Other Biotoxins

Hazards by QAssurance

Physical hazards

- Shellfish associated with toxins
  - Paralytic Shellfish Poisoning
  - Neurotoxic Shellfish Poisoning
  - Amnesic Shellfish Poisoning
  - Diarrhetic Shellfish Poisoning
- Biogenic amines (histamine)
- Ciquatera
- Glyco-alkaloids
- Grayanotoxin
- Mushroom toxins
- Phytohaemagglutinins
- Scombroid
- Tetrodotoxine

Shellfish associated with toxins

Shellfish-poisoning is caused by a group toxins produced by wild algae (dino-flagellates) functioning as food for shellfish. The toxins accumulate in shellfish and metabolize sometimes partly. The toxins are stable and resistant to heat treatment or freezing. Consumption of contaminated shellfish results in a series of symptoms depending on the concentration and types of toxins present in the consumed shellfish species.

Paralytic Shellfish Poisoning

Parameter	Characteristics
Origin	Algae (Dino-flagellate)
Food product	In shellfish takes accumulation place.
Toxic dose (ug)	500-5000 (humans). 0,3 (mice, die after 5-7 minutes)
symptoms	Toxin blocks the nerve transmission. Mortality: 1-20%. Incubation: 1-30 min.
Preventive measurements	Control of algae growth producing toxic chemicals.
Comments	Toxin is heat stable. Algae not encountered in Dutch waters yet. However, the algae could live in temperate climates.

In the case of PSP, are the symptoms mainly of neurological nature and are tingling, burning sensations, paralysis, drowsiness, incoherent talking and breathing problems. Symptoms develop within 30 - 120 minutes after intake of the toxins. In severe cases is artificial ventilation necessary. The poisoning caused by the PSP-toxins are the most toxic and had in the past a high mortality as consequences. The toxin is associated with, scallops, muscles and oysters.

Neurotoxic Shellfish Poisoning

The symptoms cause by the NSP-toxins are of gastrointestinal and neurologic nature. The most important are tingling and numbness of the lips, tongue and throat, muscle pain, dizziness, chills, diarrhoea and vomiting. After intake of NSP-toxins develop symptoms sometimes within some minutes to an hour. The duration of the disease is often short ant variates from several hours to some days. Recovery happens quickly and death did never happen because of this toxin.

Parameter	Characteristics
Origin	Algae (dino-flagellate); concentration could be very high and even colouring the sea red (red tide).
Food product	In shellfish takes accumulation place
Toxic dose (ug)	10 (deadly for mice)
Symptoms	Blockage of nerve transmission. Rarely fatal. Incubation: 2 min. to several hours
Preventive measurements	Protection of algae growth producing toxic chemicals

Amnesic shellfish poisoning

Parameter	Characteristics
Origin	Algae (diatomee of the Nitzschia punges species).
Food product	In shellfish takes accumulation place.
Symptoms	Memory loss, sometimes permanently.
Preventive measurements	Control of algae producing these toxic components.
Comments	Toxin is heat stable. Only present in the American and Canadian east-coast.

Neurotoxic shellfish poisoning or NSP is produced by a collection of fat-soluble polyether pollutants called brevetoxins. The symptoms cause by the NSP-toxins are of gastrointestinal and neurologic nature. The most important are tingling and numbness of the lips, tongue and throat, muscle pain, dizziness, chills, diarrhea and vomiting. After intake of NSP-toxins develop symptoms sometimes within some minutes to an hour. The duration of the disease is often short ant variates from several hours to some days. Recovery happens quickly and death did never happen because of this toxin.

Diarrhetic Shellfish Poisoning

DSP is caused by a collection of lipid-soluble polyether toxins. The symptoms observed with DSP poisoning are most similar to those of mild gastrointestinal complaints such as nausea, vomiting, abdominal pain, diarrhea, chills and fever. The symptoms usually develop 30 - 150 minutes after ingestion of the toxins and usually last for 2-3 days. Recovery is complete. There are no reliable data on the frequency and severity of shellfish poisoning. Cases of illness are often misdiagnosed and, due to their short duration, not always reported.

Parameter	Characteristics
Origin	Algae (dino-flagellate).
Food product	In shellfish takes accumulation place.
Toxic dose (ug)	50 (mild symptoms in humans based on okadaic acid)
Symptom	Diarrhea, stomachache, vomiting. Incubation: 30 min. to several hours.
Preventive measurements	Control of algae producing toxic components
Comments	Toxin is heat stable. Algae is sometimes encountered in Dutch waters

Biogenic amines (histamine)

Biogenic amines are components naturally present in plant and animal products. histamine is the most known biogenic amine. Biogenic amines, also mentioned as secondary amines, are formed by enzymatic decarboxylation of amino acids present in food products. the decarboxylase enzyme is produced by certain micro-organisms of which Gram-negative bacteria such as Enterobacteriaceae and Enterococcus and Proteus spp. Growth of micro-organisms takes mainly place during the production of fermented food products (cheese, sausage) or during spoilage of the food products, mainly in fatty fish. A level of around 1000 ppm ('parts per million') biogenic amines is considered causing negative effects. But form good manufacturing practises (GMP) viewpoint, are concentrations of 50 - 100 ppm for histamine, 100 - 200 ppm for tyramine, 30 ppm for phenylethylamine, or a total of 100 - 200 ppm acceptable.

.

Parameter	Characteristics
Origin	Plants, animals and microbes
Food product	Almost all protein rich food products. Histamine is formed from histidine by enzymes mainly from the Enterobacteriaceae.
Symptoms	Influences physiological processes in the body. Consumption of biogenic amines could lead to poisoning. Symptoms are nausea, stuffiness, palpitations, rash, deviating blood pressure and headache.
Comments	Common in fish in the form of histamine, symptoms are similar to food allergies.

Hazards by QAssurance