Ministry of Food Processing Industries
Government of India

NIFTEM
KNOWLEDGE • INNOVATION • OUTREACH

MARINE PRODUCTS-
FOOD SAFETY AND FSSAI REGULATIONS

AATMANIRBHAR BHARAT

PM Formalisation of Micro Food Processing Enterprises (PM FME Scheme)

HACCP

A system, which identifies, evaluates, and controls hazards, which are significant for food safety

- In HACCP System, the control is transferred from ‘end product testing’ to ‘on-line checking’

- That is a change from ‘testing for failure’ to ‘preventing failure’

HACCP

Hazard

A biological, chemical or physical agent that is reasonably likely to cause illness or injury in the absence of its control

Critical Control Point (CCP)

- Identifiable point in the production chain where a hazard may occur.
- Action is taken to prevent the hazard from occurring.
- This can either be a point, step or procedure at which control can be applied and is essential to prevent or eliminate a hazard or reduce it to an acceptable level.

PRE-REQUISITES TO HACCP

- All food business must have in place pre-requisite programmes (PRPs).

- Food businesses must have programmes consistent with the Codex General Principles of Food Hygiene in place before considering application of HACCP.

- Prerequisite programs are steps or procedures, including GMPs (Good Manufacturing Practices) and SSOPs (Sanitation Standard Operating Procedures), which control the operational conditions within a food establishment and promote environmental conditions that are favorable for the production of safe food.

- For the production of safe fish and fish products each segment of the fish industry must be supported by prerequisite programmes based on GMP/GHP (Good Hygiene Practice).

GOOD MANUFACTURING PRACTICES (GMPs)

- Required for Seafood HACCP compliance and focus on sanitation control steps.
- GMPs are key to producing safe, sanitary and quality seafood.
- Although definitions of prerequisites and/or SSOPs refer mostly to operational conditions, there are also basic requirements to the processing plant and the processing environment.

The Processing Plant:

- Conditions of premises
- Facilities:

✓ Water, ice, steam (quantitative conditions)
✓ Water treatment system (chlorination plant, waste water treatment)
✓ Sanitary facilities and installations

- Equipment: Boxes, containers and machinery

Operational conditions

✓SAFE WATER

✓CLEAN CONTACT SURFACES

✓CROSS-CONTAMINATION PREVENTION

✓EMPLOYEE HEALTH

✓EMPLOYEE SANITATION

✓ADULTERANT PROTECTION

✓PEST CONTROL

✓LABEL, STORE & USE TOXIC COMPOUNDS PROPERLY

GOOD HYGIENIC PRACTICES (GHPS)

- All practices regarding the conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain.
- The terms GMP and GHP therefore basically cover the same ground.

Operational conditions and procedures

- Safety of water and ice (qualitative conditions)
- Cleanliness of food contact surfaces
- Prevention of cross contamination from insanitary objects to food
- Maintenance of facilities for personal hygiene
- Protection of food from adulterants
- Safe storage and use of toxic compounds
- Control of employee health conditions
- Pest control
- Waste management
- Transportation
- Traceability and recall procedure
- Training.

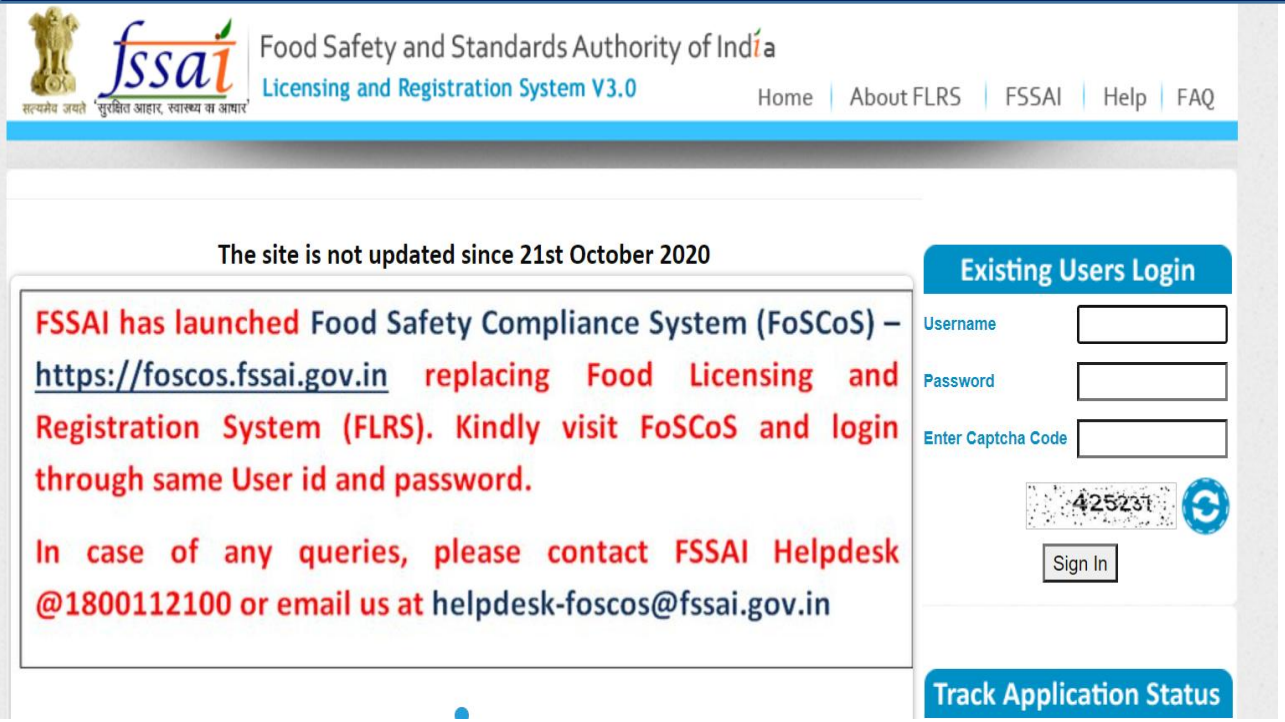
FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA (FSSAI)

- Autonomous body established by the Government of India under the Ministry of Health & Family Welfare.
- Usually sets standards for food so that there is no chaos in the minds of consumers, traders, manufacturers and investors.

