Ministry of Food Processing Industries
Government of India

NIFTEM
KNOWLEDGE • INNOVATION • OUTREACH

MUSSELS
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.

HAZARD

Biological: Harmful microorganisms and parasitic worms

Chemical: Those either naturally occurring or intentionally or unintentionally added

Physical: Any potentially harmful extraneous matter not normally found in food. E.g. Glass, stones, or metal

SEVEN HACCP PRINCIPLES

1. Conduct hazard analysis
2. Determine critical control points (CCP)
3. Establish critical limit
4. Establish system to monitor control of CCP
5. Establish corrective action
6. Establish verification procedures
7. Establish documentation

SIGNIFICANCE OF HACCP

It helps to control hazards in fish production

By monitoring and controlling major food risks, the industry can assure customers that their products are safe.

- Saves your business money in the long run
- Avoids you poisoning your customers
- Food safety standards increase
- Ensures you are compliant with the law
- Food quality standards increase
- Organizes your process to produce safe food
- Organizes staff promoting teamwork/efficiency
- Due diligence defense in court.

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).

WHY PREREQUISITE PROGRAMMES?

- Prerequisite programs are the foundation of a Food Safety/HACCP system.

- Prior to the implementation of a Food Safety/HACCP plan, plants must develop, document, and implement written prerequisite programs.

- The purpose of HACCP is to allow businesses to focus control at critical points.

- Without well functioning prerequisite programmes we risk either
  - Identifying so many critical points that we cannot focus our efforts and resources
  - Not taking sufficient account of hazards that should have been controlled by our GHPs (Good Hygiene Practices)....but are not

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.

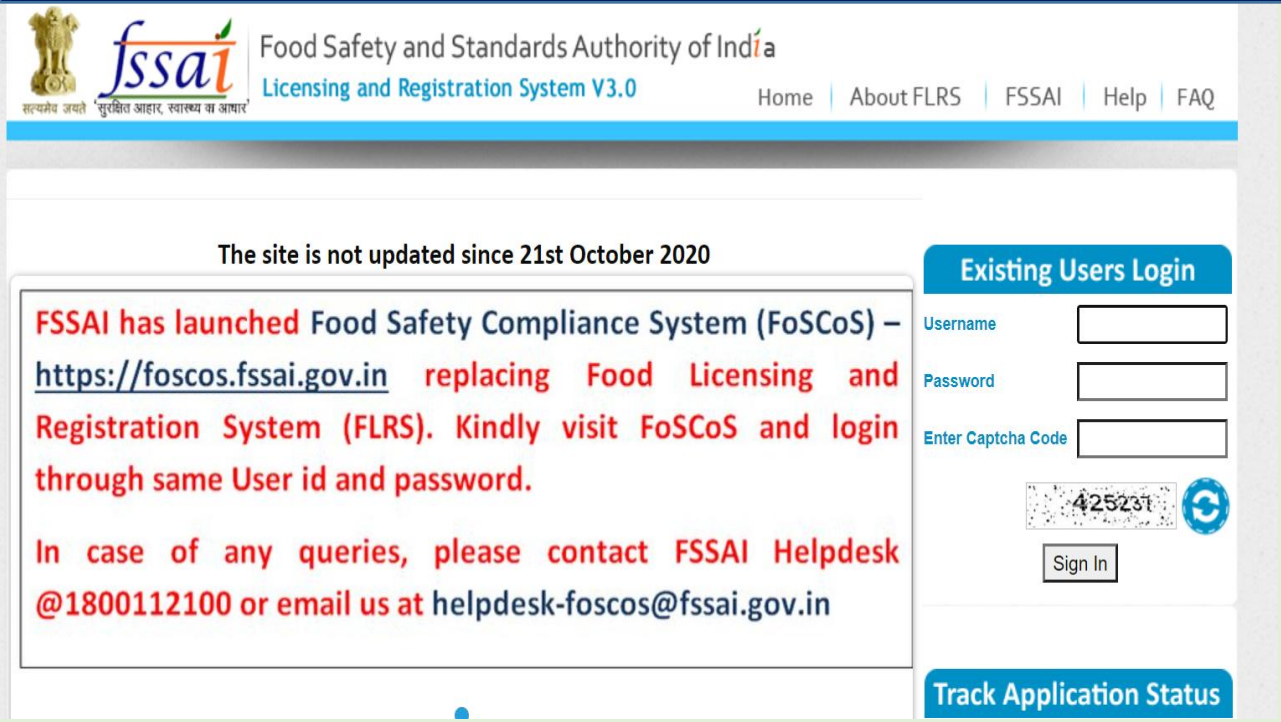
FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA (FSSAI)

- 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.

