Bangladesh Standard
Specification For
Fish Feed

1. Scope

1.1 This Bangladesh Standard prescribes the requirements, methods of sampling and test for fish feed.

2. References

2.1 This Bangladesh Standards listed in Annex A is necessary adjuncts to this standard. For references, the latest edition of the referenced document including any amendments applies.

3. Terminology

For the purpose of this standard the following definition shall be applied.

3.1 Fish Feed Reference Standards for Bangladesh

Fish Feed Reference Standards for Bangladesh is a feed reference standard guide book for fish and shrimp feeds available in Bangladesh. It describes quality of available feed ingredients and formulated feeds for different types and age groups of fish and shrimp, requirement for manufacturing and storing of feeds and laws and regulation for controlling aquaculture feed quality.

3.2 Fish

Fish means all cartilaginous and bony fishes, freshwater and brackish water prawns and shrimps including aquatic animals viz., amphibians, turtles and tortoise, crustaceans, mollusks, sea cucumber, frogs and any stage of life cycle of above aquatic animals; other aquatic animals included by the Government by Gazette notification from time to time.

3.3 Feed Ingredients

A component part or constituent of any combination or mixture making up a feed whether or not it has nutritional value in the fish/ shrimp diet, including feed additives. Ingredients are of plants, animal or aquatic origin or inorganic substances.

3.4 Feed Additives

“Feed additives” mean the elements mixed in feed in which nutritional quality may or may not remain present. This creates impact on the external and internal characteristics of the feed and increases the attraction and acceptability towards the feed.

3.5 Feed Binder

“Feed Binder” means the ingredients used in feed which keep the feed ingredients bound together for a particular period of time, so that the ingredients do not disintegrate quickly;

3.6 Anti-Nutritional Factor

“Anti-nutrient material” means those ingredients, if present in the fish or added to it or infected with it, disturb the metabolic activities and obstruct the growth and breeding of fish;

3.7 Standard Level

Standard level means the recommended level of nutrients (such as protein, lipid, carbohydrate, vitamin & minerals, moisture, ash and fiber) required for optimum growth of fish.

3.8 Medicated Feedstuffs

Any feed, which contains veterinary drugs as defined in the Codex Standards.

3.9 Undesirable Substances

Undesirable substances may be defined as contaminants and other substances, which are present in and/or on the product, intended for fish/ shrimp feeding and which constitute a risk to the health of the consumer, including food safety related fish/ shrimp health issues.

3.10 Fish Feed

Fish feeds are materials containing nutrients and energy sources, which taken by fish and shrimp thus to increase body weight, maintain health, produce heat and energy and support the growth, disease resistance and reproduction aspect.

3.11 Nutritionally Balanced Feeds

Feeds containing a mixture of feedstuffs, vitamin and mineral premixes as per nutritional requirement that provide adequate amounts of essential nutrients as well as the energy necessary for their utilization and support the normal maintenance, growth, reproduction, and health of the fish. The feed should be palatable to the fish and not contained anti-nutritional components at concentrations that would impede the performance of the fish.

3.12 Supplementary Feed

The feed, which is supplemented in addition to natural feed in the pond for increasing fish production, is called supplementary feed. Supplementary feed may be a single ingredient or a mixture of different ingredients in different combinations.

3.13 Moisture

The weight of feed lost during drying at 105℃ to reach a constant weight.

3.14 Dry matter (DM)

It refers to the moisture-free residues of a sample. The weight of a feed less that is lost due to drying at 105°C to reach a constant weight.

3.15 Organic Matter (OM)

The weight of dry matter of a feed less that of the ash content of the feed.

3.16 Crude protein (CP)

It refers to the true protein component and all the nitrogen (N) in the feed. The crude protein is calculated from the nitrogen of a feed. The nitrogen content of a feed is multiplied by 6.25 and termed as crude protein.

3.17 Amino Acids

Organic acids containing both the basic amino group ($-NH_2$) and the acidic carboxyl group (-COOH), the building block of protein.

3.18 Essential Amino Acids (EAA)

The ten amino acids, which can not be synthesized by the animal inside their body and should be supplied with food. viz. Methionine, Arginine, Tryptophan, Threonine, Valine, Isoleucine, Leucine, Phenyl alanine, Histidine, Lysine (MATTVILPHL).

