DRAFT TANZANIA STANDARD

Marine shrimp feed – Specification

TANZANIA BUREAU OF STANDARDS

Marine shrimp feed – Specification

0 FOREWORD

Aquaculture is one of the fastest growing sub-sectors in the country. A large number of aquaculture farms on specific lines have been established. This Tanzania standard lays down specifications aiming at ensuring the safety and quality of marine shrimp feed produced or traded in the country.

In the preparation of this Tanzania Standard substantial assistance was drawn from Indian standard, IS 16150 (Part 3):2014 Fish Feed – Specification Part 3 Marine Shrimp Feed.

In reporting the results of a test or analysis made in accordance with this Tanzania 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).

1.0 SCOPE

This Tanzania Standard prescribes the requirements, methods of sampling and test for marine shrimp (*Penaeus monodon* and *Litopenaeus vannamei*) feed for their grow-out culture.

2.0 NORMATIVE REFERENCES

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

TZS 4 – Rounding off numerical values.
TZS 122-1 – Microbiology of food and animal feeding stuffs – Horizontal method for the detection of *Salmonella spp*.
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 821 – Animal feeding stuffs – Preparation of test samples
TZS 826 – Animal feeding stuffs – Determination of Aflatoxin B_1 content of mixed feeding stuffs – Method using high-performance liquid chromatography
TZS 2044 – Animal feeding stuffs – Determination of ash insoluble in hydrochloric acid
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 2476 – Animal feeding stuffs -Determination of fat content
TZS 2478 – Animal feeding stuffs – Determination of moisture and other volatile matter content
TZS 2480 – Animal feeding stuffs - Determination of nitrogen content and calculation of crude protein content - Part 1: Kjeldahl method
TZS 2482 – Animal feeding stuffs, animal products, and faeces or urine - Determination of gross calorific value - Bomb calorimeter method
TZS 2488 – Animal feeding stuffs – Sampling

3.0 TERMS AND DEFINITIONS

For the purpose of this Tanzania standard, the following terms and definitions shall apply:

3.1 starter feed

feed to be fed to post larvae of penaeid shrimp in grow-out ponds until they attain a mass of about 7.0 g

3.2 grower feed

feed to be fed to growing shrimp of about 7.0 g until they attain a mass of about 20 g

3.3 finisher feed

feed to be fed to growing shrimp of above 20 g mass.

4.0 REQUIREMENTS

4.1 General requirements

4.1.1 Feed form

4.1.1.1 Starter feed shall be in meal/mash form

4.1.1.2 Grower feed and finisher feed shall be in the form of sinking pellets

4.1.2 Marine shrimp feed;

4.1.2.1 Shall be fresh, free from rancidity, musty and objectionable odour, adulterants, moulds and insect infestation.

4.1.2.2 Ingredients

The ingredients listed in Annex A shall only be used for manufacturing marine shrimp feed.

4.1.3 Water stability of pellets

The feed pellets should be stable without disintegration in water for 2 h minimum. The water stability shall not be less than 90 percent after 1 h when tested as per Annex B.

4.2 Specific requirements

Penaeus monodon feed shall conform to the requirements given in Table 1 and *Litopenaeus vannamei* feed shall conform to the requirements given in Table 2.

Table 1: Requirements for *Penaeus monodon* feed

S/No	Parameters	Requirements			Methods of test (See clause 2)
		Starter	Grower	Finisher	
1	Moisture, %, m/m, max	12.0	12.O	12.0	TZS 2478
2	Crude protein (6.25 X N), %, m/m, Min	35.0	32.0	30.0	TZS 2480
3	Crude fat, %, m/m, min	5.0	5.0	5.0	TZS 2476

4	Crude fibre, %, m/m, max	3.0	4.0	5.0	TZS 2472
5	Acid insoluble ash, %, m/m, max	4.0	5.0	5.0	TZS 2044
6	Gross energy, kcal/kg, min	3200	3200	3000	TZS 2482
7	Phosphorus, %, m/m, max	1	1	1	ICP/AAS

NOTE – The requirements specified for parameters (2) to (7) are on moisture-free basis

Table 2: Requirements for *Litopenaeus vannamei feed*

S/No	Parameters	Requirements			Methods of test (See clause 2)
		Starter	Grower	Finisher	
1	Moisture, %, m/m, max	12.0	12.O	12.0	TZS 2478
2	Crude protein (6.25 X N), %, m/m, Min	35.0	30.0	25.0	TZS 2480
3	Crude fat, %, m/m, min	5.0	5.0	5.0	TZS 2476
4	Crude fibre, %, m/m, max	3.0	4.0	5.0	TZS 2472
5	Acid insoluble ash, %, m/m, max	4.0	5.0	5.0	TZS 2044
6	Gross energy, kcal/kg, min	3000	3000	2800	TZS 2482

NOTE – The requirements specified for parameters (2) to (6) are on moisture-free basis

5 HYGIENE

5.1 Marine shrimp feed shall be prepared under strict hygienic conditions according to TZS 109 (see clause 2).

5.2 Marine shrimp feed shall comply with microbiological limits as shown in Table 3;

Table 3: Status for microbiological tolerance of Marine shrimp feed

S/No.	Microorganism	Status	Test methods (see clause 2)
1.	*Salmonella spp/25g*	Absent	TZS 122-1
2.	*Escherichia coli, cfu/g*	Absent	TZS 730-1

6.0 CONTAMINANTS

6.1 Pesticide residues

Marine shrimp feed shall comply with pesticide residues limits as prescribed in the Codex Alimentarius Commission.

6.2 Aflatoxins B_1

Aflatoxins B_1 content of the Marine shrimp feed shall not exceed 0.05mg/kg in accordance with the test method prescribed in TZS 826.

