

Communication 021/2023

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Aquatic toxins: How algal toxins can affect human health

Aquatic biotoxins are toxins that are for example, produced by algae. Some of these compounds can pose a hazard to fish and other aquatic life, while others can also present a health risk to humans. A prominent example are ciguatoxins. They are formed by dinoflagellates (unicellular microalgae) in tropical and subtropical waters of the world's oceans and can accumulate in the tissue of fish that feed on these microorganisms or that eat fish contaminated with ciguatoxins. In humans, the consumption of ciguatoxin contaminated seafood can lead to severe symptoms of ciguatera poisoning.

Overall, ciguatera poisoning is rare in Germany; but it does occur from time to time, currently only as a result of importing tropical fish. The ciguatera outbreak situation in Germany is just one of the many topics that will be discussed at a symposium on aquatic toxins hosted by the German Federal Institute for Risk Assessment (BfR) on the 10th and 11th of June 2024. The National Reference Laboratory (NRL) for the monitoring of marine biotoxins at the BfR has invited national and international aquatic toxin experts to Berlin.

The aim is to exchange scientific information for a better understanding of aquatic toxins. Specifically, the experts want to use specialist lectures and the presentation of case studies and new analytical methods to discuss, among other things, which aquatic toxins may pose health risks to humans, how they affect aquatic organisms, and how these risks can possibly be minimised.

Ciguatoxins are not the only toxins produced by tiny aquatic organisms, and it is by no means only marine species that produce toxins. Numerous freshwater algae species and cyanobacteria can also produce such metabolites.

Freshwater biotoxins came to the attention of a wider public in the summer of 2022, when an increased number of fish, snails, and mussels died in the River Oder. Caused by an increased proliferation of golden algae (*Prymnesium parvum*), which form toxic prymnesins, due to conditions of high salinity, high temperatures, and low water levels. Whether the prymnesins also pose a human health risk is still an open scientific question.

Cyanotoxins are aquatic toxins produced by cyanobacteria ("blue-green algae") with proven adverse effects on humans (e.g., liver-toxic microcystins). Strategies for the replacement or control of the increased proliferation of cyanobacteria that occasionally occurs in summer will be presented at the international and interdisciplinary symposium. The detection and handling of ovatoxin-a - a toxin that can be ingested through the consumption of mussels - as well as numerous other toxins in salt and fresh water will also be discussed.

The programme and further information on the symposium can be found here:
<https://www.bfr-akademie.de/english/aquatic-toxins-2024.html>

Further information on aquatic toxins

Question and answers: Ciguatera: cases of poisoning from ciguatoxins (algal toxins) in marine fish and shellfish

https://www.bfr.bund.de/en/ciguatera_cases_of_poisoning_from_ciguatoxins_algal_toxins_in_marine_fish_and_shellfish-303026.html

Increase in ciguatera fish poisoning cases in Europe

https://www.bfr.bund.de/en/press_information/2017/17/increase_in_ciguatera_fish_poisoning_cases_in_europe-201058.html

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