

Municipal Wastewater Contamination in the Southern California Bight: Part II. Cytosolic Distribution of Contaminants and Biochemical Effects in Fish Livers

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ABSTRACT

The objective of this study was to examine the cytosolic distribution of metals and oxygenated organic metabolites (MTBs), and biochemical effects, in livers collected from both highly contaminated and less contaminated southern California coastal sites. Cytosolic extracts were separated by Sephadex G-75 column chromatography into high molecular weight (>20,000 daltons) enzyme-containing (ENZ) pools, medium molecular weight (>3000-20,000 daltons) metallothionein- or metallothionein-like-containing (MT) pools, and low molecular weight (<3000 daltons) glutathione-containing (GSH) pools.

Concentrations of Cd, Cu, and Zn were frequently lower in cytosolic pools of longspine combfish, yellowchin sculpin, and California tonguefish from highly contaminated Palos Verdes (PV) relative to those from less contaminated Santa Monica Bay (SMB) despite much higher concentrations of these metals in sediments at PV. Patterns of cytosolic metal distribution different more between metals than between species or sampling locations. Most Cd, Cu, and Zn occurred in the MT pools of these three species, with the exception of Zn in California tonguefish which occurred predominately in the ENZ pool. In all three species, ENZ-Cu showed positive slopes when regressed against total cytosolic Cu, while ENZ-Cd showed no significant slopes when regressed against total cytosolic Cd. Patterns for Zn were the least consistent among species, with higher ENZ-Zn slopes occurring in fish livers with lower cytosolic Zn concentrations.

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