

HEAVY METALS CU, CD, PB AND ZN IN SOME COMMERCIAL FISHES FROM EAST AND WEST COAST OF PENINSULAR MALAYSIA

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Introduction

Heavy metals pollution in marine ecosystem of environmental concern worldwide. Domestic sewage, industrial effluents, combustion, mining operations, agricultural (husbandry and aquaculture) and metallurgical activities are among the sources of anthropogenic metals input into the marine ecosystem. Although heavy metals in trace concentrations are normal constituents of marine organisms, at high levels they are potentially toxic and can be concentrated in the organs of marine organisms which accounts for their toxicity. Since fishes and humans are at the higher levels of the food (chain) they may pose a direct threat of heavy metals contamination. The west coast of Peninsular Malaysia especially receives contaminants from effluents released into the rivers and activities along the coastal environment. East coast is less polluted since there are not many human activities except in few locations. Nevertheless geological input may also contribute to the elevation of heavy metals in the environment and accumulation in the marine organisms. Many studies reported that certain location in the west and east coast of Peninsular Malaysia are contaminated by heavy metals such as Cu, Zn and Pb (Ismail et al. 1991; Ismail et al. 1993; Ismail and Ramli, 1997). High levels of heavy metals in sediments and benthic organisms may reflect the levels of heavy metals in fishes. At present there is no detailed study on metals concentration in commercial species of fish from the coastline of west and east coast of Peninsular Malaysia. This study was carried out to assess the heavy metals levels in important commercial fishes that is an important component of diet in Malaysia.

Materials and Methods

Forty-nine common commercial species of fish were collected along the west coast of Peninsular Malaysia and seven species from Kelantan coastline. The samples were kept frozen until analyses. For heavy metals determination, the samples were digested in a mixture of concentrated nitric and perchloric acids and analysed for Cu, Cd, Pb and Zn by flame Atomic Absorption Spectrophotometre model Perkin Elmer 4100. The results are reported in ug/g wet weight. To avoid possible contamination, all equipments used were acid washed. In order to assess the accuracy of the method, standard addition test was carried out and the recovery was 90-100%.

Results and Discussion

In general the levels of Cu, Cd, Pb and Zn in all fishes studied are in the range of 0.2-44.5, 0.02 - 8.7, 0.01-8.4 and 1.2-

88.5 ug/g wet weight respectively. Although some of the values of metals concentration are high and above the permissible limits allowed by Malaysian Food Regulation 1985, a majority of the values recorded are low and within the permissible limits. These values are comparable to other polluted and slightly polluted areas such as Manila Bay in Phillipines (Maricar et al. 1997) and Arab Sea near Pakistan (Tariq et al. 1993). Unfortunately, no comparative data for metals content in fishes from the same study areas. Among the metals studied they show different pattern of distribution in the fish tissues. Zinc for examples accumulated high in the fin and Cu, Cd and Pb are high in the liver. Muscles show the lowest level of metals concentration in majority of the samples. In term of toxicity this results need to be clarified. Therefore more detail study is needed. Cadmium and lead especially are not an essential elements. These metals play an important role in toxicities on fishes even at low levels. Eventhough Cu and Zn are an essential elements, they may be toxic at high levels. Although the samples analysed are limited, the concentrations of metals found in the fishes suggest that the fishes are not largely threatened by metals contamination. High metals concentration released from human activities inland and in vicinities of rivers may not significantly contribute to the levels of metals in coastal fishes. Since the heavy metals contamination are localised and metals level in some organisms are positively correlated to the environment (Ismail and Ramli, 1997), more studies are needed on the metals contamination and its fate in commercial fishes from contaminated localities in Malaysia. Some metals are very toxic even at low levels. The issues of environmental hormone or endocrine disrupting chemicals are now very popular in many developed countries which historically have faced serious chemical pollution due to their industrial activities.

Conclusions

Level of Cu, Cd, Pb and Zn in the muscel tissues of commercial fishes are in the range of permissible limits allowed by food regulation. High metals level in some of the samples may be related to high level of metals in the environment of study areas.

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