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Food Poisoning by Mackerel Fish

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Abstract:
Food poisoning by fishes is usually encounters in all parts of the world. The main cause of spoilage is due to three important factors i.e., Bacterial action, Enzymatic action and Chemical action. Fishes like Mackerels spoil in great extent because they contain more oil content in their body. To regulate the spoilage parameters in the fatty fishes, proper preservation under good freezing conditions is required. Extent of physical damage is different in the samples under various freezing temperatures.
Fish preserving as well as processing should stop when spoiling conditions prevail to control the bacterial proliferation.

1. Focal Points at a Glance
Rastrelliger, storage temperatures, spoilage, fish poisoning, Histamine.

2. Introduction
Fish is a perishable commodity and undergoes spoilage quickly. Immediately after capture, fish need to be preserved where the temperatures are relatively higher in comparison with those in temperate regions. After capture, fish undergo changes that are sensory, autolytic and bacterial. These changes affect the quality of the fish.
Fishes mostly like Mackerel, Rastrilliger kanagurta, is an important commercial fish of the west coast of India. It belongs to the family Scombridae (order; perciformes). The commercial landing are mainly composed of only one species, R. kanagurta and another species, R.brachysoma, is found in Andaman water but form only a small part of the catch. Mackerels constitute 15-18% of the total marine fish landing in India, 90% of this comes from the west coast, mainly from quilon in Kerala to Ratnagiri in Maharashtra. A small part of the catch comes from Mandapam, Madras, and Vishakhapatnam etc. of the east coast.

3. Composition
Mackerel is a fatty fish and it is much edible. The fat and water content varies according to season. A typical range of fat content throughout the year is 6-22%. As fat content increases, water content decreases. Protein content is 18-20%. Water range is up to 4%.

4. Diagnostic Features
D, IX+12+5 finlets; A.12+5 finlets; P.19; V.I, 5. Body fusi form; gill rakers are long and visible when mouth is opened; two dorsal fins widely separated. body blue green above, sides silvery with golden tint; narrow dark longitudinal bands on upper part of body; two rows of small dark spots on upper back; a black spot near lower margin of pectoral fin; dorsal fin yellowish with black tips; caudal and pectoral fins yellowish; ventral fin dusky. Habitat: Pelagic. Found in coastal waters and adjacent to estuaries and lakes in small schools. Attains 30 cm in length. Distribution: Widely distributed in indo pacific.

- Remarks: commercially important pelagic fish. Caught fairly in large number

5. Objective
The main objective of the present study is to compare the spoilage parameters of Mackerel fish at different temperatures with their shelf life in ice and chilled sea water (CSW) and to study the comparative physical changes that take place in Rastrelliger.

6. Materials and Methods
4 samples of Rastrelliger of equal size and weight with a fat content of about 10-15 percent have collected from local fish market at Mehdipatnam, Hyderabad and they immediately kept under freezing for different degrees of temperature to observe the bacterial proliferation and spoilage conditions with every 5 hours of observation for 3 days.
Rastrelliger kanagurta(Cuvier,1816) Indian Mackerel

Figure 1

7. Results and Discussion

Sl. No.	Sample Type	Storage Temperature	Spoiling Conditions	Extent of Damage in Hours
1	Sample-'A'	10°C	Soft Muscle Part, off Odours Showed Near Head Region	24-48 Hours
2	Sample- 'B'	0-5°C	Sunken Eyes, Dull Colouration	30 Hours
3	Sample- 'C'	Csw (Chilled Seawater)	Remains Fresh With Thick Muscular Region	72 Hours
4	Sample- 'D'	28°C	Colour Change, Soft Body Texture with Sunken Eyes	18-24 Hours

Table 1

Mackerels are fatty and spoil quickly when they are chilled immediately after catching. In the present study Sample –A developed off odours after 1-2 days at 10 degrees temperature. The extent of spoilage observed with in 30 hrs and it is more in the fishes preserved in the temperatures of 0-5 degrees temperature in sample-B. Fish of sample-C stowed in CSW (chilled sea water) cannot show any physical changes and they remain fresh for 3 days and the other sample-D fish in ambient range of 28-30degrees of temperature will spoiled within 18-24 hours observation and slight colour change and muscle part in the head region becomes very soft resulting in spoilage.

Proper preservation keeps the fish in fresh condition, so that changes in texture, taste and appearance are minimized. Processing methods are utilized to slow down the process of deterioration of the fish slowed down and halted completely.

The signs of stale fish (mackerel) are as follows:

- Eyes are sunken /cloudy and discolored red.
- Washed out appearance.
- Off odors from gills.
- Body is sour and strongly oily.

Figure 2

8. Causes of Spoilage of Fish

Fish spoils mainly due to 3 factors bacterial action, enzymatic action and chemical action. Of these, spoilage due to chemical action occurs in fatty fishes like mackerels, the oil of such fishes is oxidized by atmospheric oxygen resulting in discoloration of the fish. The body of the fish becomes brownish in color, and has a bad odor due to certain decomposition products of fats this is also called rancidity, and can be controlled to some extent by soaking the fish in antioxidants or by glazing it. Quite a large no. of fish is spoiled due to the action of digestive enzyme which remains active even after the death of the fish and soften the flesh by autolysis. Bacteria

are the most important in causing spoilage. A large no. of bacteria present on the body, gills and gut of the fish find a good medium for development due to high moisture (75-80%) contents in fish flesh. More bacteria are added during handling and storage in unlearned places. Fishes gets cuts, abrasions during catching operation leading to hemorrhage. This provides an ideal condition for bacterial activity which is most destructive to the fish.

Figure 3

During spoilage, enzyme and bacteria act upon various proteins and non-protein compound of the fish flesh, breaking them into simpler substances like ammonia, carbondi-oxide, various amines and volatile fatty acid. In advance stage of putrefaction, certain compound like indole and hydrogen sulphide with foul odour is also produces. Spoilage occurs in stages probably due to action of different group of bacteria. Fresh fish flesh is slightly acidic with Ph of 6.4 but a spoiled one become alkaline with pH exceeding 7.6 thus, the stage of spoilage can be estimated by measuring the pH of the flesh. However for a lay man, a fresh fish can be recognized by the following characters;

1. The flesh of the fresh fish should be stiff not flabby and soft.
2. When touched, finger print is not left on the surface.
3. The eyes are glistening and not opaque.
4. The gills are bright red in color.
5. The smell of the slime and gills is fishy.
6. The vent should not be protruding.

9. Symptoms of Fish Poisoning

Symptoms of fish poisoning usually occur an hour after the ingestion of spoiled fish and last for several hours.

- Symptoms Include: Flushing, more Sweating, Nausea, Vomiting, Diarrhea, Headache, Palpitations, Dizziness, Rashes on skin with itching, respiratory distress can also occur and the toxin is not present when the fishes are caught, but it is produced subsequently during spoilage. Histamine was suggested as the causative toxin in the 1940's,on the basis of the number of observations and it is reported approximately 50 years ago as the causative agent of Scombrotoxism.It should service as the basis for general public health policy recommendation that persons with scombroid poisoning receive treatment with an anti histamine.

10. Conclusion

Histamine is the toxin responsible for fish poisoning, such poisoning can be prevented effectively by handling and preserving the fishes under good freezing conditions immediately after caught. Fish preserving as well as processing should stop when spoiling conditions prevail because the bacterial proliferation can lead to the production of histamine in quantity sufficient to cause poisoning in the absence of obvious putrefaction.

11. References

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