
Fish meal as animal feed — Specification



ARS 1838: 2024

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This African Standard was prepared by ARSO/TC 17, *Animal feeding, feeds and feeding stuffs*.

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Introduction

Fish meal is a rich source of high-quality protein and contains besides calcium and phosphorus, unidentified growth factors which are necessary for maximum growth rate and reproduction in livestock. The incorporation of fish meal in animal feeds, especially poultry feeds and pig feeds has become a regular practice in the animal feed industry.

The development of this standard will not only serve as an important and useful reference document for any envisaged large-scale fish meal production but will go a long way to assist present manufacturers produce quality fish meal.

Fish meal as animal feed — Specification

1 Scope

This African Standard specifies requirements, sampling and test methods for fish meal used in compounding animal 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.

AOAC 941.04, *Urea and Ammoniacal Nitrogen in Animal Feed*

AOAC 952.13, *Arsenic in food — Silver diethyldithiocarbamate*

BS EN 15763 *Foodstuffs. Determination of trace elements. Determination of arsenic, cadmium, mercury and lead in foodstuffs by inductively coupled plasma mass spectrometry (ICPMS) after pressure digestion*

CODEX STAN 192, *General standard for food additives*

FDARS 1828, *Animal feeds — Code of practice for production, processing, storage, transport, and distribution*

FDARS 2139, *Code of practice on good animal feeding*

ISO 13720, *Meat and meat products — Enumeration of presumptive Pseudomonas species*

ISO 16050, *Foodstuffs — Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products — High-performance liquid chromatographic method*

ISO 16654, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Escherichia coli O157*

ISO 17375, *Animal feeding stuffs — Determination of aflatoxin B1*

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

ISO 5984, *Animal feeding stuffs — Determination of crude ash*

ISO 5985, *Animal feeding stuffs — Determination of ash insoluble in hydrochloric acid*

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 6495-1, *Animal feeding stuffs — Determination of water-soluble chlorides content*

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ISO 6496, *Animal feeding stuffs — Determination of moisture and other volatile matter content*

ISO 6497, *Animal feeding stuffs — Sampling*

ISO 6561-2, *Fruits, vegetables and derived products — Determination of cadmium content — Part 2: Method using flame atomic absorption spectrometry*

ISO 6579-1, *Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella — Part 1: Detection of Salmonella spp*

ISO 6633, *Fruits, vegetables and derived products — Determination of lead content — Flameless Atomic Absorption Spectrometric Method*

3 Terms and definitions

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

3.1

fish meal

product obtained by drying (removing fat where necessary) and grinding whole fish, or parts thereof, of various species

3.2

crude protein

CP

total protein content of a feed which is determined by analysing the nitrogen content of feed and multiplying the result by a factor

3.3

crude fat

total fat content of a feed determined by a laboratory test

3.4

total ash

inorganic part of a feed consisting of mineral elements determined in a laboratory by incineration at a high temperature and weighing the residue

3.5

moisture content

mass fraction of substances lost on drying the sample by using the accredited procedure

3.6

extraneous matter

organic or inorganic materials other than fish meal such as metallic objects, sand, stones, chaff, insects and others

4 Requirements

4.1 General requirements

Fish meal shall be free from:

- a) extraneous matter;
- b) adulterants;

- c) harmful constituents;
- d) insect infestation;
- e) visible fungal growth;
- f) off odour.

4.2 Specific requirements

Fish meal shall comply with the requirements specified in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Specific requirements for fish meal

S/N	Characteristic %	Requirement	Test method
i.	Moisture, max.	10	ISO 6496
ii.	Crude protein min.	55	ISO 5983-1
iii.	Crude fat, max.	12	ISO 6492
iv.	Acid insoluble ash, max.	3	ISO 5985
v.	Total ash, max.	20	ISO 5984
vi.	Calcium, max.	10	ISO 6490-1
vii.	Phosphorous, max.	7	ISO 6491
viii.	Ammoniacal nitrogen, max.	0,5	AOAC 941.04
ix.	Sodium chloride, max.	5	ISO 6495-1

5. Food additives

Fish meal shall comply with the maximum additives' limits established by the Codex Alimentarius Commission (CODEX STAN 192).

6. Contaminants

6.1 Aflatoxin

Fish meal shall comply with the limits for aflatoxin specified in Table 2 when tested in accordance with the test methods specified therein.

Table 2 — Aflatoxin limits for fish meal

S/N	Aflatoxin	Maximum limit µg/kg	Test method
i.	Total aflatoxin	10,0	ISO 16050
ii.	Aflatoxin B ₁	5,0	ISO 17375

6.2 Pesticide residues

Fish meal shall comply with the maximum pesticide residue limits established by the Codex Alimentarius Commission.

6.3 Heavy metals

Fish meal shall comply with the maximum limits for heavy metals specified in Table 3 when tested in accordance with the test methods specified therein.

Table 3 — Heavy metals in fish meal

S/N	Heavy metal	Maximum limit mg/kg	Test method
i.	Arsenic, (As)	2,0	AOAC 952.13
ii.	Lead (Pb)	5,0	ISO 6633
iii.	Cadmium (Cd)	1,0	ISO 6561- 2
iv.	Mercury (Hg)	0,1	BS EN 15763

7. Hygiene, receiving, storage, and transportation

7.1 Fish meal shall be prepared and handled in accordance with the requirements of FDARS 2139.

7.2 Fish meal shall be produced, transported, received and stored in accordance with the procedure described in the appropriate sections of FDARS 1828.

8 Microbiological limits

Fish meal shall comply with the microbiological limits specified in Table 4 when tested in accordance with the test methods specified therein.

Table 4 — Microbial limits in fish meal

S/N	Microorganism	Limit	Test method
i.	<i>Escherichia coli</i> (<i>E - coli</i>), cfu/g	Absent	ISO 16654
ii.	<i>Salmonella spp</i> in 25 g	Absent	ISO 6579-1
iii.	<i>Pseudomonas aeruginosa</i>	Absent	ISO 13720

9. Packaging

Fish meal shall be packaged in suitable containers that are of sufficient strength, and sufficiently sealed to withstand reasonable handling without tearing, bursting or falling open. The containers shall be clean and not previously used.

10 Labelling

Each package of fish meal shall be legibly and indelibly marked with the following information;

- a) name of the product as “Fish meal”;
- b) name and physical address of the manufacturer/exporter/packer;
- c) country of origin;
- d) additives, if included;
- e) net weight in metric units;
- f) directions and precautions for use;
- g) batch number/lot identification;
- h) manufacturing date;
- i) expiry date / used before date;
- j) storage instructions;
- k) nutrients composition.

11 Sampling

Sampling shall be done in accordance with ISO 6497.

Bibliography

EAS 97: 2021, *Fish meal — Specification.*