3.19 Non-protein- nitrogen (NPN)

Compounds, which are not true protein in nature but contain nitrogen, e.g. NH_3, Urea etc.

3.20 Ether Extract (EE)

It is also called crude fat/ lipid, the material extracted with any anhydrous solvent, e.g. acetone, petroleum spirit or diethyl ether. Fats, oils, waxes, organic acids, pigments, sterols, vitamins (A, D, E and K) contents of feeds.

3.21 Crude Fiber (CF)

Cellulose, hemi-cellulose and lignin contents of feeds.

3.22 Nitrogen Free Extracts (NFE)

The food fraction that is calculated as the difference between the dry matter of the sample and the sum of the determined crude protein, ether extract (lipid), ash and crude fiber.

3.23 Vitamins

Organic compounds occurring in feeds in minute amounts and required in minute amounts for normal health and growth of fish and shrimps.

3.24 Minerals

Inorganic elements occurring in feeds in trace or major and essential for normal health and growth of fish and shrimps.

3.25 Vitamin and Mineral Premix

A mixture of substances as sources of vitamins and minerals prepared beforehand for mixing later with others.

3.26 Energy

It is defined as the capacity to do work and is derived by animal through the catabolism of CHO, lipid and protein within body.

3.27 Gross energy (GE)

The total energy contained in a substance. It is the amount of heat released from a feed when it is completely burnt or oxidized in a bomb calorie meter.

Gross energy value of

Crude protein = total energy content 23.6 kJ.g-1 (5.64 kcal.g-1)
Crude lipid = total energy content 39.5 kJ.g-1 (9.44 kcal.g-1)
Carbohydrate = total energy content 17.2 kJ.g-1 (4.11 kcal.g-1)

3.28 Digestible Energy (DE)

It refers to the portion of gross food energy (GE) minus the faecal energy that has been apparently absorbed.

3.29 Metabolizable Energy (ME)

The gross energy value of a feed less the energy lost in faeces, urine and gaseous products of digestion.

3.30 Net energy (NE)

It is the amount of energy used either for maintenance or for production or both.

3.31 Kilo Calorie (Kcal)

1000 calorie (1 calorie = 4.184 joules).

3.32 Meal

Describe the physical form of a feed that has been reduced to a particle size larger than of flour.

3.33 Nursery Feeds

Nursery feeds are given to first feeding fry or larvae when their endogenous food supply (yolk) is exhausted or about to be exhausted. Nursery feed should be nutritionally complete, easily digestible and be of the form of fine powder, crumbles or flakes.

3.34 Starter Feeds

A ration to be fed to the un-metamorphosed young stage in the life cycle of finfish and shrimps. Starter feeds generally contain higher levels of protein and in the form of flakes or crumbles. Three types of starter feed e.g. starter I, starter II and starter III vary from different crumble sizes, depending on the species cultured and their sizes.

3.35 Grower Feeds (Growing pellet feed)

A ration to be fed to the grow-out stage of finfish and shrimps. Grower feeds generally contain less protein and energy than nursery and starter feeds and in the form of 2-5 mm pellet size.

3.36 Finisher Feeds

A ration to be fed to the grow-out stage of finfish and shrimps. These feeds are used near to harvesting to enhance the consumers acceptability of the final product and also used mostly in respect of high-value species, and even then not too commonly. Grower feeds and finisher feeds may also be the same.

3.37 Pelleted Feed

Pellet may be defined as compacted particles of feed formed by forcing ground materials through die opening.

3.38 Feed Premix

A mixture of feed substances prepared beforehand for mixing later with others. Vitamin premix or protein concentrates available at present in different forms in the market are good example of feed premix.

3.39 Protein Concentrate

That are formulated and prepared by commercial companies. They are usually blends of animals and plants high proteins.

4. Classification of Available Fish Feeds/Ingredients and Feeds

4.1 Classification of Available Fish and Shrimp Feedstuffs

Feedstuffs as sources of different nutrients are used for manufacturing of fish and shrimp feeds for different age groups and production purposes. Considering sources of major nutrient available feedstuffs may be classified into groups as described in Table 4.1.

