Is a mussel processing site a point source of Zn contamination? evidence of Zn remobilization from boiled mussel, Perna viridis

Abstract

Sediment sampling in the Straits of Johore revealed that the surface sediments collected at a jetty near a mussel processing factory in Kg. Sg. Melayu had elevated Zn concentration in its first geochemical fraction; namely, easily, freely, leachable or exchangeable (EFLE) and its total concentration. This total Zn level in the sediment was comparable to the polluted sites on the west coast of Peninsular Malaysia. It was assumed that the tap water, in which mussels had been boiled, might have contained high levels of Zn which would then be released to the drainage system and finally emptied into the coastal waters where the jetty is located. In order to confirm this point source of Zn contamination, a laboratory study was designed to ascertain if the boiled mussels contained higher concentrations of metals compared to a control group. The laboratory results showed that distilled water, in which fresh mussel tissues had been boiled for 15 minutes, possessed significantly ($P < 0.05$) higher levels of dissolved Zn. In addition, Zn concentrations in the total boiled soft tissues and boiled shells of fresh mussel Perna viridis were significantly ($P < 0.05$) lower than the Zn levels before boiling, and this finding evidently showed that Zn in the mussel tissues was remobilized and thus released to the water. Therefore, these results supported the conclusion that the mussel processing factory at Kg. Sg. Melayu, which used tap water to boil the mussels before shucking, was a point source of Zn contamination in this area in the Straits of Johore.

Keyword: Perna viridis; Zn contamination; Boiled mussels