

QUALITY ISSUES IN POWDERED FISH-BASED PRODUCTS

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What is Edible Fish Powder

Edible fish powder describes a food grade powder product designated primarily for human consumption applications. It differs significantly from fish meal products which are designated for animal feed applications. Fish protein powders have various sanitary processing, purity and functional characteristics which establish them as human food ingredients.

Why Edible Fish Powder?

- Fish is a potential source of protein food. The quality of fish protein is high and the lysine level is particularly good.
- The use of surplus fish can well be used for production of fish powders of edible quality.
- Edible fish powder contains all the nutritional ingredients like protein, vitamins and minerals, and has the organoleptic qualities, like taste and flavor of dry fish
- Its use even in small quantities would serve to boost the protein quality of cereal-based diets wherever feasible.
- Can use for the formulation of convalescent and formulated foods
- Edible fish powder is prepared for human consumption by a hygienic process that does not involve solvent extraction. It is completely free from toxic organic solvents and added chemicals.

Method for the preparation of edible fish powder (IS:10059-1981)

Edible fish powder means the product prepared from non-oily white fish like sprats, either from a single species or their mixture. Whole cleaned fish was thoroughly minced in a meat mincer and

the minced meat dried in a tunnel dryer to a moisture level of below 10%. The dried meat was powdered and sieved to give a fine powder.

Raw material

Fresh fish of edible quality which is normally consumed whole should be used for the Preparation.

Edible fish powder can be prepared from lean white fish of pelagic type such as sprats

- ❖ Poisonous fish like marine snakes, elasmobranch fish with a high quantity of urea, oily fish and fish with black viscera are not considered suitable for preparation of edible fish powder.
- ❖ The fish need not be dressed but should be washed and cooked well for the preparation of the powder.

Preparation of pressed cake

- ❑ Raw miscellaneous fish received from the boat shall undergo preliminary sorting and fatty fish like sardine, shark, cat fish and non-edible varieties are removed by hand picking.
- ❑ The material shall then be washed well, in a concrete washing tank lined inside with glazed tiles and fitted with false bottom and an outlet pipe, using potable water several times to remove sand, dirt, slime and other extraneous matter.
- ❑ The washed mass is transferred as such without dressing to a steam jacketed stainless steel hemispherical kettle having a tilting arrangement, using sufficient quantity (1:1) of potable water to completely immerse the fish.
- ❑ The fish is then cooked at 100°C and boiled for 30 minutes under frequent agitation using a hand ladle till the whole mass is completely disintegrated.
- ❑ After cooking, the slurry is cooled and allowed to stand for some time to settle, so that the oil floats up.
- ❑ The oil-water mixture is decanted off by tilting the vessel.
- ❑ The operation is repeated once more.

- ❑ The solid mass is then taken in a nylon bag and pressed in a screw hydraulic press at a pressure of 5 kg/cm² to remove the maximum amount of water.
- ❑ The pressed cake so obtained is manually broken into small lumps.

PRODUCTION OF DRY POWDER

- The pressed mass is then dried on aluminium trays in a hot air tunnel drier at a temperature of 67-70°C to a final moisture level of 5 percent and below.
- The dried cake while hot is pulverized in a beater type pulveriser to a fine powder.
- The powder is sieved in a mechanical gravity-type sieving machine to 150-micron size and the oversized produce is pulverized once again sieved and the final oversize which contains mainly bones, scales etc. is discarded.
- The sieving machine shall have all its contact parts made of stainless steel and shall be fitted with two sieves (80 and 150 micron) in two decks, with an arrangement for continuous charging and for receiving products and oversize products continuously without stopping the machine.
- The product is tested chemically and bacteriological. The edible fish powder is then packed.

Packing

- ✓ The edible fish powder shall be packed in clean, sound containers made of tinplate, Post-Consumer Recycled Content (PCRC) sheets, cardboard paper or other material agreed to between the purchaser and vendor in such a way as to protect it from spillage, contamination, migration of moisture or air from the atmosphere, and seepage of fat into the material through the packing material.
- ✓ When packed in flexible material the packaging material should be capable of withstanding handling during transportation.

