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Title:

Comparing sediment and pore-water measurements as predictors of PCB uptake by oligochaetes from sediments.

Abstract:

There is an increasing amount of chemical and biological evidence that using sediment concentrations and commonly applied Koc values frequently overpredicts interstitial water concentrations of HOCs, and thereby overestimates uptake and/or effects of those chemicals on exposed organisms. Previous work suggests that this approach can overpredict the availability of HOCs such as PAHs and PCBs by as much as three orders-of-magnitude [1]. Directly measuring dissolved concentrations of PAHs has been shown to be required for accurate predictions of toxicity to *H. azteca* [2]. However, practical methods to measure freely-dissolved concentrations of other HOCs are largely not available. In the present study, we are applying a new method for determining the dissolved concentrations of PCBs [3] to determine whether directly measured water concentrations of PCBs, or dissolved concentrations predicted from sediment concentrations of PCBs in field-contaminated sediments better correlate with PCB concentrations in tissues of exposed oligochaetes. Congener-specific PCB concentrations were determined in the dissolved phase, sediment, and in oligochaetes (*Lumbriculus variegatus*) exposed to 24 field-impacted sediments for 28 days. Initial results show that, as is the case for PAHs, the use of sediment concentrations and literature Koc values generally overpredicts interstitial water concentrations by one- to two- orders-of-magnitude. Lipid-normalized PCB concentrations in oligochaete tissue are currently being compared to directly-measured dissolved PCB concentrations and those predicted from sediment concentrations to determine whether, as was the case for PAHs [2], predicting the bioavailability of PCBs is best done using measured, rather than predicted dissolved concentrations.

[1] Arp, H.P. et al. *Environ. Sci. Technol.*, **2009**, 43, 5576-5585.

[2] Hawthorne, S.B. et al. *Environ. Sci. Technol.*, **2007**, 41, 6297-6304.

[3] Hawthorne, S.B. et al. *Analytical Chem.*, **2009**, 81, 9472-9480.

