

How elevated levels of Cd, Cu and Pb in the surface sediments collected from the drainage receiving metal industrial effluents? Comparison with metal industrial drainage and intertidal sediments in Selangor, Malaysia

Abstract

Surface sediments were collected in April 2005 from a drainage receiving metal industrial effluents from Serdang in addition to 6 sampling sites from intertidal area and 4 urban drainage sites. The sediment samples were analysed for Cd, Cu and Pb. The metal concentrations at the Serdang industrial drainage sediments were 15.9 $\mu\text{g/g dw}$ for Cd, 1003.5 $\mu\text{g/g dw}$ for Cu and 1267 $\mu\text{g/g dw}$ for Pb. These metal levels were significantly higher than those in the sediments collected from intertidal area (6 sites) and other urban drainages (4 sites) [Cd: 1.39-3.41 $\mu\text{g/g dw}$; Cu: 6.64-122.7 $\mu\text{g/g dw}$; Pb: 26.0-227.7 $\mu\text{g/g dw}$]. The total concentrations of Cu, Pb and Cd found at Serdang industrial drainage sediments were 48.76, 23.52 and 8.36 times higher than those in the other sites. Based on the metal concentrations in the four geochemical fractions, for Cu, the EFLE, acid-reducible and oxidisable-organic fractions in the sediment at the Serdang industrial drainage was 59.97, 35.26 and 103.74 times, respectively, higher than those in the other sites. For Pb, the EFLE, acid-reducible and oxidisable-organic fractions in the sediment at the Serdang industrial drainage was 3.60, 2.10 and 25.42 times, respectively, higher than those in the other sites. For Cd, the EFLE, acid-reducible and oxidisable-organic fractions in the sediment at the Serdang industrial drainage was 6.17, 11.8 and 12.39 times, respectively, higher than those in the other sites. Thus, the elevated concentrations of Cu, Cd and Pb in the sediments collected from Serdang industrial drainage sediments were evidently receiving point source industrial effluent from the nearby metal factory. Therefore treatment on the factory effluent based on the present findings is necessary.

Keyword: Heavy metals; Metal industrial drainage; Surface sediments; Selangor; Malaysia