moisture, crude protein, crude fiber, ether extract, nitrogen-free extract (NFE) and ash.

3.26**supplemental feed**

refers to feed supplied to meet the nutrient requirement of fish for maintenance and growth when natural food is inadequate.

3.27**organic feed miller**

refers to a duly certified by organic certifying body (OCB) and registered feed miller (by DA).

4 Description

Organic *aquafeeds*, in any form, are prepared from safe and organic feed and feeding ingredients, milled and processed using machines, tools and equipment that are dedicated for organic production.

5 Essential composition and quality factors**5.1 Organic Aquafeeds**

5.1.1 This feed should be prepared from sustainable and quality organic raw materials and shall provide adequate nutritional requirements to produce acceptable performance to crustaceans, fish and mollusks reared in aquaculture farms/ponds and other culture facilities.

5.2 Raw materials

5.2.1 Raw materials for organic aquaculture feeds shall be sourced from duly certified organic and registered local feed ingredient suppliers. When imported raw materials are used, these must be certified and registered organic.

5.2.2 Raw materials shall be good sources of needed nutrients like protein, essential amino acids, lipids, essential fatty acids, carbohydrates, vitamins and minerals.

5.2.3 Raw materials containing molds, which are sources of aflatoxin shall not be used.

5.2.4 Limited percentage of non-organic feed may be used in areas where organic aquaculture is in early stages of development. In no case may the percentage of non-organic feed of agricultural origin exceed 20% dry matter calculated on per production cycle basis.

5.2.5 For carnivorous aquaculture animals, feed products derived from the whole fish caught in sustainable fisheries as determined by competent authority shall be allowed at an inclusion limit of up to 60%.

5.2.6 The following substances are prohibited in the products:

- a) farm animal by-products (e.g. abattoir waste) of ruminants;
- b) slaughter products of the same species;
- c) all types of excrements including droppings, dung or other manure;
- d) feed subjected to solvent extraction (e.g. hexane) or the addition of other chemical agents;
- e) crystalline/synthetic amino-acid isolates;
- f) urea and other synthetic nitrogen compounds;
- g) synthetic growth promoters or stimulants;
- h) synthetic appetite stimulants;
- i) artificial preservatives;
- j) artificial coloring agents;
- k) genetically modified organisms (GMO) or their products;
- l) use of wild fish juveniles; and
- m) veterinary drugs i.e. antibiotics.

5.2.7 Synthetic vitamins, minerals and supplements may be used when natural sources are not available.

5.2.8 Inclusion of natural pigments (e.g. in the form of shrimps shells or *Phaffia* yeast) is permitted. This must be limited to the degree of pigmentation found under natural circumstances.

5.2.9 The feed for aquatic animals shall meet the nutritional requirements of the species.

5.3 Other composition

5.3.1 Salt

Salt shall be of food grade quality.

5.3.2 Water

The water to be used in preparation shall be clean and according to Codex standards.

5.4 Final product

5.4.1 The final product must be nutritionally balanced, palatable, digestible, water stable, storage stable and has the proper size and texture for target/cultured species.

5.4.2 The final product shall meet all the requirements enumerated below:

Table 1 – Nutrient standards for complete organic aquafeeds

Feed type	Crude protein % NLT	Crude fat % NLT	Crude fiber % NMT	Ash % NMT
I. Crustaceans				
<i>A. P. monodon</i>				
a. Larval diet	(50) ¹	4	4	16
b. Fry mash	38	4	4	16
c. Starter crumble/Pellet	37	4	4	16
d. Grower pellet	35	4	4	16
e. Finisher pellet	32	4	5	16
f. Broodstock pellet ²	-	-	-	-
<i>B. P. vannamei/ Macrobrachium spp.</i>				
a. Larval diet	(50) ¹	4	4	16
b. Fry mash	38	4	4	16
c. Starter crumble/Pellet	35	4	4	16
d. Grower pellet	30	4	4	16
e. Finisher pellet	26	4	5	16
f. Broodstock pellet ²	-	-	-	-

Table 1 – Nutrient standards for complete organic aquafeeds (cont...)