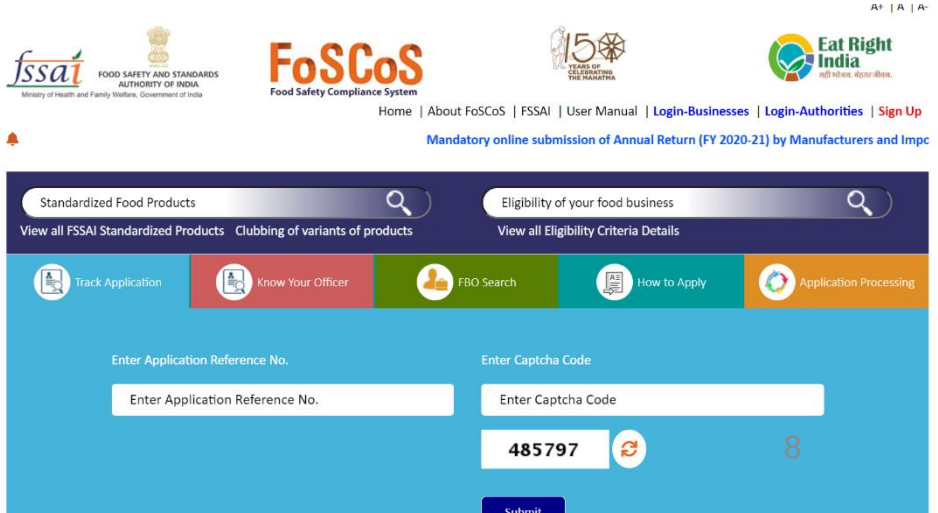
FSSAI REGISTRATION

- As per Section 31(1) & 31(2) of FSS Act, 2006, every Food Business Operator in the country is required to be licensed/registered under the Food Safety & Standards Authority of India.
- The licensing and registration procedure and requirements are regulated by Food Safety & Standards (Licensing and Registration of food Business) Regulations, 2011.
- Registration is meant for petty food manufacturers that includes petty retailer, hawker, itinerant vendor or a temporary stall holder or small or cottage scale industry having annual turnover up to 12 Lakhs.
- All food businesses having income more than this limit are required to take a license.

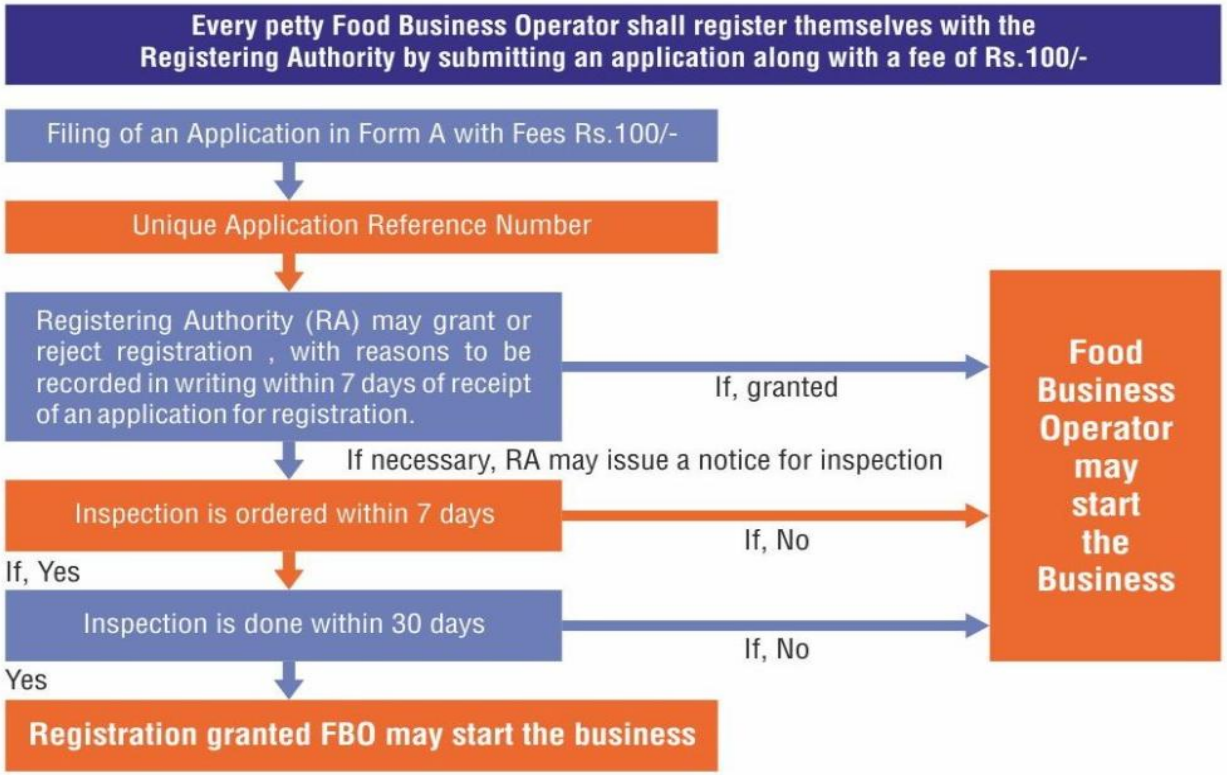
FOOD SAFETY COMPLIANCE SYSTEM (FOSCOS)

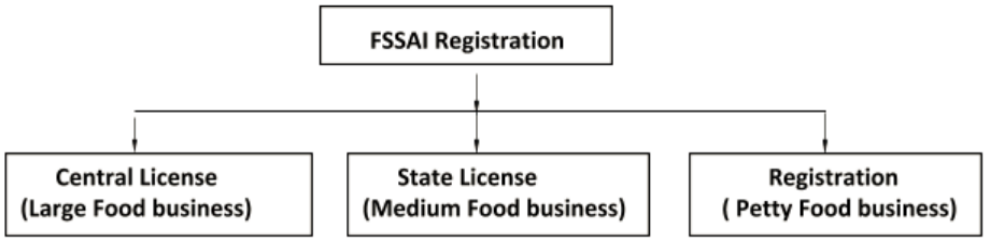


Food Safety Compliance System (FoSCoS) is an enhanced version of Food Licensing and Registration System (FLRS), which was launched in 2012 for issuance of pan-India FSSAI Licenses and Registration.



