

DISTRIBUTION OF COPPER AND ZINC IN KODIYAKKARAI COASTAL ENVIRONMENT

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ABSTRACT

The concentration of both copper and zinc were high during northeast monsoon in water samples and during postmonsoon in sediment samples. High concentrations of both metals was recorded in the swamp region. The distribution of both the metals was not uniform at all the stations.

Key-words: Copper, Zinc, Water, Sediment

Kodiyakarai swamp ($10^{\circ}18'N$; $79^{\circ}51'E$) is located in the southeast coast of India and forms one of the ecologically important biotopes, endowed with an unique kind of coastal environment as it retains connection with the Palk Strait and the Bay of Bengal (Fig.1). There is hardly any information on trace

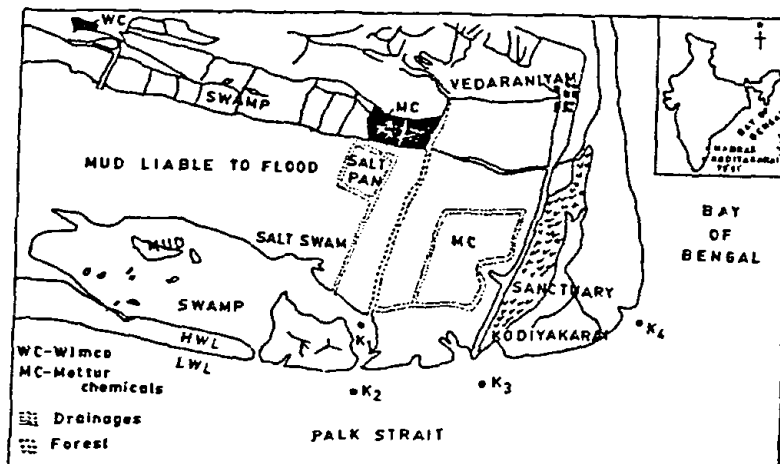


Fig.1. Map showing the sampling stations.

metal concentrations in this coastal swamp. Kodiyakarai water receives agricultural drainage from adjacent land and chemical wastes from chemical industries. The present investigation was undertaken to know the levels of Cu and Zn in water and sediment in this biotope.

Sediment and water samples were collected at 4 stations from Kodiyakarai swamp (K₁), Palk Strait (K₂, K₃) and coastal region (K₄) (Fig.1) from

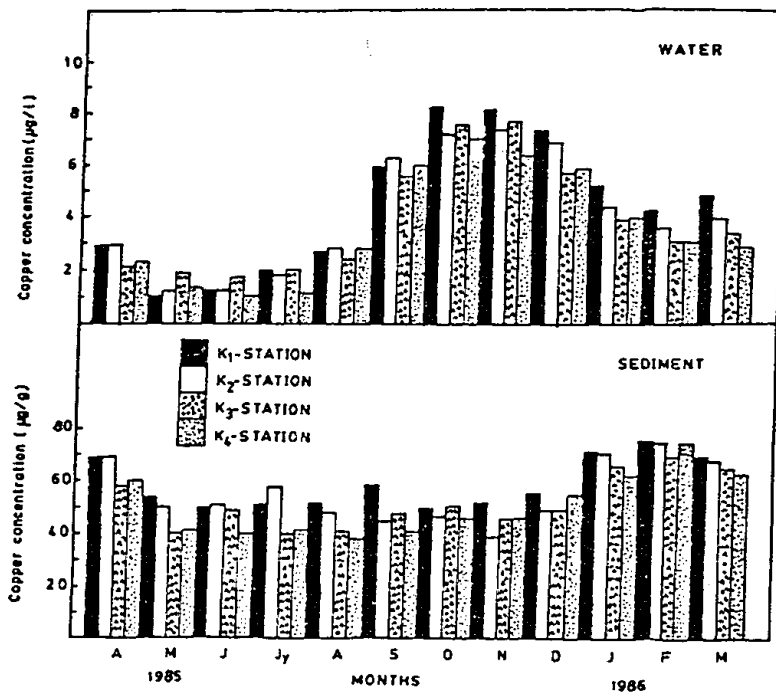


Fig.2. Concentration of copper in water and sediment samples.

