

Science for Environment Policy

Global warming could increase mercury accumulation in fish

Methylmercury may accumulate more quickly in fish as the climate grows warmer, new research suggests. Researchers in the US have found that levels of the toxin were higher in fish exposed to higher temperatures; global warming could therefore lead to increased human exposure to methylmercury through seafood consumption.

Methylmercury is a powerful toxin that has been linked with IQ reductions in children and heart disease in adults. Because this form of mercury accumulates in the body tissues of marine animals, [seafood](#) consumption is the main cause of human exposure to the toxin. However, little is known about how the rates of such accumulation will change under global warming.

In this study, researchers combined studies of fish in a natural environment with laboratory tests to investigate the differences in methylmercury accumulation under current variations in temperature, as well as those predicted under future climate change scenarios.

Natural populations of killifish, a fish commonly found in estuaries, were enclosed in six marsh pools along a river in the southwestern Gulf of Maine, USA. Average temperatures in the pools varied naturally between approximately 18-22°C, increasing with distance from the sea. As well as temperature, researchers recorded other important pieces of information about the pools, such as the salinity, the amount of oxygen dissolved in the water, and the amount of methylmercury in the sediment. Fish were kept in the pools for three to four months, over the summer growing season.

In a separate laboratory study, fish were collected from the same area and kept in tanks for 30 days at 15°C, 21°C and 27°C. This was a greater temperature range than found in the natural pools, but reflected temperature extremes and predictions of temperatures under future climate change scenarios for the study area.

The fish, which in their natural environment feed on prey such as aquatic insects or worms, were fed pellets containing mercury-contaminated fish. The researchers also recorded the growth rates of the fish. At the end of both the natural and laboratory experiments, the fish were collected and levels of methylmercury in their bodies was measured.

The results from both the natural populations and the laboratory tests revealed that concentrations of methylmercury were significantly higher in fish that had been living in warmer waters. The growth rates measured in the laboratory experiments indicate that at higher temperatures, fish ate more food but grew less, which resulted in greater accumulation of methylmercury. In the natural pool experiments, the other factors measured, such as oxygen or salinity, appeared to have no effect on levels of methylmercury in the fish.

The study concludes that warmer sea temperatures are likely to result in increased accumulation of this form of mercury in fish. It also points out that other climate-affected factors which were not covered in these tests, such as species' distributions, may also influence the availability of methylmercury.



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www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0058401

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