FSSAI REGISTRATION PROCESS





FSSAI LICENSING PROCESS

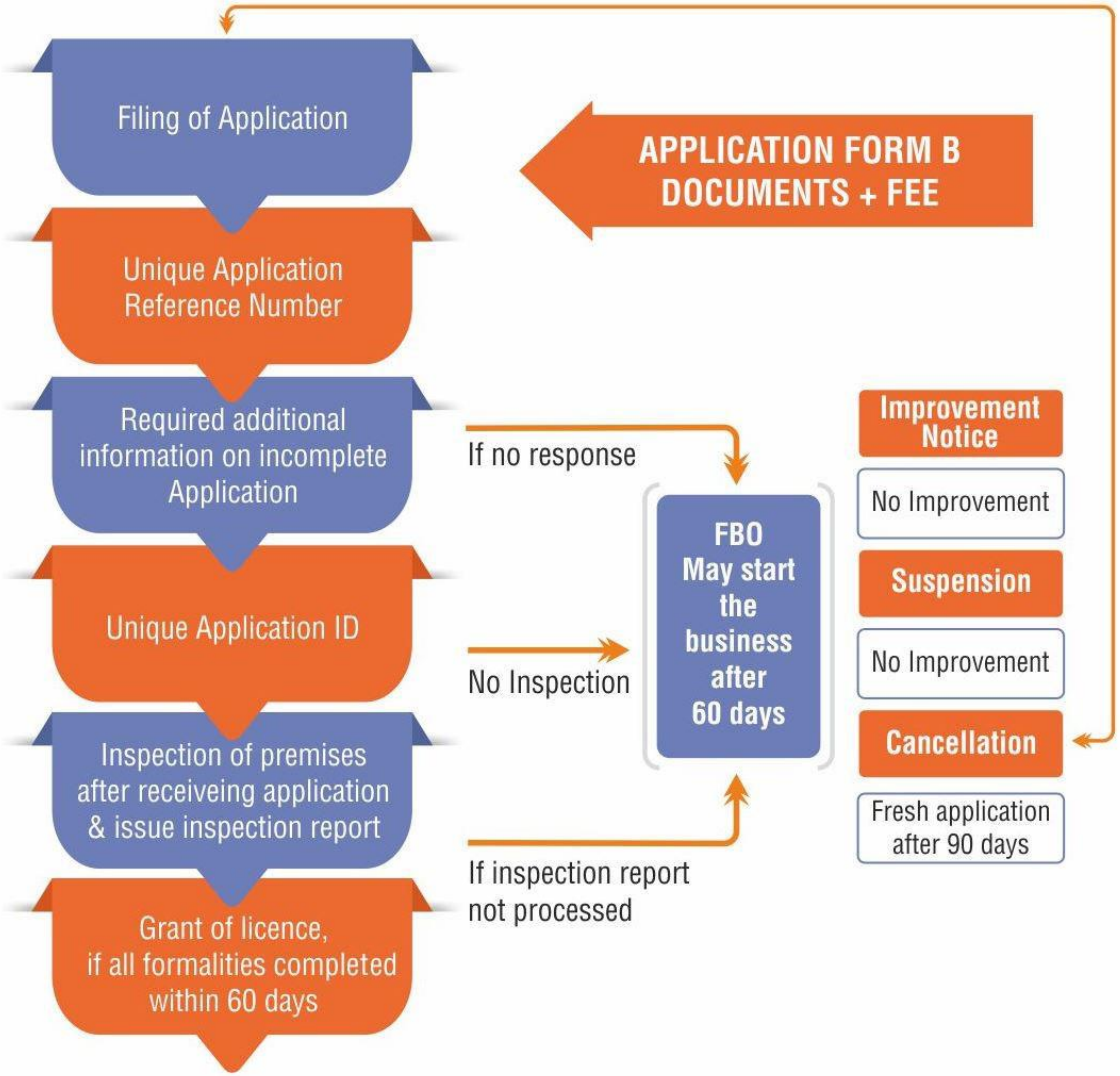


TABLE 1: MAIN INDIAN FOOD CATEGORIES

1	Dairy products and analogues
2	Fats and oils, and fat emulsions
3	Edible ices, including sorbet
4	Fruits and vegetables (including mushrooms and fungi, roots and tubers, fresh pulses and legumes, and aloe vera), seaweeds, and nuts and seeds
5	Confectionery
6	Cereals and cereal products, derived from cereal grains, from roots and tubers, pulses, legumes (fresh pulses and legumes are covered in category 4.2) and pith or soft core of palm tree, excluding bakery wares of food category 07.0
7	Bakery products
8	Meat and meat products, including poultry and game
9	Fish and fish products, including molluscs, crustaceans, and echinoderms
10	Eggs and egg products
11	Sweeteners, including honey
12	Salts, spices, soups, sauces, salads and protein products
13	Foodstuffs intended for particular nutritional uses
14	Beverages, excluding dairy products
15	Ready-to-eat savouries
16	Prepared Foods/dishes including Composite foods
17	Products not covered into category 1-16
99	Substances added to food which are 'not for direct consumption as food'

FOOD SAFETY AND STANDARDS (FOOD PRODUCTS STANDARDS AND FOOD ADDITIVES) REGULATIONS, 2011

09 Fish and Fish Products including molluscs, crustaceans, and echinoderms (Food Category Name)

Food Sub Category Names

09.1 - Fresh fish and fish products, including molluscs, crustaceans, and echinoderms

09.2 - Processed fish and fish products, including molluscs, crustaceans, and echinoderms

09.3 - Semi-preserved fish and fish products, including molluscs, crustaceans, and echinoderms

09.4 - Fully preserved, including canned or fermented fish and fish products, including molluscs, crustaceans, and echinoderms

09.1 - FRESH FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

Live and Raw Bivalve Molluscs [09.1.2] - FSSR Number 2.6.1 (18)

- Standard apply to live bivalve molluscs and to raw bivalve molluscs that have been shucked or frozen or processed to reduce or to limit target organisms while essentially retaining the sensory characteristics of live bivalve molluscs.
- Raw bivalve molluscs are marketed either in a frozen or chilled state.
- Both live and raw bivalve molluscs may be intended for direct consumption or further processing.

(1) LIVE BIVALVE MOLLUSCS : Live bivalve molluscs are products that are alive immediately prior to consumption. Presentation includes the shell.

(2) RAW BIVALVE MOLLUSCS: Raw bivalve molluscs processed for direct consumption or for further processing are products that were alive immediately prior to the commencement of processing.