Table 4.1: Classification of available fish/shrimp feedstuffs

Sl. No.	Groups	Feedstuffs
1.	Energy Sources	Rice, Wheat, Maize, Oat/ Milo, Barley, Bajra, Jowar, Starch, Rice polish, Rice polish (Deoiled), Rice bran, Wheat bran, Wheat grain (milled to flour), Molasses, Fats and Oils, Acidulated oil (Acid oil), Cassava meal etc.
2.	Protein Sources	
	(i) Animal protein sources	Fish meal, Fish soluble, Fish silage, Silk worm pupae, Feather meal, Shrimp meal, Poultry by-product meal, Hatchery by-product meal, Offal meal, Crab meal.
	(ii) Plant protein source:	Soybean (raw), Soybean meal (solvent or mechanically extracted), Mustard oil cake, Mustard meal, Sesame (Til) meal, Sesame oil cake, Rapeseed cake, Sunflower cake, Cotton seed meal (oil extracted), Groundnut meal, Groundnut cake (Deoiled), Coconut oil cake, Maize oil cake, Maize gluten meal.
	(iii) Dried leaf meal:	*Azolla* sp. meal, Duck-weed, Helencha, Ipil-ipil, Cowpea, bean, Cabbage, Water hyacinth.
3.	Vitamins supplements	Natural feed sources, Manufactured sources.
4.	Minerals supplements	Fish meal, Dicalcium phosphate, Limestone, Oyster shell, Common salt, Egg shell.
5.	Others	Dried yeast and Yeast sludge, Dehydrate poultry waste, Fish liver oils/ Fish oil

5. Biochemical Composition of Locally Available Feedstuffs/Feed

Table 5.1 Biochemical composition and energy values of some local ingredients/feedstuffs commonly used in fish and shrimp feeds (as dry matter basis)

Sl. No.	Identification of Ingredients/ feedstuffs		Dry matter (%)	Nutrient content (%)							GE ($kJ.g^{-1}$)
	Name of Ingredients	Physical properties		Crude Protein	Crude Fat	Crude Fiber	Ash	NFE	Calcium (Ca)	Phosphorus (P)	
1)	Soybean powder (whole seeds)	Powder	90-93	35-45	15-18	5-8	4-7	30	0.28	0.67	2092
2)	Soybean oil cakes	Flakes	86-90	40-50	5-7	6-8	6-10	34	0.32	0.80	1884
3)	Soybean meal (solvent extracted)	Cake/ flakes	88-92	45-55	0.5-1.5	5-8	6-8	34	0.30	0.65	1805
4)	Mustard oil cake	Cake	88-92	28-35	8-12	8-12	7-10	40	0.67	0.19	1835
5)	Sesame (Til) oil cake	Cake	85-94	25-32	4-12	5-15	10-15	40	2.08	1.12	1689
6)	Coconut oil cake	Cakes	88-94	15-20	7-14	8-12	14-20	49	0.24	0.69	1585
7)	Cotton seed cake	Cakes	88-93	20-30	4-7	8-20	5-10	47	0.20	0.28	1635
8)	Groundnut meal/cake	Cakes	88-92	20-35	10-18	20-25	3-7	30	n.a.	n.a.	1729
9)	Maize (whole seeds)	Powder/ Atta	88-92	8-10	3-6	2-5	1.5-3.0	80	0.20	0.10	1787
10)	Rice polishing	Powder	90-92	10-13	9-15	5-12	5-14	60	0.03	0.27	1789
11)	Rice bran (Traditional milling)	Powder	90-94	7-10	10-12	10-18	12-24	56	0.05	1.40	1610
12)	Rice bran (Auto, boiled)	Powder	90-94	10-12	10-15	12-20	12-23	45	0.08	1.82	1548
13)	Rice bran (Auto, atob)	Powder	90-94	10-14	10-18	12-18	12-25	45	0.08	1.82	1610
14)	Wheat (whole seeds)	Atta/ powder	88-92	11-15	1.2-2.5	1.2-2.0	0.5-1.5	80	0.08	0.44	1802
15)	Wheat bran	Small coatings	90-96	12-18	3-5	8-12	4-6	66	0.13	1.01	1647
16)	Rapeseed meal/cakes	Flakes/powder/cakes	88-94	30-40	6-12	10-15	7-15	32	n.a.	n.a.	1732
17)	Fish meal (Grade-A)	Powder	88-92	60-65	8-15	0.5-1.5	20-25	2	5.08	2.77	2268
18)	Fish meal (Grade-B)	Powder/ crumble	85-94	50-55	5-10	0.8-2.0	20-30	2	4.50	2.50	1548
19)	Fish meal (Cheoya)	Dry fish/ Flakes	82-94	30-45	10-20	1-3	20-35	25	2.20	1.67	1966
20)	Silkworm pupae	Powder/ crumble	35-60	45-60	15-30	1-4	4-12	7	n.a.	n.a.	2406
21)	Fish silage	Powder/ crumble	30-50	40-55	15-25	0.5-1.0	10-20	18	n.a.	n.a.	2162
22)	Shrimp meal (whole)	Crumble	78-90	25-40	1-3	10-20	20-35	18	n.a.	n.a.	1216
23)	Shrimp meal (head)	Crumble	80-94	20-30	1-2	15-30	35-60	12	n.a.	n.a.	1272
24)	Crab meal	Crumble/ flakes	30-60	20-40	6-10	10-25	30-40	9	14.56	1.59	1626
25)	Meat (Tenary)	Crumble/ flakes	88-94	60-90	1-4	0.5-1.5	20-30	1	n.a.	n.a.	1985