6.3 Heavy metals

Marine shrimp feeds shall comply with the limits of heavy metals as specified in the Table 4 when tested in accordance with the methods specified therein.

Table 4: Heavy metals contaminants

S/No	**Heavy metal**	**Limits** (mg/kg, max)	**Test Method (see clause 2)**
1)	Mercury (Hg)	0.5	ICP/AAS
2)	Lead (Pb)	1.0	TZS 268
3)	Arsenic (As)	2.0	TZS 76
4)	Cadmium (Cd)	5.0	ICP/AAS

7.0 SAMPLING AND TESTS

7.1 Sampling

Sampling of Marine shrimp feed shall be done according to TZS 2488 and TZS 821 (see clause 2).

7.2 Tests

Testing of marine shrimp feed shall be done according to test methods prescribed in Tables 1, 2 and 3.

8.0 PACKING, MARKING AND LABELLING

8.1 Packing

Marine shrimp feed shall be packed in clean and sound containers capable of protecting the product from moisture ingress, contamination and spillage during normal handling and transportation. The containers shall be sealed/stitched in a manner that the product will be effectively protected.

8.2 Marking and labelling

8.2.1 Marine shrimp feed containers shall be marked and labelled in accordance with TZS 538 (see clause 2). In addition, each container shall be legibly and indelibly marked with the following information:

a) Name of the product,
b) Type of the marine shrimp feed and growth stage,
c) Name and address of the manufacturer;
d) Batch or code number;

e) Date of production;
f) Net weight in metric unit;
g) Expiry date;
h) Country of origin;
i) Storage instructions;
j) Guaranteed analysis,

8.3 The container may also be marked with TBS Certification Mark.

NOTE – The TBS Standards Mark of Quality may be used by the manufacturers only under license from TBS. Particulars of conditions under which the licenses are granted may be obtained from TBS.

Annex A
(normative)

INGREDIENTS FOR MARINE SHRIMP FEED

A-1 In the compounding of marine shrimp feed a variety of ingredients are used. This Annex gives a list of such ingredients.

A-1.1 Ingredients of Animal Origin

a) Bone meal,
b) All crustacean meals,
c) Squid meal and all other squid products,
d) Molluscan meal (clam, mussel, etc.),
e) Silk worm pupae,
f) Squid oil,
g) Squid liver oil,
h) Fish oil,
i) Blood meal,
j) Meat meal,
k) Fishmeal and all other fish products,

A.1.2 Ingredients of Plant Origin

a) Soybean cake (meal),
b) Ground nut oilcake (expeller-pressed or solvent extracted),
c) Sesame (*sesamum indicum orientale*) oil cake (expeller-pressed or solvent extracted),
d) Cotton seed oil cake (decorticated) (expeller-pressed or solvent extracted)
e) Sunflower oilcake (decorticated or undecorticated),
f) Copra cake, coconut oil cake (expeller-pressed or solvent extracted),
g) Mustard oilcake,
h) Wheat and wheat products,
i) Rice and its products/broken rice,
j) Maize and maize products,
k) Any other edible cereal and its products,
l) Rice bran,
m) Wheat bran,
n) Edible vegetable oils,
o) Soybean lecithin,

p) Algal meals,
q) Sea weeds,
r) Corn gluten, and
s) Sorghum meal,
t) Alfalfa meal (Lucerne meal) – dried grass meal,
u) Potatoes (*solanum tuberosum*),
v) Brewer's yeast and dried grains,
w) Sugarcane molasses.

A.1.3 Other ingredients

- Common salt,
- Dicalcium phosphate (as TZS),
- Calcium lactate,
- Limestone,
- Vitamins,
- Minerals,
- Yeast and yeast extracts,
- Spirulina,
- Brewery by –products,
- Molasses,
- Tapioca and its products,
- Binders,
- Single cell protein,
- Attractants,
- Nucleotides,
- Amino acids,
- Pigments,
- Toxin binders and clay,
- Dunaliella,
- Antifungals,
- Peptiglycans,
- B-glucans, and
- Fuccoidan.

ANNEX B
(Normative)
DETERMINATION OF WATER STABILITY OF SHRIMP FEED PELLETS

B-1 PRINCIPLE

Water stability of dry marine shrimp feed pellets is determined by the loss in mass of pellets kept in water for specified time interval. The loss in mass of pellets indicates the stability, higher the loss poorer the stability.

B-2 APPARATUS

B-2.1 Oven

B-2.2 Nylon Mesh

B-2.3 Sieve (2.4 mm)

B-2.4 Balance

B-2.5 Glass Beaker (1 litre)

B-2.6 Stop Watch

B-3 PROCEDURE

Wash cone shaped pouches made of nylon mesh (1 mm mesh size) thoroughly and dry at 70^0C to constant mass in an oven. Take about 2 g of feed pellets in each pouch and record exact initial mass. Take 5-6 such pouches for each sample. Place the pouches with feed pellets at the bottom of 1 litre beaker containing one litre seawater (30 parts per thousands). Record water temperature, salinity and pH of the seawater. After prescribed time, slowly take out pouches with pellets out of the water. Examine the pellets for their physical shape. Wash the adhering salt on the pellets by dipping in fresh water for 5 min. Dry the pouches with pellets at 70^0C to constant mass. Difference in the initial mass and final mass of the pellets gives loss in mass at 70 ^{0}C.

D-4 CALCULATION

Water stability is calculated using the following formula:

$$\text{Precent Water stability} = \frac{\text{Final mass (g)} * \text{Percent dry matter}}{\text{Initial mass (g)} * \text{Percent dry matter}} * 100$$