09.2 - PROCESSED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

1. Frozen shrimp [09.2.1] - FSSR Number 2.6.1 (1)

- Frozen shrimp which includes shrimps, means the product frozen raw or partially or fully cooked, peeled or unpeeled.
- Frozen shrimp is the product obtained from species belonging to Penaeidae, Solenoceridae, Aristeidae, Sergestidae, Hippolytidae, Crangonidae, Palaemonidae and Atyidae.

2. Frozen Lobsters [09.2.1] - FSSR Number 2.6.1(2)

- Frozen Lobsters means the product prepared from fresh lobsters of sound quality belonging to the genus *Homarus* of the family Nephropidae and from the families Palinuridae and Scyllaride.
- The Norway Lobster may be prepared from *Nephros norvegicus*.
- The product shall not be a mixture of different species.
- The product may be raw or cooked.

09.2 - PROCESSED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

3. Frozen squid and parts of squid [09.2.1] - FSSR Number 2.6.1 (3)

- Frozen squid and parts of squid means the product prepared from fresh squid of sound quality belonging to squid species of Loliginidae, Ommastrephidae, Onychoteuthide and Thysanotenthidae families.
- The product may be glazed with water.
- No food additive is allowed in this product.

4. Frozen finfish [09.2.1] - FSSR Number 2.6.1 (4)

- Frozen finfish means the product frozen from the species as defined below and offered for direct consumption and for further processing.
- Frozen finfish refers to finfish species suitable for human consumption, with or without the head, from which the viscera or other organs may have been completely or partially removed.

Requirements of raw materials: The raw material shall not contain more than 100 mg/Kg of histamine. This shall only apply to species of Carangidae, Chanidae, Clupeidae, Coryphaenidae, Engraulidae, Istiophoridae, Mugilidae, Pristigasteridae, Scombridae and Xiphiidae.

09.2 - PROCESSED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

5. Frozen fish fillets [09.2.1] - FSSR Number 2.6.1 (5)

- Frozen fish fillets mean the product frozen from the species of fish as defined and offered for direct consumption for further processing.
- Frozen fillets are slices of fish, which are removed from the carcass of the same species of fish suitable for human consumption by cuts made parallel to the backbone and sections of such fillets cut so as to facilitate packing, and further processing.
- The product after preparation shall be subject to a freezing process as described.
- Fillets may be presented as boneless, provided that boning has been completed including the removal of pin bones.

Requirements of raw materials: The raw material shall not contain more than 100 mg/Kg of histamine. This shall only apply to species of Carangidae, Chanidae, Clupeidae, Coryphaenidae, Engraulidae, Istiophoridae, Mugilidae, Pristigasteridae, Scombridae and Xiphiidae.

09.2 - PROCESSED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

6. Frozen Cephalopods [09.2.1] - FSSR Number 2.6.1 (9)

- Frozen cephalopods are the raw frozen cephalopods and parts of raw cephalopods, as defined and offered for direct consumption and for further processing.

7. Frozen Clam meat [09.2.1] - FSSR Number 2.6.1 (17)

- Frozen clam meat means the product frozen and as defined and offered for consumption.
- Frozen clam meat is picked either raw or after heating from *Vallarta* species or *Meretrix* species or any other edible species of clams and frozen either raw or after cooking.
- The frozen clam meat shall have the characteristic appearance and colour.
- It shall be free from discoloration, deterioration, sand particles, pieces of shell, filth or any other foreign matter.
- Frozen clam meat shall be of following types

1. Raw Frozen Clam Meat (RFCM)
2. Cooked Frozen Clam Meat (CFCM)

Requirements

- ✓ The frozen clam meat shall have a soft and firm texture.
- ✓ The material shall be of a reasonably uniform size with broken pieces of meat not exceeding 10 % by count.

09.2 - PROCESSED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

8. Fresh and Quick Frozen Raw Scallop Products [09.2.1]- FSSR Number 2.6.1 (22)

- This standard applies to bivalve species of the *Pectinidae* family in the following product categories:

✓ "Fresh or Quick Frozen Scallop Meat", which is the scallop adductor muscle meat.

✓ "Fresh or Quick Frozen Roe-on Scallop Meat", which is the scallop adductor muscle meat and attached roe.

✓ Quick Frozen Scallop Meat", or "Quick Frozen Roe-on Scallop Meat", with added water and/or solutions of water and phosphates.

- Products covered by this Standard may be intended for direct human consumption or for further processing.

This Standard does not apply to

✓Scallop meat that is formed, mixed with extenders, or bound by fibrinogen or other binders and

✓Whole scallops (live, fresh or frozen in which the shell and all viscera are attached). These products are included in the Standard for Live and Raw Bivalve Molluscs.

PREPARATION METHODS

The shrimp or prawn, finfish, fish fillet, cephalopods after preparation, shall be subject to a freezing process according to following conditions.

- The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly.
- The freezing process shall not be regarded as complete unless and until the product temperatures have reached -18 ^{o}C or lower at the thermal center after thermal stabilization.
- The water used for cooking shall be of potable quality or clean seawater, which meets the same microbiological standards as potable water and is free from potential contaminants.
- The product shall be kept deep frozen to maintain the quality during transportation, storage, and distribution.
- Frozen products shall be processed and packaged to minimize dehydration and oxidation
- The practice of repacking frozen products under controlled conditions which shall maintain the quality of the product, followed by the reapplication of the freezing process as defined, is permitted.

REQUIREMENTS

- Frozen Shrimp, Frozen Finfish, Frozen Fish Fillets, Frozen Cephalopods shall be prepared from sound shrimps or prawns, fish, squid, cuttlefish or octopus used to prepare the mentioned frozen products must be of a good quality and sold fresh for human consumption.

- If glazed, the water used for glazing or preparing glazing solutions shall be of potable quality (IS 10500) or shall be clean sea-water, which meets the same microbiological standards as potable water and is free from potential contaminants.

- Other ingredients shall be of food grade quality and conform to all applicable standards prescribed in these regulations.

9. QUICK FROZEN FISH STICKS (FISH FINGERS), FISH PORTIONS AND FISH FILLETS - BREADED OR BATTERED [09.2.2]–FSSR NUMBER 2.6.1 (21)

- This standard applies to quick-frozen fish sticks (fish fingers) and fish portions cut from quick-frozen fish flesh blocks or formed from fish flesh, and to natural fish fillets, breaded or batter coatings, singly or in combination, raw or partially cooked and offered for direct human consumption without further industrial processing.