Feed type	Crude protein % NLT	Crude fat % NLT	Crude fiber % NMT	Ash % NMT
III. Finfishes				
<i>A. Herbivore/Omnivore fishes (e.g. Milkfish³, tilapia, siganid etc.)</i>				
a. Larval diet	(38) ¹	4	5	16
b. Fry mash	35	4	5	16
c. Pre-Starter crumble/Pellet	35	4	5	16
d. Starter crumble	29	4	8	16
e. Grower pellet	27	4	8	16
f. Finisher pellet	25	4	9	16
g. Broodstock pellet	(40) ¹	4	9	16
<i>B. Pangasius spp.</i>				
a. Larval diet	-	-	-	-

b. Fry crumble	28	4	5	16
c. Starter crumble/Pellet	26	4	5	16
d. Grower/Juvenile pellet	22	4	6	16
e. Finisher/Adult pellet	22	4	6	16
f. Broodstock/Breeder pellet	22	4	5	16
C. Carnivore fishes (e.g. Grouper, snapper, seabass etc.)				
a. Larval diet	(48) ¹	8	6	16
b. Fry mash	44	8	6	16
c. Starter crumble	40	8	6	16
d. Grower pellet	38	8	6	16
e. Finisher pellet	35	8	6	16
f. Broodstock pellet ²	(44) ¹	-	-	-
Legend: NLT - Not less than NMT - Not more than				
¹ values are requirement levels				
² no existing feed type in the market				
³ the following protein levels (%) suggested for supplemental feeds for Milkfish for ponds are a) starter crumble 30, b) grower pellet 28, and c) finisher 27.				

Table 2 – Physical requirements at plant

A. Fish and prawn or shrimp

Feed form	Fines ⁴ (%)	Moisture content maximum (%)
a. Mash⁵	100	12
b. Crumble	Not more than 10	12
c. Pellet (Sinking)		
Starter	Not more than 2	12
Grower	Not more than 2	12
Finisher	Not more than 2	12
d. Extruded		
Starter	Not more than 2	12
Grower	Not more than 2	12
Finisher	Not more than 2	12
⁴ measured using a sieve having mesh size of 16 openings per square inch		
⁵ 1 mm and 0.5 mm particle sizes for fish and prawn/shrimp, respectively		

Table 3 – Pellet feed water stability and floatability

Pellet feed type	Water stability % / minute	Floatability % (minimum)
a. Pellet for fish		
Floater (Extruded)	90% / 45	90
Slow sinker	90% / 3	10 ⁶
Sinker	90% / 3	0
b. Pellet for prawn/shrimp	90% / 180	
⁶ most of the feed is slow sinking		

5.4.3 Any organic aquaculture feed that does not comply with levels in Table 1 is considered supplemental feed and must be labeled as such.

6 Hygiene and handling

The final product shall be free from any foreign material and contaminants, microorganisms or substances originating from microorganisms, and any other substances which may present a hazard to the aquaculture species and human health.

7 Packaging and labeling

7.1 Packaging

The product shall be packed in sacks, bags, barrels, boxes, bins, cans, canisters or any other containers for feeds and/or feed ingredients that are clean and free from any foreign matters or contaminants.

7.2 Labeling

7.2.1 All containers or packages of organic *aquafeeds*, feed ingredients, specialty feeds and other nutrient/feed preparations for sale or offered for sale shall bear a complete label or tag.

7.2.2 Labels shall be attached or affixed to the package or to the container in such a way that the whole content of the label can be read without detaching it. Labels can also be printed directly to the container or package of the feed product.

7.2.3 Each label shall be printed in English, must be legible, clear and distinct in its meaning. Translations in Filipino and other languages shall be allowed provided English is the main language used.