** Estimated value; n.a. = not available

6. Description and Specification of Some Common Feedstuffs/Feeds

6.1 Common quality fish feed ingredients and their nutritional values used in fish feeds

(A) Fish Meal

Nutritional ingredients	
Moisture	: 14% Max.
Protein	: 40% Min.
Fat/ Oil	: 07% Min.
Ash	: 20% Max.
Calcium	: 06% Max.
Phosphorus	: 02% Min.

(B) General Rice Bran

Nutritional ingredients	
Moisture	: 12% Max.
Protein	: 08% Min.
Fat/ Oil	: 08% Min.
Ash	: 20% Max.
Fibre	: 15% Max.

(C) Mustard oilcake

Nutritional ingredients	
Moisture	: 12% max.
Protein	: 28% min.
Fat/Oil	: 07% min.
Ash	: 10% max.
Fibre	: 12% max.

(D) Oil Extracted Rice Bran

Nutritional ingredients	
Moisture	: 10% max.
Protein	: 14% min.
Fat/Oil	: 0.5% min.
Ash	: 20% max.
Fibre	: 20% max.

(E) Rape seed oil cake

Nutritional ingredients	
Moisture	: 12% max.
Protein	: 32% min.
Fat/ Oil	: 01% min.
Ash	: 12% max.
Fibre	: 12% max.

(F) Wheat Bran

Nutritional ingredients	
Moisture	: 14% max.
Protein	: 12% min.
Fat/ Oil	: 5% min.
Ash	: 15% max.
Fibre	: 10% max.

(G) Rice Bran (auto)

Nutritional Value	
Moisture	: 12% max.
Protein	: 11% min.
Fat/ Oil	: 12% min.
Ash	: 20% max.
Fibre	: 15% max.

(H) Soyabean Meal

Nutritional Value	
Moisture	: 14% max.
Protein	: 40% min.
Fat/ Oil	: 01% min.
Ash	: 15% max.
Fibre	: 10% max.

6.2 The Feedstuffs (Ingredients)

No single feedstuffs can supply all the nutrients and energy required for optimum growth of fish/shrimp. Ingredients used in practical fish/shrimp feeds can be classified as protein sources, energy sources, vitamin supplements, mineral supplements, and specific feed additives. In Bangladesh, most dietary nutrients sources including fish, poultry, oilseeds, cereals, and algae, are available in different forms (raw, semi-processed). An indication of the suggested maximum inclusion level of the feedstuffs in fish/ shrimp feed is presented along with its principal limiting constraints are as follows (Tables 6.2.1- 6.3).

6.2.1 Animal Protein Sources

Animal feedstuffs are generally used sparingly due to their high cost. Their typically good nutrient profile means inclusion is desirable to ensure good nutrient balance in the feed. The addition of one or more animal source feedstuffs to a feed is often necessary, even in small amount, to avoid nutrient deficiencies and/or enhanced palatability of feeds to ensure good growth and nutritional performance of the fish/ shrimp.

