Polycyclic aromatic hydrocarbon (PAH) contamination of surface sediments and oysters from the inter-tidal areas of Dar es Salaam, Tanzania

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PAH contamination may pose hazards to benthos but limited risks to humans.

Abstract

Surface sediment and oyster samples from the inter-tidal areas of Dar es Salaam were analyzed for 23 polycyclic aromatic hydrocarbons (PAHs) including the 16 compounds prioritized by US-EPA using GC/MS. The total concentration of PAHs in the sediment ranged from 78 to 25,000 ng/g dry weight, while oyster concentrations ranged from 170 to 650 ng/g dry weight. Hazards due to sediment contamination were assessed using Equilibrium Partitioning Sediment Benchmarks and Threshold Effect Levels. Diagnostic indices and principle component analysis were used to identify possible sources. Interestingly, no correlation between sediment and oyster concentrations at the same sites was found. This is supported by completely different contamination patterns, suggesting different sources for both matrices. Hazard assessment revealed possible effects at six out of eight sites on the benthic communities and oyster populations. The contribution of PAH intake via oyster consumption to carcinogenic risks in humans seems to be low.

Keywords: Equilibrium partitioning sediment, Benchmarks, Threshold effect levels, Principle component analysis, Hazard assessment, Carcinogenic risk