7.2.4 Brand name and feed type or class of the feed, feed ingredient, feed supplement, feed additive, concentrate, base mix, specialty feed, special feed nutrient preparation or other feed products shall be printed with the biggest font size and located at the upper front portion of the tag or label.

7.2.5 Labels shall not contain any form of advertisement and/or claims that are false and misleading. Any advertisement containing any claim that the feed is suited for all purposes shall not be allowed and shall be considered a misleading advertisement.

7.2.6 Labels shall be placed on a conspicuous place on the container or package showing the following information:

- a) Brand name or trademark of the product;
- b) Generic name, type or class and form of the product;
- c) Recommended species and species life stage;
- d) Guaranteed analysis of the product which includes the following:
 - minimum percent of crude protein;
 - minimum percent of crude fat;
 - maximum percent of crude fiber;
 - maximum percent of moisture;
 - maximum percent of ash; and/or
 - other information relevant to the product;
- e) Accepted or official name of each and every ingredient used in the product;
- f) Name and complete address of the company;
- g) storage condition;
- h) Control/Code/Batch/Lot number;
- i) Date of manufacture (MM/YYYY);
- j) Best Before Date (MM/DD/YYYY);
- k) Net weight in metric equivalent;
- l) [Bureau of Animal Industry Registration Number of the company and the product;]
- m) OCB accreditation number issued by BAFS;
- n) Organic certification mark/logo;
- o) Certification number issued by OCB; and
- p) the name "Product of the Philippines".

7.2.7 Label or tag on each container shall show the plant net weight in kilograms of the feed and/or feed ingredient. Such statements as "50 kilos gross" or "50 kilos when packed", etc. shall not be allowed.

8 Methods of sampling, examination and analyses

8.1 Method of sampling

Sampling of lots for physico-chemical examination of the product shall be in accordance with sampling plans based on FAO/WHO Codex Alimentarius Commission Sampling Plans for Prepackaged Foods (AQL =6.5) (CAC/RM42-1969). A sample lot (N) shall be the quantity of the product under similar conditions. A sample unit shall be the primary container where the product is in bulk, while the individual feed sack is the sample unit for retail packaged products.

8.2 Method of physical examination

Samples taken for physical examination shall be assessed by persons trained in such examination and using procedures elaborated in 8.3.

8.3 Methods of analyses

8.3.1 Proximate analysis and nutritional composition

8.3.1.1 Determination of ash (animal feeds)

According to Association of Official Analytical Chemists (AOAC) International Official Methods of Analysis (OMA), Method No. 942.05, 18th Ed., Rev. 2, 2007.

8.3.1.2 Determination of crude fat (animal feeds)

According to Association of Official Analytical Chemists (AOAC) International Official Methods of Analysis (OMA), Method No. 920.39, 18th Ed., Rev. 2, 2007.

8.3.1.3 Determination of crude fiber (animal feeds)

According to Association of Official Analytical Chemists (AOAC) International Official Methods of Analysis (OMA), Method No. 962.09, 18th Ed., Rev. 2, 2007.

8.3.1.4 Determination of crude protein (animal feeds)

According to Association of Official Analytical Chemists (AOAC) International Official Methods of Analysis (OMA), Method No. 968.06, 18th Ed., Rev. 2, 2007.

8.3.1.5 Determination of moisture (animal feeds)

According to Association of Official Analytical Chemists (AOAC) International Official Methods of Analysis (OMA), Method No. 925.04, 18th Ed., Rev. 2, 2007.

8.3.2 Determination of aflatoxins B₁ content

According to Association of Official Analytical Chemists (AOAC) International Official Methods of Analysis (OMA), Method No. 975.36, 18th Ed., Rev. 2, 2007.

8.3.3 Determination of feed floatability

According to Method of Determining Floatability as described in Annex C.

8.3.4 Determination of feed water stability

According to Method of Determining Water Stability as described in Annex B.

