FISH SPOILAGE

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Spoilage occurs in fish due to three main causes

Viz. **bacterial, enzymatic and biochemical**

BACTERIAL SPOILAGE

- Fish slime, intestinal tracts and gills get a host of bacterial strains, *viz Achromobacter, Pseudomonas, Vibrio, Flavobacterium, Crynobacterium, Micrococci, Bacillus, Acromonus, Photobacterium, Sarcina, Serratia,* etc., in marine fishes depending upon the environment from which they are caught

- In fresh water fishes beside most of the genera, *Lactobacillus, Brevibacterium, Alcaligenes* and *Streptococcus*

- After catch also several other strains of terrestrial bacteria find their way on the fish from several sources like boat decks, fish boxes, ice and other material including atmospheric air.

- Organism of public health importance like *Escherichia coli, Streptococci, Staphylococci* and *Salmonella,* present of which in the fish muscle beyond certain limit renders it unfit and dangerous for human consumption

- When once fish is dead, this bacteria attack the fish flesh from both inside and out side multiplying very rapidly and decomposing the flesh very quickly.

ENZYME SPOILAGE

- Enzymes constituting the second causative factor of spoilage
- These natural enzymes as well as those produced by bacteria attack the muscle once the fish is dead breaking down the proteins in to simpler compounds
- The final product of spoilage reaction are ammonia and other odoriferous compounds like indole, skatole, hydrogen sulphate etc., which gives characteristic putrid smell to the spoiled fish
- This process is scientifically termed autolysis are self digestion which helps rapid bacterial invasion of the fish tissues

BIOCHEMICAL SPOILAGE

- Biochemical spoilage consists of oxidation of the fat in the case of fatty fishes by atmospheric oxygen, resulting in rancidity, melanosis (black discoloration) in shell fishes and hydrolytic changes in fats and proteins.

- Methods like total plate count (TPC) in respect of bacterial load, Trimethylamine nitrogen (TMA-N), Total volatile nitrogen (TVN), etc are useful for the assessment of the freshness of fish, most of them are time consuming and serve only to confirm the organo leptic rating and indicating the adequacy of sanitation of fish handling.

PREVENTION OF SPOILAGE

- Several bactericidal and fungicidal chemicals and anti-oxidants have been recommended to prevent spoilage.

- Propionic acid and its sodium and calcium salts, sorbic acid and its sodium and potassium salts, boric acid, sodium borate, sodium/potassium bi-sulphites, sodium benzoate, butylated hydroxyl anisole(BHA) and toluene (BHT), ethyl and propyl gallates are some preventies.

USE OF PROPIONIC

- Dip treatment of dressed fish in 4% Propionic acid for 10 minutes prior to the usual salting and drying process has been found very effective in controlling mould growth and reddening in the product up to 62 weeks. Compared to 15-20 weeks in the control.

USE OF PROPIONIC

- The dressed and cleaned fish are kept immersed in 4% Propionic acid solution for 10 minutes.
- They are then removed from the solution and drained.
- The acid bath is used repeatedly for the treatment.
- The drained fishes are treated with one-fifth their weight of common salt, distributing with uniformly in the stomach cavity and surfaces and stalked for 48 hrs as in the usual method of dry salting.
- The salted fish are then given a light rinse in potable water to remove adhering salt crystals and dried in the sun for three to four days.
- Some absorption of the acid by the fish muscle occurs in this method which result in some slight acid flavor in the product

USE OF CHEMICALS

- Another effective method is using chemicals instead of acids. The mixture is prepared by thoroughly mixing three part of weight of sodium propionate and 0.5 parts by weight of BHA with 96.5 parts of refined salts

USE OF CHEMICALS

- This mixture is smeared on the surface of salted and dried fish
- The product can then be stored for quite a long time with out any red or fungal attack
- The advantage is that the chemicals is not absorb by the fish muscle does not alter its flavor
- When the dried fish is soacked in water prior to cooking the preservative is easily leached away
- This preservative mixture is dried on commercially
- The method has been further simplified and rendered cheaper by using calcium propionate