Table 6.2.1 Quantity and maximum level of the use of animal based feed ingredients in fish and shrimp feed (dry matter basis)

Sl. No.	Feedstuffs	Crude protein (%)	Maximum level use (%)
1.	Fish meal	60-65	50
2.	Fish silage	45 -70	30
3.	Poultry by-product meal	50 - 60	20
4.	Poultry offal meal	60 - 65	30
5.	Silkworm pupae	45-60	20
6.	Shrimp meal (head and tail)	20-30	8
7.	Shrimp meal	45-70	25

6.2.2 Plant Protein Sources

Plant protein sources vary considerably in their nutritive values, most are deficient in at least one amino acid and many have very high levels of fiber. Many plant feedstuffs also contain anti-nutritional factors and toxins, which can significantly reduce their feed value. However, such factors can often be de-activated or destroyed by a suitable processing technique such as soaking or heat treatment. In this section the key anti-nutritional factors and toxins are considered. Recommended maximum inclusion levels for plant protein sources feedstuffs in fish/shrimp feed are shown in the Table 6.2.2.

Table 6.2.2 Quantity and maximum level of the use of plant based feed ingredients in fish or shrimp feed (dry matter basis)

Sl. No.	Feed ingredients	Crude protein (%)	Maximum level use (%)
Oilseeds and oil fruits:			
1.	Soybean (seed)	24-26	10
2.	Soybean meal, (Solvent extracted or mechanically extracted)	40 - 45	<30% of dietary protein or <75% of dietary protein with methionine addition
3.	Cotton seed meal (oil extracted)	30 - 40	15
4.	Nut meal	30 - 50	25
5.	Sunflower seed meal	30 - 40	25
6.	Linseed meal	30 - 40	25
7.	Mustard oil cake	30 - 35	20
8.	Rapeseed meal	30 - 40	20
Sl. No.	**Feed ingredients**	**Crude protein (%)**	**Maximum level use (%)**
Cereals:			
1.	Rice bran (auto)	10 - 14	
2.	Broken wheat (flour)	12 - 14	20
3.	Wheat bran (polish)	12 - 16	50
Aquatic weed:			
1.	Dried *Azolla* meal	20 - 25	25
2.	Dried duckweed	18 - 20	25
Legumes:			
1.	Ipil-ipil leave meal	25-28	20

6.3 Additives, binder and ideal values of ingredients used in fish feed

The additives, the feed binders mentioned, and the ideal levels mentioned in Fish Feed Rules shall be followed for preparation of fish feed (feed formula for preparation of feed should be preserved).

6.4 Methods for determination of standard value/nutritional value of the prepared fish feed and fish feed ingredients:

The quality and nutritional value of the commercial fish feed can be determined by the methods described below;

a) Protein (True protein): Kjeldhal method or any recognized scientific method. (Definition of true protein)
b) Oil: Solvent extraction (acetone/ether extraction) method or any scientifically recognized method.
c) Moisture: Oven drying method at 105 ℃-110 ℃ or any scientifically recognized method.
d) Ash: 6 (six) hours furnace burning method at 600℃ or any other process scientifically recognized method.
e) Fiber: Solvent extraction, and acid and alkali hydrolysis method or any other scientifically recognized method.
f) Carbohydrate: The value that remains after deduction of the values of protein, oil, moisture, ash, and fiber as determined in percentage shall be treated as carbohydrate.
g) Vitamin, minerals and other nutritional composition any recognized scientific method.

7. Commercially Manufactured Fish Feed

7.1 Compound fish and shrimp feeds may be produced by the manufacturers or may be prepared by the farmers. Whatever the method is followed mixed feeds should contain nutrients as specified for the target group of fish and shrimp at their different life stages. Some of the specifications are given in the following Tables 7.a-7.f.

a) Standard level of nutrients in manufactured feeds (% dry wt. basis) for major carps

Nutrient	Level	Name of feeds				
		Nursery	Starter (1-2)	Starter-3	Grower	Finisher
Moisture	maximum	12.0	12.0	12.0	12.0	12.0
Protein	minimum	28.0	26.0	24.0	22.0	21.0
Fat/ Oil	minimum	7.0	6.0	6.0	5.0	4.0
Carbohydrate	maximum	30.0	32.0	35.0	40.0	41.0
Fiber	maximum	6.0	8.0	8.0	9.0	10.0
Ash	maximum	17.0	18.0	19.0	21.0	22.0
Calcium	maximum	2.20	2.00	1.90	1.80	1.7
Phosphorus	minimum	0.8	0.7	0.7	0.60	0.50

b) Standard level of nutrients in manufactured feeds (% dry wt. basis) for cat fishes (including Thai Pangas)

