Effects of feeding rate and loading density on bioaccumulation of PCBs in oligochaete *Lumbriculus variegatus*

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Sediment tests with aquatic organisms can provide valuable information about potential toxicity and the bioavailability of polychlorinated biphenyls (PCBs) to the organisms. The US-Environmental Protection Agency 28-day *Lumbriculus variegatus* bioaccumulation test for sediments when successfully performed often has poor growth of the *L. variegatus.* Potential causes of poor growth include poor nutritional quality of the sediment, sublethal toxicity effects, and/or too much competition for the available food in the sediment (i.e., too many organisms for the available food). The test, as currently configured, has conditions of no feeding and a loading rate of organisms in the test chambers of no less than a ratio of 50:1 of organic carbon to organism dry weight (US-EPA, Test Method 100.3). The objectives here are to investigate the effects of loading density and feeding on the growth of the *L. variegatus* and their subsequent impacts on the bioaccumulation of PCBs by the organisms. A preliminary test was performed with 2 loading densities, 100:1 and 25:1 (ratio of organic carbon to organism dry weight) and 3 feeding rates (0, 2, 4 times feeding per week) using a Hudson River (HR) sediment contaminated with PCBs at 2.6 ppm along with our standard control sediment (West Bearskin). Results of the preliminary study demonstrated that PCBs residues were influenced by feeding and loading rates. Growth of the organisms increased with increase feeding rate suggesting more available nutrition from external food provided. A significant difference (Tukey honestly significant difference, $\alpha = 5\%$) in the growth of the organisms was observed with low loading (100:1). No significant difference in the growth was observed with high loading (25:1). These results suggest limited food availability per organism in high loading treatments. PCB residues declined with increasing feeding rate and residues increased with increased loading. Growth of the organisms with feeding in combination with loading rates was inversely related to the bioaccumulation of PCB residues. Following this study, we performed another 28-day exposure with no feeding and four different loading densities based on the organic content of the sediment samples of WBS and HR sediments. The end points of the test were biomass, lipid content and PCB concentrations in the tissue. Further, analyses and interpretations of the test results will be presented.

This abstract does not necessarily reflect U.S. EPA policy.