- A fish stick (fish finger) means the product, which includes the average percent of fish flesh must not be less than 50 percent of total weight. Each stick shall be not less than 10 mm thick. A fish portion including the coating may be of any shape, weight or size. Fish sticks or portions may be prepared from a single species of fish or from a mixture of species with similar sensory properties
- Fillets are slices of fish of irregular size and shape, which are removed from the carcass by cuts made parallel to the backbone and pieces of such fillets, with or without the skin.
- The product after any suitable preparation shall be subjected to a freezing process and shall comply with the conditions laid down hereafter.

9. QUICK FROZEN FISH STICKS (FISH FINGERS), FISH PORTIONS AND FISH FILLETS - BREADED OR BATTERED [09.2.2] - FSSR NUMBER 2.6.1 (21)

Continued……

- The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallisation is passed quickly.
- The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18 ^{o}C or colder at the thermal centre after thermal stabilisation. The product shall be kept deep frozen so as to maintain the quality during transportation, storage, and distribution.
- Industrial repacking or further industrial processing of intermediate quick frozen material under controlled conditions, which maintains the quality of the product, followed by the re-application of the quick freezing process, is permitted.
- Quick frozen breaded or battered fish sticks (fish fingers) breaded or battered fish portions and breaded or battered fillets shall be prepared from fish fillets or minced fish flesh, or mixtures thereof, of edible species, which are of a quality such as to be sold fresh for human consumption.
- The products shall not contain more than 10 mg/100 g of histamine based on the average of the sample unit tested. This shall apply all the species mentioned in the list of histamine. to species of *Clupeidae*, *Scombridae*, *Scombresocidae*, *Pomatomidae* and *Coryphaenedae* family.

DEFECTIVES– THE SAMPLE UNIT SHALL BE CONSIDERED DEFECTIVE WHEN IT EXHIBITS ANY OF THE PROPERTIES

Foreign Mater (cooked state): The presence in the sample unit of any matter, which has not been derived from fish (excluding packing material), does not pose a threat to human health, and is readily recognised without magnification or is present at a level determined by any method including magnification that indicates noncompliance with good manufacturing and sanitation practices.

Bones (cooked state) (in packs designated boneless): One bone per kg greater or equal to 10 mm in length, or greater or equal to 1 mm in diameter; a boneless than or equal to 5 mm in length, is not considered a defect, if its diameter is not more than 2 mm. The foot of a bone (where it has been attached to the vertebra) shall be disregarded, if its width is less than or equal to 2 mm, or if it can easily be stripped off with a fingernail.

Odour and flavour: A sample unit affected by persistent and distinct objectionable odour and flavours indicative of decomposition or rancidity or of feed.

Flesh abnormalities: Objectionable textural characteristics such as gelatinous conditions of the fish core together with greater than 86 % moisture found in any individual fillet or sample unit with pasty texture resulting from parasites affecting more than 5 % of the sample unit by weight.

10. FROZEN MINCED FISH MEAT [09.2.3]-FSSR NUMBER 2.6.1 (15)

Raw material

- Clean and fresh fish which do not show any signs of degradation and spoilage shall be used.
- The fish shall be gutted; the tail, entrails, bones, tips, skin, head and other non-edible portion shall be removed and eviscerated. Fish shall be washed thoroughly with clean potable water to remove the blood.
- The variety of fish used shall be specified.
- The fish shall be properly iced and maintained at a temperature not exceeding 5 °C till transported to the freezing factory.

Requirements- Processing Method

- ❑ Fresh fish shall be washed to make free of all foreign matter preferably by chilled potable water (5°C) having 5 mg/kg (ppm) of available chlorine and meat separated from fish in the wholesome condition.
- ❑ The material shall be quickly frozen at a temperature not exceeding -30 °C in polyethylene wrappers and packed in waxed cartons in the minimum possible time.
- ❑ The quickly frozen material shall be stored in the cold storage at a temperature not less than -23 °C.

10. FROZEN MINCED FISH MEAT [09.2.3]-FSSR NUMBER 2.6.1 (15)

Continued……

Finished Products:

- The frozen minced fish meat, on thawing must be clean and shall be found undamaged and free from defects.
- Deterioration, such as dehydration, oxidative rancidity and adverse changes in the texture shall not be present.
- The product shall be free from foreign matter and finishing agents.

The products shall conform to the requirements specified in the table below

Sl. No	Characteristics	Requirements
1.	Colour of minced fish meat	Characteristic of the species
2.	Texture of the minced meat	Characteristic of the species
3.	Odour	Characteristic of the species, free from rancid, putrid of foreign odour
4.	Flavour	Characteristic of the species, sweetish and pleasant, free from spoilt or foreign flavour
5.	Bone content, % by weight, Max	1.0

11. DRIED SHARK FINS[09.2.5] – FSSR NUMBER 2.6.1 (6)

- Dried shark fins means the product prepared from dorsal and pectoral fins, lower lobe of caudal fin and Pelvic from fresh shark of edible quality.
- The product shall be free from adhering flesh and may be with or without skin. The product shall be dried in a suitable manner and shall be free from any food additive.
- The product shall be free from foreign matter, objectionable odour or flavour and rancidity.
- No food additive is allowed in this product.

The products shall conform to the following requirements:—

Sl. No	Characteristics	Requirements
1.	Moisture	Not more than 10.0 percent
2.	Ash insoluble in HCl on dry basis	Not more than 1.0 percent
3.	Yeast and Mould Count	Absent in 25 g

12. SALTED FISH/ DRIED SALTED FISH [09.2.5]– FSSR NUMBER 2.6.1 (7)

-Dried/ salted and dried fishery products means the product prepared from fresh or wholesome fish after drying with or without addition of salt.

-The fish shall be bled, gutted, beheaded, split or filleted and washed prior to salting and drying.

-Salt used to produce salted fish shall be clean, free from foreign matter, show no visible signs of contamination with dirt, oil, bilge or other extraneous materials.

-The product shall be free from foreign matter, objectionable odour and flavour.

-The product may contain food additives permitted in Appendix A.

The products shall conform to the following requirements:—

Sl. No	Characteristics	Requirements
1.	Water activity (a_w), at 25°C	Less than 0.78
2.	Salt Content (percent Sodium Chloride)*	Not less than 12 %
3.	Histamine** content, max.	200 mg/Kg
4.	Acid Insoluble Ash on dry basis	Not more than 1 %

13. EDIBLE FISH POWDER [09.2.5]– FSSR NUMBER 2.6.1(13)

- **Edible fish powder:** 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. 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.

