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Research paper

## **HEAVY METAL PARAMETERS OF CHOTHAVILAI BEACH, KANYAKUMARI DISTRICT**

G M LEKSHMI\*, M SUKUMARAN \*\*AND M MATHEVAN PILLAI\*\*

Department of Botany, St. Gregorios College, Kottarakara, Kerala\*

Department of Botany, S.T.Hindu College, Nagercoil, Tamilnadu\*\*

E-mail : [gmlekshmi@gmail.com](mailto:gmlekshmi@gmail.com)\*

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### **Abstract**

The Chothavilai beach of Thengamputhoor village located in Kanyakumari district of Tamilnadu state lying along the Southwest coast of India, is a recreation spot frequented by tourists and local people. In the present investigation emphasis was laid on the heavy metal parameters in the surface water of two stations of Chothavilai beach for a period of six months from January to June 2004. Only low concentrations of heavy metals were found in water during the study period. The concentrations of iron and manganese were higher during the monsoon season and the concentration of copper and zinc were higher during pre-monsoon season.

**Keywords:** Chothavilai beach, heavy metal, APDC, MIBK.

### **INTRODUCTION**

Ocean is the largest habitat and covers about 71% of earth's surface. Unlike fresh water and terrestrial habitat, sea is continuous and is inhabited by various organisms. In fact life started in the marine habitat and is called the "cradle of life". The marine habitat exhibits two clear horizontal stratifications named pelagic region or whole body of water and benthic region or bottom region. The biological productivity of the sea is dependent on the complex physical, chemical and biological processes active in the medium and subsequently transferred to different trophic levels Pillai et al., (2000), Longhurst and Wooster (1990).

The seasonal climatic changes in the marine environment play a significant role in the ecological cycle of the Indian seas, especially Arabian sea. Observations made over the years, point to the fact that the seasonal changes brought in through the pre-monsoon, monsoon and post-monsoon phenomena along with the resultant oceanographic changes influence the overall productivity of the region significantly. Chothavilai beach is a recreation spot frequented by tourists and local people as well. The quality of the beach and the environment should be hygienic and healthy to the fun loving people. In the present study an attempt has been made to assess the water quality using heavy metal parameters.

### **MATERIAL AND METHODS**

Water samples were collected from the surface region of the coast and immediately kept in an ice box and transported to the laboratory to avoid contamination. The water samples were then filtered through a Millipore filtering unit using Millipore filter (mesh 0.45 $\mu$ ). The filtered water samples were pre-concentrated with Ammonium PyrolydineDiphio Carbonate (APDC), methyl Iso-Butyl Ketone (MIBK) extraction procedure followed by Brooks *et al.*,(1967).

Filtered water was divided into two 500 ml aliquots and the pH was adjusted to 4  $\pm$ 0.1 by careful dropwise addition of 50% nitric acid. The heavy metals were pre-concentrated and separated from the bulk matrix by complexation and APDC and extraction into MIBK. The organic layer containing metal chelates was collected and back extracted with 50% nitric acid and diluted with metal free double distilled water to a minimum quantity (25ml). Re-extraction of each sample with the addition of APDC and MIBK to each aliquot established the blank.

The extracted samples of water were aspirated into Atomic absorption spectrophotometer (Varian Techtron, AA 1100) for the determination of (Cu, Zn, Mg, Fe) heavy metals.

A series of standard metal solutions (Cu,Zn,MgandFe) were prepared in the optimum concentration range with metal free double distilled water. Calibration curves were prepared by plotting absorption against concentration of the working solution for each element. Metal concentrations in the samples were calculated with the help of these calibration curves.

The study period was demarcated as pre-monsoon (January,February and March) and monsoon (April,May and June) for the sake of convenience of study as the early onset of South west monsoon brought rainfall in the months of April, May and June.

## RESULTS AND DISCUSSION

**Table : 1.** Seasonal variations of heavy metal parameters in station I

Sl. No.	Parameters	Pre-monsoon Mean value	Monsoon Mean value	Total Mean value
1	Iron ( $\mu\text{gl}^{-1}$ )	4.9	5.82	5.36
2	Copper ( $\mu\text{gl}^{-1}$ )	0.5	0.42	0.46
3	Zinc ( $\mu\text{gl}^{-1}$ )	0.71	0.59	0.65
4	Manganese ( $\mu\text{gl}^{-1}$ )	3.46	2.99	3.23

**Table : 2.** Seasonal variations of heavy metal parameters in station II

Sl. No.	Parameters	Pre-monsoon Mean value	Monsoon Mean value	Total Mean value
1	Iron ( $\mu\text{gl}^{-1}$ )	4.6	5.58	5.09
2	Copper ( $\mu\text{gl}^{-1}$ )	0.45	0.36	0.41
3	Zinc ( $\mu\text{gl}^{-1}$ )	0.58	0.54	0.56
4	Manganese ( $\mu\text{gl}^{-1}$ )	3.32	3.3	3.31

Most heavy metal pollution that occurs in the coastal areas are influenced by local hydrographical conditions. Sometimes it may be due to human interference or oil spilling during

fishing activities. The concentration of these elements did not show wide variation between seasons during the study period. During the monsoon season at both the stations the levels of iron and manganese were higher. The level of copper and zinc were higher at pre-monsoon season at both the stations. A low level of heavy metals in water indicates less heavy metal pollution Govindasamy *et al.*, (1997). In the present study, only low level of heavy metals like iron, copper, zinc and manganese were observed, indicating less heavy metal pollution of water in the study area.

## CONCLUSION

Only low concentrations of heavy metals were found in water during the study period. The concentrations of Iron and manganese were higher during the monsoon season and the concentration of copper and zinc were higher during pre-monsoon season.

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