Nutrient	Level	Name of feeds				
		Nursery	Starter (1-2)	Starter-3	Grower	Finisher
Moisture	maximum	12.0	12.0	12.0	12.0	12.0
Protein	minimum	32.0	30.0	28.0	25.0	24.0
Fat/ Oil	minimum	8.0	7.0	7.0	6.0	5.0
Carbohydrate	maximum	26.0	30.0	33.0	37.0	38.0
Fiber	maximum	5.0	6.0	7.0	8.0	9.0
Ash	maximum	18.0	20.0	21.0	23.0	24.0
Calcium	maximum	2.2	2.1	1.9	1.9	1.8
Phosphorus	minimum	0.9	0.8	0.7	0.7	0.6

c) Standard level of nutrients in manufactured feeds (% dry wt. basis) for Koi

Nutrient	Level	Name of feeds				
		Nursery	Starter (1-2)	Starter-3	Grower	Finisher
Moisture	maximum	12.0	12.0	12.0	12.0	12.0
Protein	minimum	35.0	33.0	33.0	32.0	32.0
Fat/ Oil	minimum	8.0	8.0	7.0	6.0	6.0
Carbohydrate	maximum	24.0	28.0	28.0	34.0	35.0
Fiber	maximum	4.0	5.0	6.0	6.0	6.0
Ash	maximum	16.0	18.0	18.0	20.0	21.0
Calcium	maximum	2.1	2.0	2.0	1.8	1.7
Phosphorus	minimum	0.7	0.6	0.6	0.5	0.4

d) Standard level of nutrients in manufactured feeds (% dry wt. basis) for Tilapia

Nutrient	Level	Name of feeds				
		Nursery	Starter (1-2)	Starter-3	Grower	Finisher
Moisture	maximum	12.0	12.0	12.0	12.0	12.0
Protein	minimum	30.0	28.0	27.0	25.0	24.0
Fat/ Oil	minimum	6.0	6.0	5.0	5.0	5.0
Carbohydrate	maximum	28.0	30.0	32.0	38.0	40.0
Fiber	maximum	5.0	7.0	7.0	8.0	9.0
Ash	maximum	16.0	18.0	18.0	20.0	22.0
Calcium	maximum	2.3	2.1	2.0	1.9	1.8
Phosphorus	minimum	0.8	0.7	0.6	0.5	0.4

e) Standard level of nutrients in manufactured feeds (% dry wt. basis) for Freshwater prawns/ shrimp

Nutrient	Level	Name of feeds				
		Nursery	Starter (1-2)	Starter-3	Grower	Finisher
Moisture	maximum	12.0	12.0	12.0	12.0	12.0
Protein	minimum	32.0	31.0	30.0	29.0	28.0
Fat/ Oil	minimum	7.0	6.0	6.0	5.0	5.0
Carbohydrate	maximum	25.0	28.0	29.0	35.0	36.0
Fiber	maximum	4.0	5.0	6.0	7.0	7.0
Ash	maximum	17.0	19.0	20.0	21.0	22.0
Calcium	maximum	3.2	3.0	2.8	2.6	2.5
Phosphorus	minimum	1.5	1.4	1.3	1.2	1.0

f)Standard level of nutrients in manufactured feeds (% dry wt. basis) for Brackish water shrimp/prawns

Nutrient	Level	Name of feeds				
		Nursery	Starter (1-2)	Starter-3	Grower	Finisher
Moisture	maximum	12.0	12.0	12.0	12.0	12.0
Protein	minimum	40.0	36.0	34.0	32.0	32.0
Fat/ Oil	minimum	5.0	5.0	4.0	4.0	4.0
Carbohydrate	maximum	22.0	24.0	26.0	29.0	30.0
Fiber	maximum	5.0	5.0	5.0	6.0	6.0
Ash	maximum	16.0	18.0	18.0	19.0	20.0
Calcium	maximum	3.0	2.7	2.5	2.1	2.0
Phosphorus	minimum	1.6	1.5	1.4	1.3	1.2

8. List of harmful chemical substances in fish feed

The following growth hormones, steroids, antibiotics and other harmful chemicals are prohibited to use in fish feed.

i) Stilbenes, its associate salts and esters

ii) Steroids

iii) Antibiotics and pharmacologically active substances:

(a) Chloramphenicol,
(b) Nitrofurans and its metabolites (AOZ, AMOZ, AHD and SEM)
(c) Metronidazole
(d) Dimetridazole
(e) Tetracycline
(f) Chlorotetracycline
(g) Oxytetracycline
(h) Amoxicillin
(i) Ampicillin
(j) Penicillin
(k) Gentamycin
(l) Tiamulin
(m) Tylosin
(n) Sulphonamides and
(o) (Fluro)quinolones

iv) Antihelemintics:

(a) Fenbendazole
(b) Mebendazole

8.1 List of chemical substances in fish feed that may be present as environmental contaminants and their acceptable limits

The following substances may come to fish feed as environmental contaminants or as residues through raw materials. Its acceptable limits are mentioned below.