Requirement

- 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.
- No organic solvent or chemicals shall be used in its preparation.
- Particle Size – Unless otherwise specified, the edible fish powder shall be of such fineness that it passes completely through a 100-mesh sieve.
- The Protein Efficiency Ratio (PER) shall not be less than 2.5 (IS: 7481).

13. EDIBLE FISH POWDER [09.2.5]– FSSR NUMBER 2.6.1(13)

Continued……

The edible fish powder shall comply with the following requirements

Sl. No	Characteristics	Requirements
1.	Moisture % by weight, Max	10
2.	Crude protein content (N X 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 as on dry basis % by weight, Max	0.5

14. FREEZE DRIED PRAWNS (SHRIMPS) [09.2.5]– FSSR NUMBER 2.6.1(16)

Freeze dried prawns (shrimps)

They shall be of

- any edible species

- the following types

- **Peeled, non-deveined and cooked** – head and shell removed completely and cooked
- **Peeled, deveined and cooked** – head, shell and dorsal tract removed and cooked
- **Cooked and peeled** – peeled after cooking

Requirements

•The raw material shall be prepared from clean, wholesome and fresh prawns, and shall not show any visible sign of spoilage.

•The colour of the raw material shall typically be of freshly caught prawns. The meat shall be firm and shall have the typical odour of freshly caught prawns. The material shall be free from any discoloration and off odours.

14. FREEZE DRIED PRAWNS (SHRIMPS) [09.2.5]– FSSR NUMBER 2.6.1(16)

Continued……

- The water used in the processing of prawns shall be of potable quality and shall contain 5 mg/kg available chlorine.
- The maximum value for moisture content shall be 2.0 percent.
- The extent of rehydration shall be minimum 300 percent (IS: IS 14949).

When observed visually, physical defects for various characteristics shall not exceed the values specified in the table below

Sl. No	Characteristics	Requirements
1.	Deterioration with spoiled pieces	Nil
2.	Discoloration	3
3.	Black spots	Nil
4.	Broken and damaged pieces	2
5.	Legs, bits of veins etc.	Nil
6.	Foreign matter or filth	Nil

15. SMOKED FISHERY PRODUCTS [09.2.5]– FSSR NUMBER 2.6.1 (10)

- Smoked fishery products mean the product smoked, smoke-flavoured and smoke-dried fish prepared from fresh, chilled or frozen raw material. It deals with whole fish, fillets and sliced and similar products thereof.
- The standard applies to fish, either for direct consumption or for further processing, or for addition into a specialty or minced products where fish constitutes only part of the edible contents.

Types of Smoked Fish

1. Smoked fish
2. Smoke-dried fish
3. Smoke-flavoured fish

•Smoked fish is prepared from fish that has undergone hot or cold smoking process. The smoke must be applied through one of the smoking processes defined in regulation below and the end product must have smoked sensory characteristics. Spices and other optional ingredients may be used.

•Smoke-dried fish is prepared from fish that have undergone combined smoking and drying process and may include a salting process as described in regulation below. The smoke must be applied through a traditional or industrial smoke-drying process and the end product must have smoke-dried sensory characteristics. Spices and other optional ingredients may be used.

15. SMOKED FISHERY PRODUCTS [09.2.5]– FSSR NUMBER 2.6.1 (10)

Continued……

•Smoke-flavoured fish is prepared from fish that has been treated with smoke flavours, without employing a smoking process as described in regulation below. The end product must have a smoked taste. Spices and other optional ingredients may be used.

Requirements

- Smoked fish, smoke-flavoured fish, and smoke-dried fish shall be prepared from sound and wholesome fish, which may be fresh, chilled or frozen and of a quality to be sold for human consumption after appropriate preparation.

- Other ingredients shall be of food grade quality and conform to all applicable standards prescribed in these Regulations

16. PASTEURIZED FISH SAUSAGE[9.2.4.1]- FSSR NUMBER 2.6.1 (23)

(1) The term fish sausage refers to fish mince-based product comprising fish mince, seasoning and spices, food additives, which are mixed thoroughly and stuffed into suitable casing and heat processed to achieve pasteurization. Fish sausage is an emulsion product wherein, myofibrillar proteins from fish are emulsifiers. The major myofibrillar protein fraction, myosin, is responsible for emulsion and texture of heat processed sausage. Pasteurized fish sausage is either ready to eat or can be cooked for further preparation.

(2) Any fish meat of acceptable quality for human consumption or surimi (separated fish flesh water washed, partially dehydrated, mixed with food grade additives, frozen and frozen stored) may be used for fish sausage preparation.

(3) Fish mince is mixed with different food grade additives, seasoning, spices and oil using bowl chopper. The resultant paste shall be stuffed into a suitable casing material (food grade) using stuffer. The stuffed casings shall be sealed or clipped with appropriate material using ringer or clipper. The stuffed and sealed sausages shall be pasteurized (F value at 85 ^{o}C: 31 min; Z value: 8.9 ^{o}C) and cooled immediately in chilled water at 4-5 ^{o}C for 10 min. The sausages shall be air dried and stored at refrigerated temperature (<3 ^{o}C).

16. PASTEURIZED FISH SAUSAGE[9.2.4.1]- FSSR NUMBER 2.6.1 (23)

Continued……

(4) The sensory quality of the final product shall be characteristic of the fish used. It shall be free from off door and devoid any foreign matter. The product shall not have swollen appearance nor phase separation of added oil and water.

(5) The product shall conform to the following requirements, namely: –

Sl. No	Characteristics	Requirements
1.	Fish mince proportion (min)	65 %
2.	Fat (max)	8 %
3.	Binding agent (Food grade starch)- (max)	9 %
4.	Seasoning and spices (max)	5 %

16. PASTEURIZED FISH SAUSAGE[9.2.4.1]- FSSR NUMBER 2.6.1 (23)

Continued……

(6) Microbiological specification of pasteurised fish sausage shall be as per Convenience Fishery Products, (Item No.15 of Microbiological Requirements for fish and fishery products as given under these regulations.)

(7) The level of additives can be same as per the edible casing (e.g., sausage casing) mentioned for food category 08.4 under these regulations.

(8) The products shall comply with the packaging and labelling requirements specified in the Food Safety and Standards (Labelling and Display), Regulations, 2020 and shall apply to the pre-packaged products. Fish sausages shall be packed in transparent food grade containers and best before use to be provided.