8.3.5 Determination of heavy metals

According to the Codex Recommended Methods of Analysis and Sampling (CODEX STAN 37 234-1999) or an equivalent analysis method.

8.3.6 Determination of pesticides

According to Association of Official Analytical Chemists (AOAC) International Official Methods of Analysis (OMA), Method Nos. 990.06 and 992.14, 18th Ed., Rev. 2, 2007.

8.3.7 Determination of veterinary drugs in feeds

According to Association of Official Analytical Chemists (AOAC) International Official Methods of Analysis (OMA), Method No. 957.23, 18th Ed., Rev. 2, 2007.

9 Definition of defectives

The sample unit shall be considered as defective when it exhibits any of the properties defined below.

9.1 Foreign matter

The presence in the sample unit of any matter, which has not been recognized as feed composition (excluding packing material), that can cause harm to the aquaculture species, and is readily recognized without magnification or is present at a level determined by any method including magnification that indicates non-compliance with good manufacturing and sanitation practices.

9.2 Aflatoxin contaminations

Sample unit having a higher level of Aflatoxin (B1) of more than 20 ppb at the plant level (production level).

9.3 Veterinary drugs

The presence in the sample unit of veterinary drugs i.e. antibiotics.

9.4 Pesticides

The presence in the sample unit of any pesticide.

References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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- Philippine Veterinary Drug Directory 2006. 8th Edition, pp. 411.
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Annex A

Banned drugs (as of 2009)

Drug	Administrative Order	Subject	Date
Clenbuterol, Salbutamol, Terbutalin, Pirbuterol	No. 14, Series of 2003 (Department of Agriculture)	Ban on the use in food animals of beta-agonist drugs used in human as bronchodilators and tocolytic agents.	May 12, 2003
Furaltadone, Furazolidone, Nitrofurazone	No. 2, Series of 2000 (Dept. of Agriculture & Dept. of Health)	Declaring a ban/phase-out of the use of nitrofurans in food-producing animals.	August 17, 2000
Carbadox, Olaquinox	No. 60, Series of 2000 (Dept. Agriculture) No. 4-A, Series of 2000 (Dept. of Health)	Ban and withdrawal of Olaquinox and Carbadox from the market.	January 11, 2000
Chloramphenicol	No. 60, Series of 1990 (Dept. Agriculture) No. 91, Series of 1990 (Dept. of Health)	Declaring a ban on the use of chloramphenicol in food-producing animals.	April 30, 1990
Source: Philippine Veterinary Drug Directory, 8 th Edition, 2006, pp. 411			

Annex B

Method of determining water stability

(Source: SEAFDEC AQD May 2002. Nutrition in Tropical Aquaculture. Essentials of Fish Nutrition, Feeds, and Feeding of Tropical Aquatic Species)

1. Wire baskets are totally oven-dried at 100°C (1-3 h), cooled in a dessicator, and weighed to constant weight.
2. A certain amount of feed (about 5 g) with known moisture content is then placed in the wire basket.
3. The wire baskets with feed are then allowed to stay in the water under conditions similar to those of the experimental tanks at designated times (2, 4, 6, and 8 h).
4. The wire baskets are then oven-dried, cooled in a dessicator, and weighed to constant weight.
5. Percent dry weight loss is calculated after subtracting the basket weight.
6. Percent water stability is then computed as:

$$\% \text{ Water stability} = \frac{F_o}{I_o} \times 100$$

where:

I_o is the initial dry weight of feed; and

F_o is the final dry weight of feed.

Annex C

Method of determining feed floatability

(Source: European Aquaculture Society and World Aquaculture Society – Aqua 2006.
Physical, Chemical and Biological Evaluation of
Commercial Fish Feeds in Amazonas State)

1. Percent feed floatability can be determined using the equation:

$$\% \text{ Feed floatability} = \frac{100 - \text{immerse pellets}}{100} \times 100$$

