

HEAVY METAL CONCENTRATION IN DIFFERENT TISSUES OF FISHES FROM COASTAL WATERS OF COCHIN

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Information on the concentration of trace metals in the environment is essential to assess the possible accumulation of these metals in the body of organisms and its transfer to man through the food chain. Muscles, alimentary canal and gills of 14 species of fishes collected from the inshore waters of Cochin were analysed for heavy metals like Cu, Zn, Cd, Mn and Fe. The data showed that the concentration of various metals in different tissues of fishes varied differently, (but in general the musculature which forms the edible part showed lower concentration than other tissues. Higher concentration of all metals were observed in the gills and alimentary canal for most of the fishes studied. The concentration of Cu in the muscle tissue of *Sphyryna zygerus* was $54 \mu\text{g g}^{-1}$, while in the case of liver it was $35.69 \mu\text{g g}^{-1}$ (dry weight). This corresponds to an average enrichment ratio of about

1:23 in respect of liver and musculature. Similarly the enrichment ratio for Zn and Mn in the same species were 1:26 and 1:3 respectively.

In the case of *Chirocentrus dorab* the liver to muscle ratio for Cu, Zn, Fe and Cd were 1:11, 1:38, 1:2 and 1:7 respectively. The enrichment ratio for each element between given pair of organs for different fishes varied. The absolute increase of heavy metals in muscle tissue of contaminated fish is often much lower than in other organs. Elevated levels of Zn was observed in the alimentary canal and gills of *Stolephorus devis*, *Chirocentrus dorab*, *Sardinella longiceps*, *Rastrelliger kanagurta*, *Mus maculatus* and *Megal cephalus*. It is generally believed that fish actively regulates Zn concentration in their muscle tissue and as a result do not reflect changes in ambient available levels of this element in the

environment (Cross et al. 1973). Therefore, the high levels of Zn concentration reported here infers that the regulation of this element may not be complete. In all the species, Fe was found to be the most abundant of the metals analysed. Acceptable limits for other elements for human consumptions are: Zn, 150ppm; Cu, 10ppm; Cd, 0.2ppm; pb, 1.5ppm; and Hg, 0.5ppm on wet weight basis (Denton 1986).

The variation in concentration of metals in different tissues may be attributed to the feeding habits. In detrital feeders like *Mugil cephalus* feed by grazing on submerged materials and plant surfaces or by sucking the surface layer of the mud. Ingestion of sediment which could be enriched with heavy metals as a result of contamination, would probably lead to the ingestion of greater quantities of heavy metals by the fishes (Eustace 1974).

From the data it is clear that the concentration of all the metals analysed are within the prescribed limits for human consumption. The data obtained from this region form a baseline study, but constant monitoring is essential in the changing environment due to industrialisation and fast urbanisation.

References

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