

The trophic transfer of Pb and Cd from *Navicula pelliculosa* (Bacillariophyta) to *Hyaella azteca* (Amphipoda).

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Abstract

Currently, information identifying the importance of food and water in the trophic transfer of metals for most aquatic organisms is limited, yet such information is essential for modeling metal movement within food webs. *Hyaella azteca* is a suitable organism to study the trophic transfer of metals since they represent a major, but potentially vulnerable component of the food web of many lakes. Since studies involving the trophic transfer are limited, the objective of this research was to determine the relative importance of food and water sources of Pb and Cd to these animals.

Hyaella azteca browses on the film of microscopic plants, animals and organic debris covering leaves, stems and other substrates. *Hyaella azteca* are epibenthic freshwater organisms that prefer foods high in protein. A major challenge of this study involved determining a substrate in which algae would grow and stay attached so *Hyaella azteca* could graze. Preliminary studies found that the diatom species, *Navicula pelliculosa* grew and adhered well to Teflon® surfaces and that *Hyaella azteca* grazed the diatoms from the surface of Teflon®. Thus, *Navicula pelliculosa* was grown in the presence of Pb and Cd concentrations and then fed to the organisms. No significant difference was found between organisms exposed to Pb and Cd from water and from water and food, indicating that Pb and Cd bioaccumulation from food is negligible when the dissolved inorganic fractions are buffered with ethylenediamine tetra-acetic acid (EDTA). The average \log_{10} bioconcentration factor (BCF) for Cd was calculated to be 5.25 from water exposure and 5.49 from water and food exposure. The \log_{10} BCF for Pb was calculated as 4.62 from water exposure and 4.59 from water and food exposure. From these results, it can be concluded that a food source containing Pb and Cd concentrations of 15 nM Pb and 0.37 nM Cd, had no noticeable effect on metal burdens to *Hyaella azteca*. Metal uptake by *Hyaella azteca* at the levels studied was found to be primarily from the dissolved phase.