

Distribution of heavy metals in the different parts of *Cerithidea obtusa* and the relationships between metal distribution and allometric parameters of the snail

Abstract

The intertidal gastropod, *Cerithidea obtusa* were obtained from Bako and Sematan (Sarawak) and Deralik (Perak). Besides the shell, the snails were dissected into five different soft tissues. The soft tissues and the shell were then analysed for heavy metals. It was found that the highest concentrations of Cu (112 - 178 $\mu\text{g/g dw}$) and Zn (117 - 161 $\mu\text{g/g dw}$) were found in the tentacle; the highest concentrations of Cd (4.41 - 5.37 $\mu\text{g/g dw}$), Pb (53.2 - 63.8 $\mu\text{g/g dw}$) and Ni (26.1 - 27.9 $\mu\text{g/g dw}$) were found in the shell. On the other hand, the highest Fe concentrations (910 - 2921 $\mu\text{g/g dw}$) were found in the operculum. The Spearman's correlation coefficient and multiple stepwise linear regression also revealed that the allometric parameters can influence the distribution of heavy metals in some of the different parts. From the present findings indicated that the heavy metals accumulated by the *C. obtusa* from the environment might affect its physical growth, which was shown by the negative correlations found between the metals in the different parts with the allometric parameters.

Keyword: *Cerithidea obtusa*; Heavy metals; Allometric parameters; Different parts; Cluster analysis; Multivariate analysis