

METAL AND TRACE ELEMENT ASSESSMENT OF TIETÊ RIVER SEDIMENTS, SÃO PAULO, BRAZIL

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The Tietê River is one of Brazil's most important rivers and crosses the State of São Paulo (SP) from east-to-west flowing into another important river, the Paraná River. The objective of this study was to quantify the amount of trace elements and some metals present in sediments collected from the Tietê River, at 5 different sampling points (P₀-P₄), in 3 campaigns (2008/2009), from the headwaters to Suzano County upstream from São Paulo city. Instrumental Neutron Activation Analysis was applied for measuring total concentration of some metals and trace elements. The USEPA 3051 digestion procedure was used for sediment digestion and determination of Cd, Cu, Cr, Ni, Pb and Zn by inductively coupled plasma optical emission spectrometry (ICP OES) and Hg by cold vapor atomic absorption spectrometry (CV AAS) were carried out. The metal concentrations obtained by acid digestion were compared to concentrations established by CONAMA 344 (Brazilian legislation) for evaluating the potential effects on

aquatic organisms. The sampling sites P3 and P4, near industrialized areas, showed the highest concentrations for potentially bioavailable metals, mainly Zn and Hg. Zn concentrations at sampling P₃ and P₄ were 390 and 590 mg kg⁻¹ respectively, well above CONAMA level 2 (315 mg kg⁻¹). Mercury was found in the range of 0.411- 0.448 mg kg⁻¹ close to CONAMA level 2 (0.486 mg kg⁻¹). Cd, Cu, Cr and Pb were also detected above CONAMA level 2 concentrations in at least one of these two sampling points. The results obtained by INAA were compared to earth crust values. The enrichment factor in relation to earth crust values using Sc as a normalizer element was also calculated. A strong enrichment was found for the elements As, Br, Sb, Th, U and Zn. These results evidenced contamination by industrial effluents and sewage even relatively close to the Tietê River headwaters. The worst biological effects (acute toxicity) were also observed at P3 and P4.