17. PASTEURISED CRAB MEAT [9.2.4.2] -FSSR NUMBER 2.6.1 (24)

- Standards specified in this clause shall apply to crab meat that has been cooked, pasteurized and chilled, intended for direct consumption with or without cooking and for further processing.

- Pasteurized crab meat is a ready-to-eat product obtained from different parts of the crab, singly or in combination, packed in hermetically sealed containers, pasteurised and stored at chilled condition (<3 ^{o}C).

- Pasteurized crab meat shall be processed from live blue swimming crabs that have been subjected to the following general steps:

a) Washing, cooking, cooling, dressing, picking and sorting using appropriate methods;
b) Packed in cans or other appropriate containers;
c) Pasteurized at sufficient time and temperature; and
d) Cooled using appropriate method

- It is recommended that the crab meat shall be pasteurized to a minimum cumulative total lethality of $F_{85}{}^{o}{}_{C}$= 31 minutes, where z = 9^{0} C. Equivalent processes at different temperatures can be calculated using the z values provided.

17. PASTEURISED CRAB MEAT [9.2.4.2] -FSSR NUMBER 2.6.1 (24)

Continued……

The final product shall conform to the following quality requirements for fill of containers or net weight and sensory properties. Rigid container, like cans or plastic cups, shall be well filled with the product, which shall occupy not less than 90 % (minus any necessary headspace according to good manufacturing practices) of the water capacity of the container. The water capacity of the container is the maximum volume of distilled water at 20 ^{0}C that the sealed container can hold when completely filled.

Defectives

- Foreign matter
- Distinct objectionable odours or flavours indicative of decomposition
- Soft and mushy texture
- Discoloration

(i) Blue, brown, black discolorations exceeding 5% by weight of the drained contents; or,

(ii) Black sulphide staining of the meat exceeding 5% by weight of the drained contents

- Any struvite crystals greater than 5 mm in length
- Shell bits with 2 mm or greater, of more than ten (10) pieces

09.3 - SEMI-PRESERVED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

1. Fish pickles[09.3.2] - FSSR Number 2.6.1(14)

- Fish pickle shall possess a good uniform colour and appearance and shall be practically free from defects, visible fungal growth and disintegration of meat.
- The material shall possess a good texture, shall not be unduly hard, or tough, and shall be free from development of any softening.

Requirements: Raw material will be as follows

- Edible fish
- Spices and condiments such as ginger garlic, chilies and curry powder
- Edible common salt
- Preservation media
- Vinegar (4 % acetic acid)
- Edible vegetable oils.
- The product shall possess the characteristic pleasant aroma and flavour and shall be devoid of any objectionable off -taste smell or odour.
- The material shall be free from artificial colouring matter and firming agents other than edible common salt and vinegar.

Fish pickles[09.3.2] - FSSR Number 2.6.1(14)

Continued……

The material shall conform to the requirement specified in the Table below.

Sl. No	Characteristics	Requirements
1.	Fluid portion % by weight, Max	40
2.	pH	4.0 - 4.5
3.	Acidity as acetic acid of fluid Portion % by weight, Max	2.5 - 3.0
4.	Sodium chloride % by weight, Max	12.0

09.3 - SEMI-PRESERVED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

2. Sturgeon Caviar [09.3.3] - FSSR Number 2.6.1 (19)

- Standard specified in this clause shall apply to granular sturgeon caviar of the fish of the *Acipenseridae*
- For the purposes of this clause

➢ **"Fish eggs"** means non-ovulated eggs separated from the connective tissue of ovaries. ovulated eggs may be used from aquaculture sturgeons.

➢ **"Caviar"** means the product made from fish eggs of the *Acipenseridae* family by treating with food grade salt.

- The product is prepared from fish eggs of sturgeon fishes belonging to the *Acipenseridae* family (four genera *Acipenser, Huso, Pseudoscaphirhynchus and Scaphirhynchus* and hybrid species of these genera).
- The eggs are of about one size and characteristically coloured according to the species used. Colour can vary from light grey to black or from light yellow to yellowish grey. Brownish and greenish shades are permissible.
- The product is made with the addition of salt and is intended for direct human consumption. The salt content of the product shall be in the range of 3-5 g/100gm in the end product.

09.3 - SEMI-PRESERVED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

2. Sturgeon Caviar [09.3.3] - FSSR Number 2.6.1 (19)

Continued……

- The product, after suitable preliminary preparation of the caviar, shall be subject to treatment or conditions sufficient to prevent the growth of spore and non-spore forming pathogenic microorganisms and shall comply with the conditions laid down hereafter.

- Ovulated eggs are harvested after hormonal induction of ovulation of the female. The eggs are appropriately treated to remove the adhesive layer and to harden the shell. Permitted hormones may be used to produce ovulated eggs.

- During packaging, storage, and retail, the product temperature is between 2°C to 4°C, whereas, for wholesale business, including storage and transportation, the temperatures are between 0°C to -4°C.

- Freezing as well as frozen storage of caviar is not permitted unless the deterioration of quality is avoided.

09.3 - SEMI-PRESERVED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

2. Sturgeon Caviar [09.3.3] - FSSR Number 2.6.1 (19)

Continued……

Defects

Foreign matter

Persistent and distinct objectionable odour or flavour indicative of decomposition, oxidation, or taste of feed (in fish reared in aquaculture), or contamination by foreign substances(such as fuel oil).

Consistency and condition

•The presence of hardcover of caviar grains that is not easily chewable or tenuous

•The breaking up of the outer membranes when attempting to separate the grains

•The Presence of broken eggs or fluid

Objectionable matter– The presence of remnants of membranes or secreted fat in finished caviar shall be objectionable.

Only those **food additives** permitted under these regulations shall be used. The use of colours and texturizing agents is not allowed.

09.4 - FULLY PRESERVED, INCLUDING CANNED OR FERMENTED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

1. Canned Fishery Products[09.4] - FSSR Number 2.6.1 (8)

Canned fishery products mean canned finfish, crustaceans and molluscs solid packed or packed in oil, water or other suitable media.

Presentation

•The product shall be presented in one of the following packing media own juice, brine or water, edible oil, tomato sauce or curry.

•The can shall not show any visible external defects like denting, panelling, swelling or rusting.

