

# Toxicokinetics of Organic Contaminants in *Hyaella azteca*

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**Abstract.** Uptake, biotransformation, and elimination rates were determined for pentachlorophenol (PCP), methyl parathion (MP), fluoranthene (FU), and 2,2',4,4',5,5'-hexachloro-biphenyl (HCBP) using juvenile *Hyaella azteca* under water-only exposures. A two-compartment model that included biotransformation described the kinetics for each chemical. The uptake clearance coefficients ( $k_u$ ) were 25.7, 2.9, 11.5, and 1.1, 184.4, 9.3, and 251.7, 9.0 ( $\text{ml g}^{-1} \text{h}^{-1}$ ) for PCP, MP, FU, and HCBP, respectively. The elimination rate constant of the parent compound ( $k_{ep}$ ) for MP was almost an order of magnitude faster ( $0.403$ – $0.070 \text{ h}^{-1}$ ) than for PCP and FU ( $0.061$ – $0.034$  and  $0.040$ – $0.008 \text{ h}^{-1}$ ). The elimination rate constants for FU and PCP metabolites ( $k_{em}$ ) were similar to the parent compound elimination  $0.040$ – $0.005 \text{ h}^{-1}$  and  $0.076$ – $0.012 \text{ h}^{-1}$ , respectively. For MP, the metabolites were excreted much more slowly than the parent compound ( $0.021$ – $0.001 \text{ h}^{-1}$ ). For PCP, FU, and MP whose metabolites were measured, the biological half-life ( $t_{1/2p}$ ) of the parent compound was shorter than the half-life for metabolites ( $t_{1/2m}$ ) because the rate is driven both by elimination and biotransformation processes. Thus, *H. azteca* is capable of metabolizing compounds with varying chemical structures and modes of toxic action, which may complicate interpretation of toxicity and bioaccumulation results. This finding improves our understanding of *H. azteca* as a test organism, because most biomonitoring activities do not account for biotransformation and some metabolites can contribute significantly to the noted toxicity.