

Toxic Metal Cadmium Can Enter Great Lakes Food Chain Through Algae

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Some algae from the Great Lakes can use cadmium for nutritional requirements. A recent study published in the Journal of Great Lakes Research reports that algae collected from lakes Erie and Ontario can use cadmium, a known toxic metal, as a nutrient replacement for zinc, an essential trace metal.

"This observation makes pollution of our lakes even more of a concern since low levels of pollutants, such as cadmium, in vast offshore areas will be actively sought by microbes like algae and gain entry into the food chain where it can ultimately increase to toxic levels," states lead investigator Michael R. Twiss, a Clarkson University biology professor.

Despite visibly polluted coastal areas in the Great Lakes, offshore areas out of sight of the shore can have concentrations of trace metals during summer as low as expected in mid-ocean regions. This means that algae can have their growth limited by inadequate nutrition of essential metals. One such metal is zinc, an essential metal for algae and humans alike.

In this study, algae were collected from central regions of Lake Erie and in Lake Ontario from onboard both Canadian Coast Guard and U.S. Environmental Protection Agency ships during summer. Once the algae were purified in the laboratory, experiments were conducted under stringent controls needed to assess responses to low levels of these potentially toxic metals.

By carefully removing zinc from the growth media of the algae

researchers were able to starve algae of zinc and the growth of these microbes slowed. By then offering low amounts of cadmium, a metal with similar chemical properties to zinc, the algae were able to resume their growth. A similar observation was made by providing the zinc-starved algae with cobalt, another trace metal that is chemically closely related to zinc.

Results of this study, "Nutritive Substitution of Zinc by Cadmium and Cobalt in Phytoplankton Isolated from the Lower Great Lakes," are reported by Asha Intwala, Tara D. Patey, Damien M. Polet and Michael R. Twiss in the latest issue (Volume 34, No. 1, pp. 1-11) of the *Journal of Great Lakes Research*, published by the International Association for Great Lakes Research (IAGLR), 2008.

Source: Clarkson University

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