•The contents of the can, on opening, shall not display any appreciable disintegration. Pieces from which portions have separated out would be treated as disintegrated units. The percentage of the detached portion of fish calculated on the basis of the drained mass shall not exceed 5 percent by mass based on the average of 5 cans.

•The product shall have the odour, flavour and colour characteristic of the species.

1. CANNED FISHERY PRODUCTS[09.4] - FSSR NUMBER 2.6.1 (8)

Continued……

Requirements- Raw Material – Fish

•The material used for the preparation of canned finfish shall be from sound fish of the species as given in the regulation and of a quality fit to be sold fresh for human consumption. Heads and gills shall be completely removed, scales and tail may be removed.

•The fish may be eviscerated. If eviscerated it shall be practically free from visceral parts other than roe, milt or kidney. If not gutted, it shall be practically free from undigested feed or used feed.

•Shrimp, crab meat, mussels and squid rings must all be prepared from sound species as given in the regulation and must be of a quality fit for human consumption and mussels and squid rings should have no evidence of spoilage and degradation.

Decomposition: The raw fish shall not contain more than 100 mg/Kg of histamine based on the average of the sample unit tested. This shall apply only to species of fish with the potential to form a hazardous level of histamine as mentioned in Food Safety and Standards (Contaminants, Toxins, and Residues) Regulations, 2011.

1. CANNED FISHERY PRODUCTS[09.4] - FSSR NUMBER 2.6.1 (8)

Continued……

Final Product

The product shall be free from foreign materials, filth and from grittiness. Other parameters like drained weight, disintegrated portion as % of drained weight, medium, a percentage of water, vacuum, etc. have been given in tabular form in these regulations.

Sr. No.	Characteristics	Finfish				Crustaceans		Molluscs	
		Tuna	Mackerel	Sardine	Pomfret/ Seer fish	Shrimp / Prawn	Crab	Mussel	Squid
1.	Medium	Oil	Oil Brine Curry Tomato Sauce	Oil Brine Curry	Oil	Brine	Brine	Oil	Brine
2.	Drained wt. as % of water capacity*	70	65	70	66	64	65	65	64
3.	% of water in the drained liquid**	5	10	10	10			5	-
4.	Disintegrated portion as % of drained weight (max)	5	5	5	5	5	5	5	5
5.	Vacuum (Minimum)	For round cans 100 mm and negative pressure in flat cans							
6.	Head Space	5-10 mm							
7.	Can Exterior	shall not be rusted, dented or bulged							

***A tolerance of ±5 percent is permitted, ** Only applicable for oil medium**

- **The percentage of sodium chloride in the final product of sardine and mackerel shall be 3.5 percent in the case of brine treated cans.**
- **The acidity of brine as citric acid anhydrous shall be between 0.06 and 0.20 percent (m/v).**

09.4 - FULLY PRESERVED, INCLUDING CANNED OR FERMENTED FISH AND FISH PRODUCTS, INCLUDING MOLLUSCS, CRUSTACEANS, AND ECHINODERMS

2. Ready –to-Eat Finfish or Shell Fish Curry in Retortable Pouches [09.4]- FSSR Number 2.6.1(11)

Product Definition

- Ready-To-Eat Finfish/Shellfish Curry in Retortable Pouches is prepared from finfish or shellfish species of sound quality without any visible sign of decomposition.
- The product is prepared from the edible portions of sound fish, packed in a gravy of spices, vegetable fat and other ingredients appropriate to the product and heat processed by an appropriate manner after being sealed in a container so as to prevent spoilage.

Process Definition

•Products are hermetically sealed and shall have received a processing treatment sufficient to ensure commercial sterility.

•The product shall be presented in curry packing medium.

Decomposition

The total volatile base nitrogen (TVBN) level of raw material (finfish or shellfish) should not exceed 35 mg/100g.

2. READY –TO-EAT FINFISH OR SHELL FISH CURRY IN RETORTABLE POUCHES [09.4]- FSSR NUMBER 2.6.1(11)

Continued……

Final Product

- The finished product shall have the odour, flavour and colour characteristic of the product. The bones shall be soft and yielding.
- The contents of the pouch on opening shall not display any appreciable disintegration. Pieces from which portions have separated out would be treated as disintegrated units. The percentage disintegrated portions of the fish, calculated on the basis of the drained mass shall not exceed 5 % based on the average of five pouches.
- The product shall be free from foreign materials such as sand, dirt and insects, objectionable odour, or flavour.
- The residual air in the pouch after processing shall be less than 2 % of the volume of the pouch contents.
- The average proportion of fish to curry in retort pouch shall be in the ratio of 60: 40.
- The percentage of salt in the product shall be 1% to 2 %, maximum.

Processing

•The material shall be packed in retortable pouches, exhausted or vacuumized and heat-sealed. Exhausting can be done either by steam injection or hot filling to achieve residual air level of less than 2%.

•Processing (Retorting) shall be done in overpressure autoclave till the product reaches an F0 value of 8-10 minutes at the slowest heating point. The water used for cooling of retort pouches shall be as per IS 10500:2012 standards and chlorinated to maintain free residual chlorine of less than 2 mg/l.

2. READY –TO-EAT FINFISH OR SHELL FISH CURRY IN RETORTABLE POUCHES [09.4]- FSSR NUMBER 2.6.1(11)

Continued……

Packaging and Labelling

- ❑ The retort pouches shall be packed in suitable retail containers to prevent physical impact during transportation.
- ❑ Retort pouch materials of food grade quality having the configuration of polyester/ aluminium foil/cast polypropylene or four layers consisting of polyester/ aluminium foil or aluminium oxide/nylon and cast polypropylene may be used. Other suitable packaging materials which can withstand high temperature and pressure can also be used.

The pouches shall be of food grade quality. The retort pouch shall have the mechanical properties as under

Sl. No	Characteristics	Requirements
1.	Tensile strength (Kgf/15 mm) machine direction	3.0-5.25
2.	Bond Strength (Kgf/15 mm)	0.225 – 0.750
3.	Heat seal strength (Kgf/15 mm), Min	4.60
4.	Bursting strength (Kg/cm2), Min	1.74

For More details Contact:

National Institute of Food Technology and Entrepreneurship and Management
Ministry of Food Processing Industries
Plot No. 97, Sector-56, HSIIDC, Industrial Estate, Kundli, Sonipat, Haryana-131028

Website: http:www.niftem.ac.in

Email: pmfmecell@niftem.ac.in
Call: 0130-2281089