Distribution and speciation of Zn and Pb in coastal sediments of Dumai Sumatera, Indonesia

ABSTRACT

Concentrations of Zn and Pb in surface sediments collected from 23 sampling stations of Dumai coastal waters have been geochemically [easily, freely or leachable and exchangeable (EFLE), acid reducible, oxidizable organic and resistant] analyzed in addition to their total concentrations [expressed in μg g−1 dry weight (d.w.)]. Results showed that mean concentrations of total Zn and Pb were highest in Ferry Port (88.2 and 61.2 μg g−1 d.w., respectively), while the lowest was in Batu Panjang (32.6 and 15.7 μg g−1 d.w., respectively). Metal concentrations in 87% and 74% of the sampling stations for Zn and Pb were dominated by the resistant fraction. However, nonresistant fractions were found to be higher than resistant fractions at Cargo Port, Sungai Dumai, and Penyembal for Zn; and in Pelintung, Guntung, Mundam, Ferry Port, Fishing Port, and Purnama for Pb, indicating that anthropogenic inputs of Pb occurred in more stations when compared to Zn. Site I (eastern Dumai) was dominated by the nonresistant fraction for Pb (61%) suggesting dominant anthropogenic inputs of this metal. This might be attributed to the combination of large population, discharges of untreated domestic and industrial wastes, shipping activities and city run-off.

Keyword: Heavy metals; Metal speciation; Sediment; Indonesia