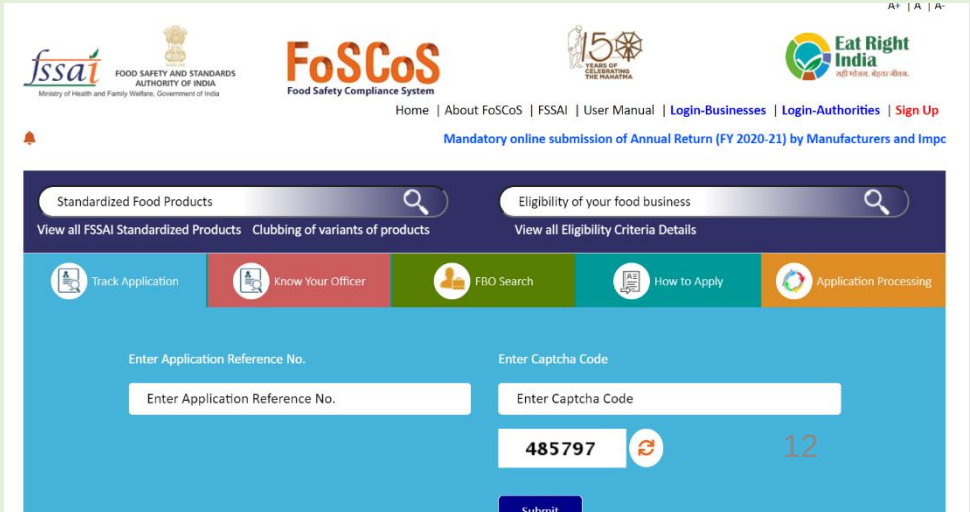
FSSAI REGISTRATION

- 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.

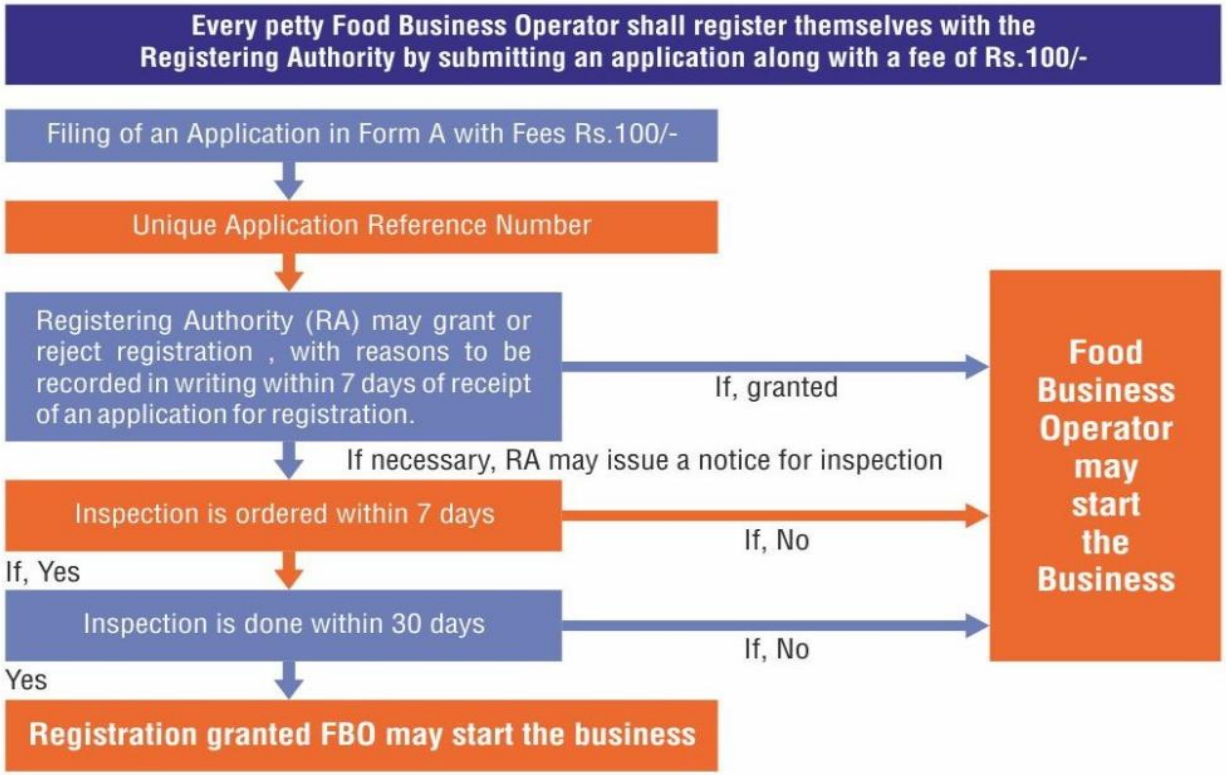
FOOD SAFETY COMPLIANCE SYSTEM (FOSCOS)

