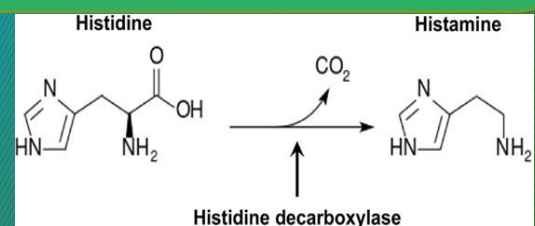


Scambrotoxin fish poisoning (Histamine fish poisoning)

Histamine poisoning is a syndrome resembling an allergic reaction that occurs after consuming fish contaminated with high levels of histamine. The food poisoning is caused by heat-stable biogenic amine, histamine developed by decarboxylation of histidine by histidine decarboxylase. It is caused by ingestion of certain species of marine fish that contain high levels of histamine and possibly other biogenic amines. Other biogenic amines mainly putrescine and cadaverine act as histamine potentiators. Histamine forming bacteria found in fish are *Morganella morgani*, *Morganella psychrotolerans*, *Photobacterium damsela*, *Photobacterium phosphoreum*, *Raoultella planticola* and *Hafnia alvei*. Histamine formers are capable of growing and producing histamine using the enzyme histidine decarboxylase (HDC) over a wide temperature range.

Formation of histamine is more rapid, however, at high-abuse temperatures ($>21.1^{\circ}\text{C}$) than at moderate-abuse temperatures (7.2°C). Fish handling practices are critical with regard to histamine production and the histamine content in fish depends upon free histidine level, fish handling, the duration, conditions and temperature of storage of the fish. Histamine formation in fish is dependent on the time/temperature conditions under which the fish is handled, and therefore time/temperature control needs to be taken into consideration from harvest to consumption. High histamine levels are a result of gross time/temperature abuse during handling and storage



Species of Fishes causing histamine poisoning

- Fish families namely Carangidae, Chanidae, Clupeidae, Coryphaenidae, Engraulidae, Istiophoridae, Mugilidae, Pristigasteridae, Scombridae, Xiphiidae
- Common fish species are tuna, mackerel, sardines, herring, anchovy, Bonitos, Carangids, Herrings etc
- These fish species contain high levels of free histidine in their tissues. When fish are subjected to temperature abuse during and/or after harvest, decarboxylation of histidine amino acid due to bacterial action leads to histamine formation.

Limits of histamine in fish and fishery products (FSSR 2011)

SNo	Product category	Histamine level			
		n	c	m (mg/Kg)	M (mg/Kg)
1	Raw/chilled/ frozen fin fish	9	2	100	200
2	Thermally processed fishery products	9	2	100	200
3	Smoked fishery products	9	2	100	200
4	Battered and breaded fishery products	9	2	100	200
5	Other RTE fishery products	9	2	100	200
6	Other value added fishery products	9	2	100	200
7	Other fish based products	9	2	100	200
8	Dried/ salted and dried fishery products	9	2	200	400
9	Fermented fishery products	9	2	200	400
10	Fish pickle	9	2	200	400



Symptoms

The symptoms of histamine fish poisoning are: flushing, rash, hypotension, headache, abdominal cramps, diarrhea, vomiting, pain, itching, oral burning sensation, nausea, swelling of tongue. Severe suffocation and respiratory distress have been reported in severe cases of histamine poisoning. The onset of histamine poisoning can extend from 10 minutes to 1 hour following consumption of contaminated fish and can last from 12 hour to a few days. Histamine concentration required to produce poisoning varies with respect to the susceptibility of each individual. In case of susceptible individuals' concentration between 5 and 10 mg/100g can cause symptoms. Many foods contain small amounts of histamine which can be tolerated easily.

Preventive measures

- Rapid chilling of scombrotxin-forming fish immediately after death is the most important element in any strategy to prevent the formation of scombrotxin. The fish should be kept at temperature less than 4.4 °C immediately after the capture to arrest the formation of histamine.
- Care should be taken that the cold chain is maintained at or below 4°C along the supply chain, including points of transfer such as offloading of fish from the vessel and processing procedures.
- Enzyme histidine decarboxylase remains stable in frozen condition. So due care must be taken during thawing to avoid the formation of histamine.



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