

Marine biotoxins in Brown crab (*Cancer pagurus*)

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Marine biotoxins are produced by marine algae. During algal blooms at sea, these toxins end up in different sorts of seafood by filtration of contaminated water (eg mussels and oysters) or by eating contaminated food (eg crabs or lobsters). Two groups of marine biotoxins were included in this research: the so-called 'DSP toxins' ('Diarrhetic Shellfish Poisoning toxins'), lipophilic toxins that cause diarrhea and 'ASP toxins' ('Amnesic shellfish poisoning toxins'), domoic acid and isomers, which can lead to nausea and neurologic symptoms. Both toxin groups are a threat to the Belgian population. For many years, food monitoring programs for marine biotoxins in seafood are implemented, based on reference methods described in European regulations and legislation. The shellfish included in these regulations, are species feeding directly on the toxin producing algae. In this study we want to go a step further and investigate whether the toxins can also be accumulated in crabs that feed on shellfish, and thus indirectly on the toxic algae. In addition, we examine the effect of different processing methods on the toxin content of the diverse types of common seafood.

The objectives of the project are:

- checking the accumulation and distribution of marine biotoxins in Brown crab (*Cancer pagurus*)
- effect of food processing on marine biotoxins in bivalve shellfish and crustaceans

In a first experiment (accumulation and distribution of toxins) crabs were administered with a known concentration of the toxins. The food consisted of an agar gel which was mixed with homogenized tissue of a matrix (mussels or scallops) naturally contaminated with the desired toxin group. The crabs were fed during three weeks with these toxins followed by a detoxification period of two weeks. Twice a week, two test crabs were collected for analysis of the toxins. The crabs were dissected for separate analysis of the hepatopancreas, the reproductive organs and the muscle tissue.

In a second experiment, the effect of food processing on marine biotoxins in bivalve molluscs and crustaceans was examined. An online survey among fishmongers, hotel schools and fish distributors in Belgium and the Netherlands was performed to determine which matrices and which processing methods could best be included in the project. In order to execute the processing experiment with crabs, a preliminary experiment was carried out to produce contaminated material. The contaminated crabs were obtained by feeding them during two weeks with naturally contaminated scallops or mussels. After two weeks, all crabs were killed and processed using the procedures obtained from the survey.

The first results indicate that most of the ASP toxins are found in the hepatopancreas of the crabs, followed by the reproductive organs, and then into the muscle tissue. The analysed concentrations are relatively low compared to the initial concentration of ASP-toxins in the feed. In the processing experiment, we expect that a part of the water-soluble ASP toxins will end up in the cooking liquid. For the lipophilic DSP toxins, moisture loss during processing could cause a higher concentration of toxins in the cooked crab than in the raw crab.