

Food Safety Hazard: Biotoxins



Characteristics/description

Most marine biotoxins are produced by certain species of naturally occurring marine algae (phytoplankton) that are eaten by fish. In the case of *G. toxicus* (gambiertoxins), such biotoxins are modified and concentrated as they pass up the food chain to carnivorous fish and then finally to humans. The most common diseases caused by marine toxins are (in order of incidence): scombrototoxic fish poisoning (also called scombroid poisoning), ciguatera poisoning, paralytic shellfish poisoning, neurotoxic shellfish poisoning and amnesic shellfish poisoning. Climate change, coral reef damage and the spread of toxic algal blooms contribute to an increased prevalence of this problem. Additionally, several forms of shellfish poisoning may occur after eating filter-feeding bivalve mollusks found in both temperate and tropical waters (such as mussels, oysters, clams, scallops and cockles). Shellfish ingest and concentrate potent toxins produced by algae, especially during algae blooms.

Source

Seafood contaminated with toxins is the source of diseases caused by marine biotoxins. Toxins may be concentrated in the liver, intestines, roe and heads of fish. Fish that are most likely to cause ciguatera poisoning — another disease caused by marine biotoxins — are carnivorous reef fish including barracuda, grouper, moray eel, amberjack, sea bass and sturgeon. Omnivorous and herbivorous fish such as parrot fish, surgeonfish and red snapper can also be a risk. Ciguatera is widespread in tropical and subtropical waters; it is particularly common in the Pacific and Indian Oceans and the Caribbean Sea.

Risk reduction strategies

Preventive measures to reduce the risk of diseases caused by marine biotoxins include regular inspection of seawater bodies in which shellfish are grown for the possible appearance of toxic dinoflagellate, especially in the season that algae blooms may occur. Toxins do not affect the texture, taste or smell of fish, and they are not destroyed by gastric acid, cooking, smoking, freezing, canning, salting or pickling.

Scombroid poisoning — one of the most common fish poisonings caused by marine biotoxins — occurs after eating improperly refrigerated or preserved fish containing high levels of histamine. Scombroid poisoning occurs worldwide in both temperate and tropical waters.

Effects on humans

After consumption of toxin-contaminated seafood, symptoms such as nausea, vomiting, diarrhea and abdominal pain, followed by neurologic symptoms such as paresthesia, tooth pain, itching, metallic taste, blurred vision, amnesia or even transient blindness may occur. Scombroid poisoning often resembles a moderate-to-severe allergic reaction.

Incubation

Marine biotoxins may cause symptoms of disease 30 minutes to 12 hours after consumption.

Treatment for patients

Other than supportive care, there are few specific treatments for ciguatera poisoning, paralytic shellfish poisoning, neurotoxic shellfish poisoning or amnesic shellfish poisoning. Antihistamines and epinephrine, however, may sometimes be useful in treating the symptoms of scombrototoxic fish poisoning. Intravenous mannitol has been suggested for the treatment of severe ciguatera poisoning.

Key links

Food and Agriculture Organization (FAO): "Marine Biotoxins," www.fao.org/docrep/007/y5486e/y5486e00.htm

FAO: "Aquatic Biotoxins (Hans Henrik Huss)," <http://www.fao.org/docrep/006/y4743e/y4743e0d.htm>

Centers for Disease Control and Prevention, "Food Poisoning from Marine Toxins" <https://wwwnc.cdc.gov/travel/yellowbook/2018/the-pre-travel-consultation/food-poisoning-from-marine-toxins>