QUALITY DEFECTS IN CURED FISH PRODUCTS

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Curing and drying are traditional low cost preservation techniques. The processing techniques varies with type, size, nature and condition of the fish. Improper handling practices can result in poor quality product due to spoilage and insect infestation. Though salt is known to have bactericidal activity, some bacteria are halophilic and can cause microbial spoilage. In addition to the action of halophilic bacteria, changes in protein, fat, attack of insect etc. causes quality problems in salt dried products . The common defect found in salt dried fish products is given below.

1. Case hardening:

During drying, if the temperature is high and the relative humidity is low, the outer surface of fish get overdried and the inner layers of fish will be still having water content. When case hardening takes place, the temperature of fish muscle increaes and result in cooking. This will result in a briitle final product. Case hardening can be prevented by proper maintenance of temperature and relative humidity during drying.

2. Rancidity and discoloration

Pigments, fat etc. in the fish are sucsceptible to oxidation. Prolonged drying of fish exposed to hot air can accelearte this process. So , air dried fish often faces discolaration and rancid odoures. Oxidation is more in oily fishes such as sardine, mackerel, anchovies etc. lipid oxidation in dried fish give rise to unfavourable odour and the color changes to brown. This is known as rust. Another type of discolartion is the non enzymatic browing developed through maillard reaction.

3. “Pink” or “red”

This is a common type of microbial spoilage in cured product which occures mostly during the warm season. The surface of the fish become covered with a red slime that gives off an unpleasant odour. This is brought about by the growth of halophilic bacteria such as *Halobacterium salinaria*, *Sarcina morrhuae* etc. The spoilage manifest first as a delicate pink sheen on the surface of fish. In the initial

stages, it can be rubbed or washed off easily without damaging the fish. However, in severly affected fish, it will reappear.

4. Mould attack

"Dun" is a type of mould development observed in salted fish when the relative humidity is above 75%. This is characterised by the appearance of colored spots, black, grey or brown, visible particularly on the fleshy side of the fish. This gives an appearance as if sprinkled with black pepper. This discoloration is unsightly and reduces the marketabilty of the product. Some times, the small spots develop a root type network into the interior of the fish flesh.

The mould, *Sporendonema epizoem* is the common causative agent for this type of spoilage. This mould can be relatively easily removed in the early stages. In cases of severe infection, dipping in 0.1 % sorbic acid will give some protection. Since solar salt is the source of contamination, effective control may be achieved by the use of good quality salt.

5. Insect infestation

Infestation by flies is a very common and serious problem faced by the salt fish trade. Infestation actually takes place during the early stages of drying. Adult female flies get attracted to the fish and lay their eggs on the fish surface. The emerging adults can reinfest more fish and the cycle continues. Infestation can be controlled to a greater extend by maintaining proper hygienic handling practices. This include keeping the handling and drying premises clean and fly proof, keep the fish completely covered during salting etc.

Fungal infestation in dried fish

6. Rust

Appearance of a color similar to that of rusted iron on the dried fish surface is a most commonly occuring phenominan in the tropical countries. Oily fishes such as sardine, mackerel etc. are particularly prone to rusting. Apart from the discoloration, rusted fish is characterised by an unpleasant racid odour and taste. This all changes are brought about by the oxidation of oil in the fish. The best method to prevent the occurance of rust in fish is to prevent it from contact with atmosphearic oxygen. Dried fish should be properly packed in oxygen impermeable packages.

7. Fragmentation

Cured and dried fish often become brittle and break during storage and transportation. This is refferred to as fragmentation. Denaturation of protein, hallowing the fish by insect attack, use of spoiled fish for drying etc. are the reasons for fragmentation. It can be reduced by using fresh fish and providing adequate packages during storage.

Characteristics	Requirements
Water activity at 25°C	:Less than 0.78
Salt content (% sodium chloride)	: Not less than 12%
Histamine content (Max)	:200 mg/kg
Acid insoluble ash (sand) on dry basis	:Not more than 1%

Quality requirements of dried fish

Suggested readings

Balachandran, K.K., 2001. *Post Harvest Technology of Fish and Fish Products*, Daya publishing house, New Delhi.

Gopakumar K., 2002. *Text Book of Fish Processing Technology*, ICAR Publication

Hall, G.M., 1992 *Fish Processing Technology,* Blackie Academic & Professional, UK.