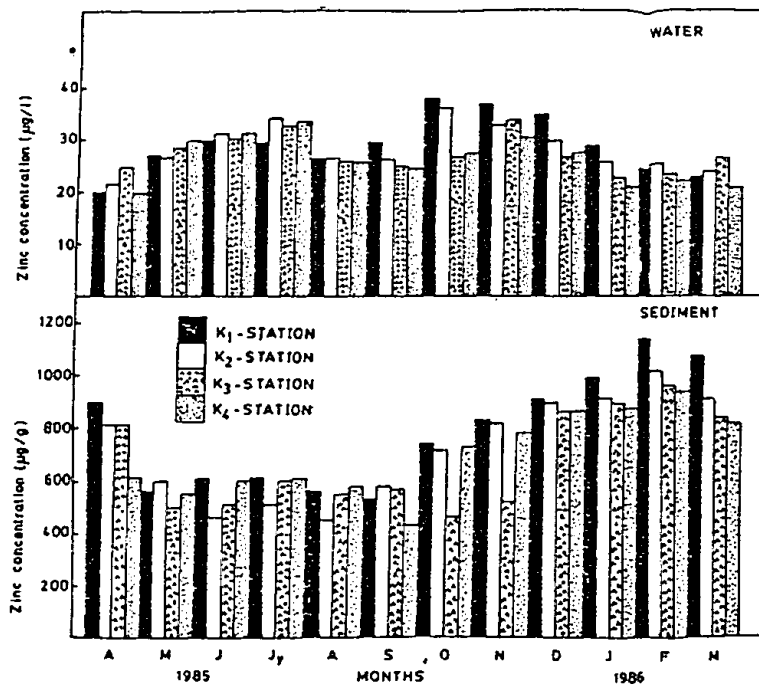


Fig.3. Concentration of zinc in water and sediment samples.

April, 1985 to March, 1986. Sediments collected with the help of plastic corer, were oven dried. One gram sample of powdered sediment was used for analysis. They were digested by hot acid (conc. HNO_3 and HClO_3) as per the method of Chester and Hughes (1967). Metal concentrations in water samples were estimated by ADPC - MIBK extraction procedure of Brooks, Presely and Kapalam (1967). Zinc and copper concentrations were estimated using a Flame Atomic Absorption Spectrophotometer (Perkin Elmer 2280) with adequate number of standards for calibration of the instrument. The precision and the detection limit of the instrument is $\pm 0.01 \mu\text{g}$.

Among the 4 stations studied, highest levels of copper and zinc were recorded in water samples at K_1 during October (northeast monsoon beginning). These results are closely in agreement with those of Kumaraguru (1980) who recorded increased levels of copper and zinc during monsoon season and decreased levels during January - May in the Vellar estuary and Killai back water. Maghendran (1985) also noted a similar pattern of zinc distribution in waters of the Vellar estuary. The results of the present investigation are comparable to the values observed in sediments of the polluted Belfast Lough (McGrath and Austin, 1979). Castagna, Sarro, Sinatra and Console (1982) and Pragatheeswaran, Loganathan, Ramesh and Venugopalan (1986) also noted high concentrations of metals in the Gulf of Catania (Italy) and the Bay of Bengal respectively. Increased levels of metals in the present study may be due to wastes from chemical industries, sewage, land drainage and leaching by floods into the swamp (Fig.1).

Hallberg (1974) noted a linear relation between metal concentration and sediment organic carbon. Martin (1973) studied the fate of metals by flocculation and their subsequent deposition along with organic matter in the sediments. In the present investigation, the concentrations of metals (Figs.2&3) were found to be high in sediments during postmonsoon season. The sediment organic carbon levels were also found to be high in the present study areas during the same season (CBPCWP, 1986). The increased levels of metals in sediment samples during postmonsoon can be attributed to the settlement of metal ions along with organic matter on to the bottom.

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