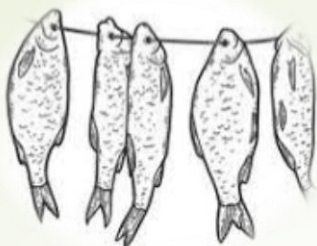


- The product shall conform to the following requirements

Characteristics	Requirements
Water activity (a_w) at 25 °C	Less than 0.78
Salt content (% NaCl)*	Not less than 12%
Histamine content, max**	200 mg/Kg
Acid insoluble ash on dry basis	Not more than 1%

* Only for salted products; **for listed species for histamine poisoning



Microbiological requirements - hygiene indicator organisms

Product Category*	Aerobic Plate Count				Coagulase positive Staphylococci				Yeast & mould count				Stage where criterion applies	Action in case of unsatisfactory results
	Sampling plan		Limits (cfu/g)		Sampling plan		Limits (cfu/g)		Sampling plan		Limits (cfu/g)			
	n	c	m	M	n	c	m	M	n	c	m	M		
Dried/Salted and Dried Fishery Products	5	0	1x10 ⁵		-	-	-		5	2	100	500	End of Manufacturing process	Improvement in hygiene; Selection of raw material; Adequate drying (water activity <0.78)



Microbiological requirements - hygiene indicator organisms

Product Category*	<i>Escherichia coli</i>				<i>Salmonella</i>				<i>Vibrio cholerae</i> (O1 and O139)				<i>Listeria monocytogenes</i>				<i>Clostridium botulinum</i>			
	Samplin		Limits		Samplin		Limits		Samplin		Limits		Samplin		Limits		samplin		Limits	
	n	c	m	M	n	c	m	M	n	c	m	M	n	c	m	M	n	c	m	M
Dried/Salted and dried fishery products	5	0	20		5	0	Absent/25 g		-	-	-	-	-	-	-	-	-	-	-	-

The terms n, c, m and M used in this standard have the following meaning: n = Number of units comprising a sample, c = Maximum allowable number of units having microbiological counts above m., m = Microbiological limit that may be exceeded number of units c, M = Microbiological limit that no sample unit may exceed.

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Quality and Safety of dried/ salted and dried fishery products



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Drying / curing of fishes

Fish is a nutrient rich commodity with high perishability nature. Drying is a least expensive and easily accessible preservation method of fish regularly followed traditionally in many developing countries including India. It also plays an important role in socio economic status of small scale fishermen in many countries. Although sun drying is a simple and economical method of fish preservation, still it has many limitations, such as long period of drying during cloudy climate. The main type of fishes used for salting and drying are mackerel, ribbonfish, shark, silver belly, anchovies, lizard fish, pink perch, malabar sole, sardine, Bombay duck and lesser sardine etc. In India, cured fishes are popular in local markets and some commercially important species are exported to other countries. In many of the dry fish markets in our country the dried products are exposed to high humid and temperature conditions. Long term storage in such a situation can increase the deterioration rate of dried products.

Quality and Safety issues

Inadequate curing procedures, unhygienic handling practices during process of sundrying, storage and marketing can deteriorate the quality and safety of cured products.



Quality and safety issues in dried fish	Preventive measures
Pink formation - Halophilic bacteria species of the genus Halobacterium and Halococcus attack dried fish and result a pink or red discolouration of slimy nature	Usage of good quality salt
Dun formation - Dun is a brown or chocolate coloured pepper like spot that grows in dried fish at 10 to 15% salt content. This is mainly caused by growth of halophilic mould called Sporendonema epizoum. Wallemia spora and Wallamia sabi appears chocolate in colour.	Fish has to be dried, packed and stored properly to avoid uptake of moisture and mould growth
Salt Burn - If fine grain salt is used directly on the fish, salt burn may occur due to the rapid removal of water from the surface with no penetration of salt to the interior of the fish.	A mixture of large and small grain size of salt is recommended for dry salting of fish.
Case hardening - When the rate drying is very rapid due to high temperature and low relative humidity, the surface of the fish can become very hard or 'case hardened'.	Proper maintenance of high relative humidity and temperature control

Quality and safety issues in dried fish	Preventive measures
Rancidity -This is caused by the oxidation of fat, mostly in oil rich fishes like mackerel.	Proper air tight packaging and use of antioxidants
Insect infestation: The flies which attack the fish during the initial drying stage such as blowflies belonging to the family Calliphoridae and Sarcophagidae. The most commonly found pests during storage are beetles belonging to the family Dermestidae. Beetles attack when the moisture content is low and especially when the storage is for a long time. Mites are also an important pest, which are found infesting dried and smoked products. <i>Lardoglyphus kono</i> is the commonly found mite in fish products.	Infestation can be reduced by proper hygiene and sanitation, disposal of wastes and decaying matter, use of physical barriers like screens, covers for curing tanks etc, and use of heat to physically drive away the insects and kill them at 45 ° C.
Fragmentation - Denaturation and excess drying of fish results in breaking down of the fish during handling. Fish can become brittle and liable to physical damage when handled roughly.	Use fresh fish as raw material to ensure good finished product.
Contamination due to enterotoxigenic staphylococci can occur through unhygienic handling and storage. Consumption of food containing thermally stable enterotoxigenic staphylococci causes serious health implications.	Maintenance of proper hygiene and sanitation practices during handling and processing operations.
Chemical impurities of commercial salt such as calcium chlorides and sulphates, magnesium chlorides and sulphates, sodium sulphate and carbonate and traces of copper and iron. These impurities can affect the quality of salt dried fish.	Usage of good quality salt

Drying / curing of fishes

As per Food Safety and Standards Regulations (FSSR) 2011 dried/salted and dried fishery products shall be

- Prepared from fresh or wholesome fish
- Fish shall be bled, gutted, beheaded, split or filleted and washed prior to salting and drying
- Salt used shall be clean, free from foreign matter, no visible signs of dirt, oil, bilge etc.
- The product shall be free from foreign matter, objectionable odour and flavour
- Only the food additives permitted under these regulations shall be used (Table 9, Food category 9.2.5 in FSSR 2011)