

Occurrence, environmental implications and risk assessment of Bisphenol A in association with colloidal particles in an urban tropical river in Malaysia

ABSTRACT

Phase distribution of emerging organic contaminants is highly influential in their presence, fate and transport in surface water. Therefore, it is crucial to determine their state, partitioning behaviour and tendencies in water environments. In this study, Bisphenol A was investigated in both colloidal and soluble phases in water. BPA concentrations ranged between 1.13 and 5.52 ng L⁻¹ in the soluble phase and n.d-2.06 ng L⁻¹ in the colloidal phase, respectively. BPA was dominant in the soluble phase, however, the colloidal contribution ranged between 0 and 24% which implied that colloids can play a significant role in controlling BPA's transportation in water. Urban and industrial areas were the main sources of BPA while forest areas displayed lower levels outside the populated domains. pH levels were between 6.3 and 7.4 which might have affected BPA's solubility in water to some extent. The particle size distribution showed that the majority of the particles in river samples were smaller than 1.8 µm in diameter with a small presence of nanoparticles. Zeta potential varied between -25 and -18 mV, and these negative values suggested instability of particles. Furthermore, BPA was positively correlated with BOD, COD and NH₃-N which might indicate that these organic compounds were released concurrently with BPA. RQ assessment showed low levels of risk towards algae and fish in the study area.