- ✓ The edible fish powder shall not come in direct contact with packaging material other than grease-proof or sulphate paper, cellulose paper or any other non-toxic packing material which may be covered with moisture-proof laminate or coated paper.
- ✓ When packed in metallic containers, the containers shall be airtight and completely filled to have minimum air or the space shall be filled with inert gas, or the contents held in vacuum.

Marking on the container

The following details shall be clearly marked on the container:

- Name, type and grade of the material;
- Name and address of manufacturer;
- Batch/Code number;
- Minimum net quantity and gross quantity;
- Date of manufacture; and
- Any other requirements under the Legal Metrology (Packaged Commodities)2011 and the Food Safety Standards (Packaging and Labelling) regulation,2011 .
- Each container may also be marked with the ISI Certification Mark

Sampling

Representative samples of material for test and criteria for conformity shall be drawn according to the method prescribed in IS:5315-1978

Requirements

IS:10059-1981

*Specification for fish protein concentrate

Sr.No.	ic	Requirement
1	Moisture present% by weight, Max	10

2	Crude protein content (NX 6.25) on dry basis percent by weight, Min	65
3	Total available lysine g/100g of Protein, Min	6
4	Fat content on dry basis % by Weight, Max	6
5	Ash on dry basis % by weight, Max	18
6	Acid insoluble ash on dry basis % by weight, Max	0.5
7	Fluoride (as F), mg/kg, Max	250
8	Mercury, mg/kg, Max	0.5
9	Lead, mg/kg, Max	2.5

BACTERIOLOGICAL REQUIREMENTS OF EDIBLE FISH POWDER (Clause 3.5)

CHARACTERISTIC	REQUIREMENT	METHOD OR TEST, REF TO
2	3	4
Total bacterial count, Max.	15000 per g	IS:5402-1969*
E.Coli and pathogenic organisms including <i>salmonella</i>	Nil	IS:5887-1976 (Parts I and III)
<p>* Method for plate count of bacteria in foodstuffs. Methods for detection of bacteria responsible for food poisoning: Part I Isolation and identification of enteropathogenic <i>Escherichia coli</i> and the enumeration of <i>Escherichia coli</i> Part III Isolation and identification of <i>salmonella and shigella</i>.</p>		

FSSAI has notified the final Food Safety and Standards (Food Products Standards and Food Additives) Eleventh Amendment Regulations, 2017. This notification prescribes the standards for Edible Fish Powder, along with other standards of F & F products. The regulation is effective from

the date of its publication in the Official Gazette. 15th September, 2017. The specifications of Edible Fish Powder as per FSSAI is as follows

(a) Edible fish powder means the product prepared from non-oily white fish like sprats, either from a single species or their mixture. Fresh fish of edible quality which is normally consumed whole should be used for the preparation. Poisonous fish like marine snakes, elasmobranch fish with a high quantity of urea, oily fish and fish with black viscera are not considered suitable for preparation of edible fish powder.

(b) The fish need not be dressed but should be washed and cooked well for the preparation of the powder.

(c) Requirements.-

(i) Edible fish powder shall be a fine powder free from needle-like bones. It shall blend easily with cereal flours. It shall have a faint yellow colour and the characteristic flavour and taste of dry fish. It shall be free from rancidity and off-flavours.

(ii) No organic solvent or chemicals shall be used in its preparation.

(iii) Particle Size – Unless otherwise specified, the edible fish powder shall be of such fineness that it passes completely through a 100-mesh sieve.

Characteristic	Requirement
Moisture % by weight, Max	10
Crude protein content (NX 6.25) on dry basis percent by weight, Min	65
Total available lysine g/100g of Protein, Min	6
Fat content on dry basis % by Weight, Max	6

Ash on dry basis % by weight, Max	18
Acid insoluble as on dry basis % by weight, Max	0.5

(v) The Protein Efficiency Ratio (PER) shall not be less than 2.5 (IS : 7481).

(d) Food Additives.- Only the food additives permitted under these regulations shall be used.

(e) Hygiene.-

The product shall be prepared and handled in accordance with the guidelines specified in part-II of Schedule 4 of the Food Safety and Standards (Licensing and Regulation of Food Businesses) Regulations, 2011 and such guidelines as provided from time to time under the provisions of the Food Safety and Standard Act, 2006.