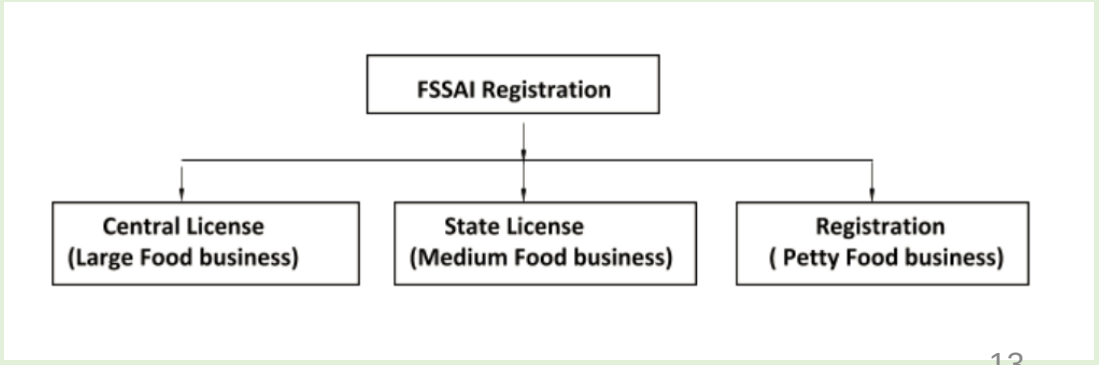


Food Safety Compliance System (FoSCoS) is an enhanced version of Food Licensing and Registration System (FLRS), which was launched in 2012 for issuance of pan-India FSSAI Licenses and Registration.