1. Organochlorine pesticides:	**Acceptable limit**
(a) Aldrin	0.005 mg/kg
(b) DDT	1 mg/kg
(c) Deildrin	0.005 mg/kg
(d) Endrin	0.01 mg/kg
(e) Heptachlor	0.005 mg/kg
2. Chemical elements:	**Acceptable limit**
(a) Arsenic	1mg/kg
(b) Cadmium	0.50 ppm (shrimp) 0.05 ppm (fish)
(c) Chromium	0.10mg/kg
(d) Lead	0.50 ppm (shrimp) 0.30 ppm (fish)
(e) Mercury	0.50 mg/kg

3. Mycotoxin:	**Acceptable limit**
(a) Aflatoxin (group B1)	2 ppb
(b) Aflatoxin (group B1, B2, G1, G2)	4 ppb

9. Packing and Marking

9.1 Packing

The fish feed shall be packaged in approved container or packet consisting of two layers of jute cloth or polythene in the outer layer of the packets and a airproof inner poly pack layer and packaged under vacuum condition, The material shall be packed in packages which are leak-proof, impermeable to oxygen and moisture and prevent deterioration during transportation and storage.

9.2 Marking

The following particulars shall be marked on each container:

a) Name and address of the manufacturer;

b) Net mass and gross mass;

c) The percentage of different nutritional elements contained in the fish feed;

d) Batch or Code number;

e) What type of fish feeds for what type of fish species;

f) Date of packaging;

g) Date of expiry;

h) Maximum retail price;

j) Labels showing marks “to be used only as fish feed”; and

k) Any other requirements as specified in the current Legislations and Regulation enforced in the country.

9.2.1 The container may also be marked with BSTI Certification Mark.

NOTE – The use of BSTI Certification Mark is governed by the provisions of Bangladesh Standards and Testing Institution Act, 2018 and the Rules and Regulations made thereunder. Details of conditions, under which a license for the use of BSTI Certification Mark may be granted to manufacturers, processors or importer, may be obtained from the Bangladesh Standards and Testing Institution.

10. Legal Requirement

The product shall in all other aspects comply with the requirements of the legislations enforced in the country.

Annex-A
(Clause 2)

BDS No.	Title
BDS 103	Methods of rounding off numerical value

Annex-B
Recognized Methods of Analysis and Sampling

Title/Description	References
Sampling of Animal Feed	AOAC 965.16
Animal Feed: Preparation of Sample	AOAC 950.02
Moisture in Animal Feed	AOAC 934.01
Ash in Animal Feed	AOAC 942.05
Minerals in Animal Feed	AOAC 968.08
Calcium in Animal Feed	AOAC 927.02
Phosphorous in Animal Feed	AOAC 964.06 AOAC 965.17
Cobalt in Animal Feed	AOAC 952.02
Copper in Animal Feed	AOAC 947.03
Fat (Crude) or Acetone Extract in Fish Meal	AOAC 948.04
Fat (Crude) or Ether Extract in Animal Feeding	AOAC 920.39
Fat (Crude) in Animal Feed	AOAC 962.09
Fiber (Acid Detergent) and Protein (Crude) in Feed	AOAC 989.03
Nitrogen (Amido) in Animal Feed	AOAC 920.38
Nitrogen (Nitrate and Nitrite) in Animal Feed	AOAC 968.07
Protein (Crude) in Animal Feed	AOAC 954.01
Protein in Animal Feed	AOAC 935.11
Starch in Animal Feed	AOAC 920.40
Antibiotics in Feed	AOAC 957.23
Arsenic (total in animal feed)	AOAC 957.22
Aflatoxin in Foods and Feeds	AOAC 975.36
Mycotoxin	AOAC 970.43