

**Commercial
Fish &
Shellfish
Technology
fact sheet**

***New Guidelines Prevent Excessive
Histamine Production in Bluefish and other
Scombroid Fish***

What is Histamine Poisoning?

Histamine poisoning, also known as scombroid poisoning, results from the ingestion of high levels of histamine in fish. In humans, the illness is characterized by redness of the face and neck, a tingling sensation in the tongue, vomiting, and diarrhea. The extreme discomfort associated with the illness is usually short-lived, resulting in little or no long-term consequences for the victim.

Scombroid fish, such as tuna and mackerel, as well as other species such as bluefish and mahi mahi are particularly susceptible to a problematic elevation of histamine levels as spoilage begins.

What are the FDA Regulations concerning Histamine Levels?

The Food and Drug Administration, along with other governmental organizations, have established a maximum level of allowable histamine in fish products. This maximum level is 50 ppm. This standard is not universally accepted, and other countries have established a 100 ppm limit.

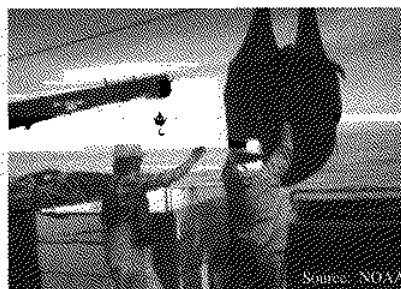
How Does Histamine Develop in Fish?

Certain bacteria, probably present in the gills and gut of a fish, produce decarboxylase enzymes that act on amino acids present in fish muscle. Histidine decarboxylase interacts with the naturally occurring amino acid histidine to produce histamine. Histidine is present in greater amounts in Scombroid fish, increasing their vulnerability to excessive histamine production during handling and storage.

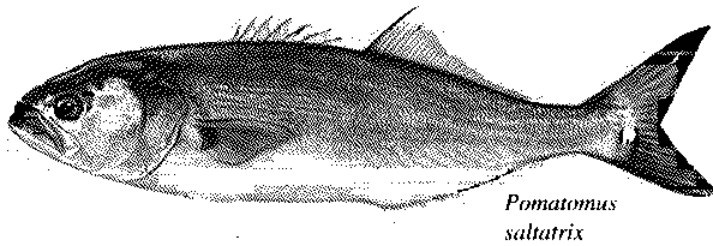
Current Sea Grant Research:

While the FDA has established limits on the level of histamine allowable in fish, they do not establish any guidelines on how fish must be handled to prevent the accumulation of this harmful amine. It is important for seafood processing companies to know the steps that can be taken to stay within FDA regulations, and to prevent histamine poisoning outbreaks. Companies must show compliance with government standards as required by HACCP (Hazard Analysis Critical Control Points) regulation (21CFR123).

Storage studies were conducted to show what time/temperature combinations can result in a harmful product. Much of the research was conducted with a previously unstudied fish species – bluefish (*Pomatomus saltatrix*). Historically, bluefish has been linked to histamine poisoning outbreaks, but the rate of histamine formation in this fish was not known. Sea Grant research showed that storage of bluefish above 60°F for 24 hours resulted in histamine levels above 55 ppm, and the formation of other potentially harmful biogenic amines, putrescine and cadaverine, in lesser amounts. Storage of bluefish at lower temperatures resulted in lower levels of histamine, putrescine, and cadaverine.



Source: NOAA



Pomatomus saltatrix

Table 1: Sensory acceptance and histamine, putrescine, and cadaverine levels during 60°F storage of bluefish

Days	% acceptance	histamine	putrescine	cadaverine
1	44	35 +/- 26	ND	ND
2	12	55 +/- 39	51 +/- 39	ND
3	0	938 +/- 200	96 +/- 58	50 +/- 62

Note: During the storage study a sensory panel judged the acceptability of the product to determine if product that has been stored improperly or has a high concentration of histamine would still be acceptable to the consumer. Note that by day three a very high histamine level was observed, but there was a zero percent acceptance level.

The research also involved environmental sampling in scombroid fish processing facilities to observe whether histamine-forming bacteria are present. Knives, saws, gloves, and cutting surfaces were analyzed for histamine-forming bacteria. Overall, the number of histamine-forming bacteria present in these facilities was very low.

New Guidelines for Bluefish Handling:

The study showed that storage time and temperature have a substantial impact on histamine levels in Scombroid fish. The minimum dose of histamine required to induce histamine poisoning is not known, and therefore it is impossible to know whether ob-

served histamine levels would have caused a harmful response if ingested. Other research and case studies of histamine levels indicate that several hundred ppm of histamine are necessary to produce illness.

To reduce the risk of microbial contamination and the formation of harmful biogenic amines, processors should take care to bring the fish to 40°F as soon as possible after capture. Adequate sanitation in the cutting rooms can also reduce the risk of contamination.

Handling Guidelines for Bluefish and other Scombroid Fish
(including tuna, mackerel, and mahi mahi)

- Bring fish to a temperature of 40°F or less as soon as possible.
- Clean all surfaces in the cutting room daily with an approved cleaning solution.
- Fish which stands at temperatures near or above 60°F for more than 24 hours should be discarded.

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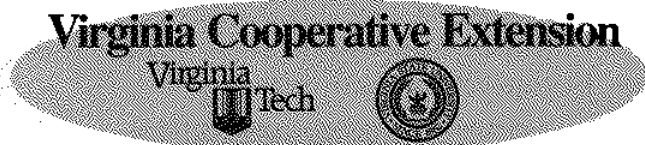
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