Complexation of heavy metals by humic substances in sediments from the polluted Erhjin estuary, Taiwan

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ABSTRACT

Humic substances were extracted from Erhjin estuary sediments for the determination of their heavy metal concentrations using atomic absorption spectrophotometry. The purposes are to investigate the distributions of heavy metals in humic substances as well as the environmental characteristics of heavy metals associated with different phases in the sediments. The concentrations of Cu, Pb, and Fe and Mn in humic acid were found to be between 282 and 821 μg/g, nd and 49.5 μg/g, 15.2 and 114 mg/g, and 118 and 454 μg/g, respectively. In fulvic acid, the concentrations of Pb, Fe and Mn were all below the detection limits, but Cu concentration was found to be between 165 and 1750 μg/g. Also, we found that fulvic acid has stronger copper complexing capacity than humic acid, but has weaker complexing capacities than humic acid for the other metals (Pb, Fe and Mn). For the sequential leaching analysis of sediments, higher copper percentages were generally associated with high sulfide concentrations in the anoxic area, but lower copper percentages were generally associated with lower sulfide concentrations in the oxic area. The competition for copper between sulfide and humic substances was also discussed.

(Key words: humic substances, heavy metals, complexing capacity)

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