

**M.S.88. SIVADASAN, C.R.—Studies on the effects of selected trace metals on *Metapenaeus Dobsoni* (Miers)—1987—
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The investigation is an attempt to determine the baseline concentrations of Hg, Cu, and Zn in *Metapenaeus dobsoni* (Miers) a widely distributed prawn of Indian waters and to study the feasibility of *M. dobsoni* as a biological indicator of trace metal pollution.

The variation of Cu and Zn content in edible and nonedible parts of *M. dobsoni* collected during June 1984 to May 1985 was not appreciable but the Hg content varied with the season. Concentration of Cu and Zn in edible and nonedible parts showed significant positive correlation. Stratification of water and intermittent industrial effluent discharges seem to play the major role in controlling the trace metal concentration in the estuary than the seasonal variation in salinity. The trace metal content was within the specified limits for human consumption and these values form the basis for suggesting the baseline concentration of these metals in *M. dobsoni* from Cochin backwaters.

In acute toxicity tests, the adaptability of organisms to ambient conditions seems to have more influence on the toxic effects of trace metals. Hg was found to be the most toxic and the order of toxicity was found to be Hg > Cu = Zn. The LC50 values determined for the different size groups at various salinities paved as a guideline in predicting the water quality criteria in pollution monitoring.

Studies on the kinetics of accumulation and depuration in *M. dobsoni* suggested a first order two compartment kinetic model. In the case of Hg, *M. dobsoni* was found to shed the Hg load after reaching a threshold concentration depending on the salinity of the exposure medium. Gill was found to be the major site of accumulation of all the three metals and the order of accumulation in different body parts was gill > viscera > exoskeleton > muscle. Accumulation was higher in lower size groups and this observation confirmed the hypothesis that smaller animals with large surface area to volume ratio accumulate trace metals faster from solution than larger ones. Two stage depuration mechanism with a rapid initial one followed by a slow release was noticed for Hg and Cu. In the case of Zn, two compartment release was noticed with a very slow rate of release in the slow compartment. The biological half life ($t_{1/2}$) for Hg and Cu in the species were also determined.

On exposure to Hg and Cu, oxygen consumption was decreased while the same was enhanced on exposure to Zn during the initial periods of exposure. The response of oxygen consumption was comparable to the rate constant values for accumulation. The influence of threshold values during accumulation was

reflected in the rate of oxygen consumption on exposure to Hg.

In the light of the observations made *M. dobsoni* conforms to the requirements of a sentinel organism in the estuarine environmental management and is recommended as an indicator organism of trace metal pollution for Indian waters.