Histamine (Scombroid Poisioning) Fact Sheet

What is Histamine?

Scombroid food poisoning is caused by ingestion of fish containing high concentrations of histamine, which is a product of the degradation of the amino acid histidine. Histidine can be found freely in the muscles of some fish species and can be degraded to histamine by enzymatic action of some naturally occurring bacteria.

Which types of fish can be implicated?

The scombrid fish such as tuna and mackerel are traditionally considered to present the highest risk. However, other species have also been associated with histamine poisoning; e.g. anchovies, sardines, Yellowtail kingfish, Amberjack, Australian salmon and Mahi Mahi.

Which bacteria are involved?

A variety of bacterial genera have been implicated in the formation of histamine; e.g. *Clostridium*, *Morganella*, *Pseudomonas*, *Photobacterium*, *Brochothrix* and *Carnobacterium*.

What outbreaks have occurred?

In Australia, 38 outbreaks (148 cases) were reported between 1988 and 2010. Many of the outbreaks were associated with tuna, however other implicated species included Mahi Mahi, sardines, anchovies and Australian Salmon. Both domestically harvested and imported fish have been implicated with disease. Illnesses were associated with seafood consumed both from restaurants and also in home settings.

How much histamine is a harmful dose?

A threshold dose is considered to be 90 mg/100 g. Although levels as low as 5-20 mg/ 100 g could possibly be harmful; particularly in susceptible individuals.

What are the symptoms?

Initial symptoms resemble some allergic reactions, including sweating, nausea, headache and tingling or a peppery taste in the mouth and throat.

Other symptoms include urticarial rash (hives), localised skin inflammation, vomiting, diarrhoea, abdominal cramps, flushing of the face and low blood pressure.

Severe symptoms include blurred vision, severe respiratory distress and swelling of the tongue.

What can be done to manage histamine in seafood?

- Histamine levels can increase over a wide range of storage temperatures. However, histamine production is highest over 21.8 °C. Once the enzyme is present in the fish, it can continue to produce histamine at refrigeration temperatures.
- Preventing the degradation of histidine to histamine by rapid chilling of fish immediately after death, followed by good temperature control in the supply chain is the most appropriate control. However, a novel strain of *Morganella* has the ability for growth at 0-2 °C. Thus temperature control may not eliminate risks in all circumstances.

How can we test for histamine?

- There are several analytical techniques that have been described by the AOAC including: a biological method (AOAC 954.04), a chemical method (AOAC 957.07) and a fluorometric method (AOAC 977.13).
- Commercially available ELISA based kits can be used.
- Histamine concentration can vary considerably between anatomical locations and this should be considered in sampling plans.

Regulatory standards

The Australian regulatory limit for histamine can be found in Section 1.4.1 of the Australia New Zealand Food Standards Code, available at http://www.foodstandards.gov.au.

Codex sets decomposition and also hygiene and handling limits for a variety of seafood products including sardines and sardine-type products; canned fish; salted herring and sprat; frozen finfish and products comprised of finfish; crumbed or battered fish and fish portions; boiled dry salted anchovies; and fish sauce.

International regulatory limits can be found in the Trade & Market Access Database, available at www.frdc.com.au/trade.

Where can I access more information?

LEHANE , L. & OLLEY, J. 2000. Histamine fish poisoning revisited. *International Journal of Food Microbiology*, 58 (1-2), pp. 1-37.

FAO/WHO 2012. Joint FAO/WHO Expert Meeting on the Public Health Risks of Histamine and Other Biogenic Amines from Fish and Fishery Products. Rome, Italy: Food and Agriculture Organization and World Health Organization.

EMBORG, J., DALGAARD, P. & AHRENS, P. 2006. *Morganella psychrotolerans* sp nov., a histamine-producing bacterium isolated from various seafoods. *International Journal of Systematic and Evolutionary Microbiology,* 56**,** 2473-2479.

HAHN, S. & CAPRA, M. 2003. Fishborne illnesses: Scombroid and Ciguatera Poisoning. *In:* HOCKING, A. D. (ed.) *Foodborne Microorganisms of Public Health Significance.* Sixth ed. North Ryde, NSW: Australian Institute of Food Science and Technology Inc. pp. 689-701

Contact us:

http://safefish.com.au

AUSTRALIAN SEAFOOD COOPERATIVE RESEARCH CENTRE

Considering the Benefits and Risks of Seafood Consumption

Eating seafood confers many benefits: it provides top-quality protein, and is an excellent source of important nutrients like iodine, selenium, vitamins A and D, and long-chain polyunsaturated omega-3 fatty acids. However like all foods, some seafood products may contain substances that are harmful to health. Illness from seafood is rare, so the benefits of seafood consumption must be weighed against the risks. For more information, see http://www.nap.edu/catalog.php?record_id=11762