

Bioavailability of Sediment-Associated Benzo(a)pyrene Within Single-Versus Multiple-Species Systems

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Abstract. A series of experiments were conducted with ben-zo(a)pyrene (B(a)P) spiked sediments to determine if bioavailability of sediment-associated contaminants is affected by multiple species interactions. Three benthic invertebrates, *Hyalella azteca*, *Chironomus tentans*, and *Lumbriculus variegatus*, were exposed to sediments spiked with radiolabeled B(a)P that was aged for 60 days. Organisms were introduced into the spiked sediments in single, binary, and ternary combinations. Changes in bioavailability were then determined for each species by estimating uptake clearance coefficients (k_s) and bioaccumulation factors (BAFs) during 7-day exposures. In general, there was a trend toward lower k_s values in binary and ternary exposures compared to the single-species systems. In contrast, BAF estimates were more variable with fewer significant differences noted among treatments. BAF estimates were highest for *L. variegatus* followed by *C. tentans* and *H. azteca* and appear to be dependent on specific feeding and habitat requirements as well as the relative biotransformation/elimination potential of each species. Overall, these results suggest that animal–animal interactions may be important to consider when estimating bioavailability of sediment-bound chemicals.