FSSAI REGISTRATION PROCESS





FSSAI LICENSING PROCESS

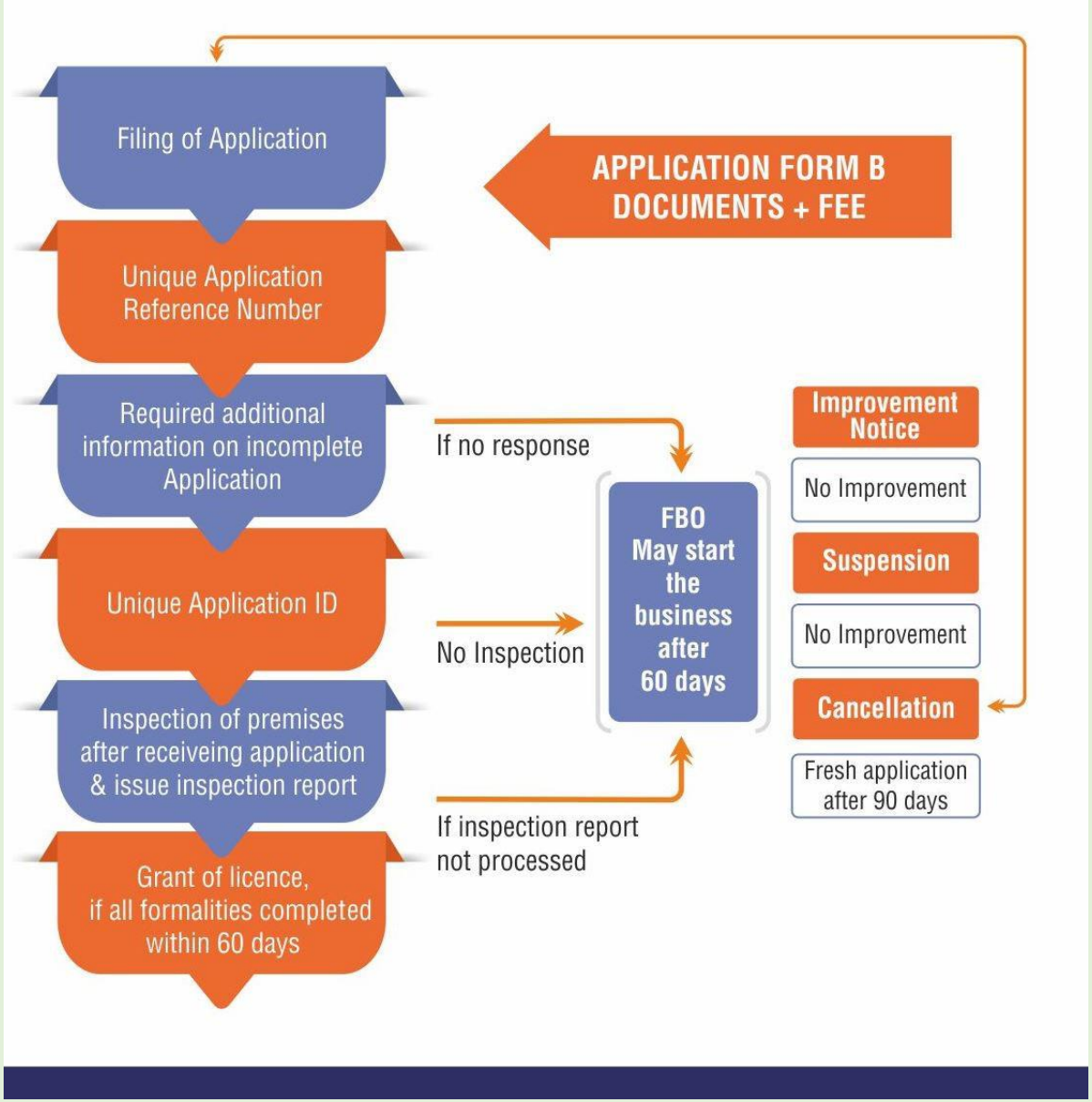


TABLE 1: MAIN INDIAN FOOD CATEGORIES

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.

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

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

(1) LIVE BIVALVE MOLLUSCS

•Live bivalve molluscs are harvested alive from a harvesting area either approved for direct human consumption or classified to permit harvesting for an approved method of purification, e.g. relaying or depuration, prior to human consumption. Both relaying and depuration must be subject to appropriate controls implemented by the official agency having jurisdiction.

•Live bivalve molluscs shall possess organoleptic characteristics associated with freshness, as well as an adequate response to percussion (i.e. the shellfish will close by themselves when tapped) and freedom from extraneous matter, as determined by specialists familiar with the species concerned.

Defectives

1. Foreign Matter: The presence in the sample unit of any matter which has not been derived from bivalve molluscs, does not pose a threat to human health and is readily recognized without magnification or is present at a level determined by any method including magnification, that indicates non-compliance with good manufacturing and sanitation practices.

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)

(1) LIVE BIVALVE MOLLUSCS

Defectives

2. Dead or Damaged Product– Dead product is characterized by no response to percussion (i.e. shellfish will close by themselves when tapped). Damaged product includes the product that is damaged to the extent that it can no longer function biologically. A Sample unit shall be considered defective if dead or damaged valve molluscs exceed 5% by count.

- Live bivalve molluscs shall be labelled by weight, count, count per unit weight, or volume as appropriate to the product.

- Bivalve shall be alive when sold.

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)

(2) RAW BIVALVE MOLLUSCS

- Raw bivalve molluscs shall be of a quality fit for human consumption.
- All ingredients used shall be of food grade quality and conform to these regulations.

Defectives

- **Deep Dehydration**.-greater than 10% of the weight of the bivalve molluscs in the sample unit or greater than 10% of the surface area of the block exhibits excessive loss of moisture clearly shown as white or abnormal colour on the surface which masks the colour of the flesh and penetrates below the surface, and can not be easily removed by scraping with a knife or other sharp instrument without unduly affecting the appearance of the bivalve molluscs.

- **Foreign matter**.- The presence in the sample unit of any matter which has not been derived from bivalve molluscs, does not pose a threat to human health and is readily recognized without magnification or is present at a level determined by any method including magnification, that indicates non-compliance with good manufacturing and sanitation practices.

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)

(2) RAW BIVALVE MOLLUSCS

Defectives

iii) Odour or flavour.- Persistent and distinct objectionable odours or flavours indicative of decomposition or rancidity

- Textural breakdown of the flesh, indicative of decomposition, characterized by muscle structure that is mushy or paste-like.
- The label shall specify the conditions for storage and temperature that will maintain the product safety or viability during transportation, storage, and distribution.

Microbiological Requirements–Safety Indicator Organisms

Product Category*	*Escherichia coli*			
	Sampling Plan		Limits (cfu/g)	
	n	c	m	M
Live Bivalve Molluscs	5	1	230	700

CHILLED/FROZEN BIVALVES

- Chilled/Frozen Bivalves includes clean, whole or shucked bivalves, which are live either in chilled or frozen condition and handled in accordance with good manufacturing practices.
- This product category includes filter feeding aquatic animals such as oysters, mussels, clams, cockles and scallops.

FROZEN HEAT SHUCKED MOLLUSCS

- Frozen heat shucked Mollusca includes bivalves where meat is removed from the shell by subjecting the animals to mild heat before shucking to relax the adductor muscle and subsequently frozen.

Microbiological Requirements for Fish and Fishery products -Hygiene Indicator Organisms

Product Category*	Aerobic Plate Count			
	Sampling Plan		Limits (cfu/g)	
	n	c	m	M
Chilled/Frozen Bivalves	5	2	$1*10^{5}$	$1*10^{6}$

No hygienic indicators are currently prescribed for the Live Bivalve Molluscs

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.

Requirements- Raw Material

•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.

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)

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……

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:

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