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Impact of Industrial Effluent Release on Metal Toxicity in Musi River at its Origin in Vikarabad , at Hyderabad and at Valigonda

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Abstract: The industrial development of Hyderabad has increased the quality of life for several families, benefitted by employment; but has destroyed the ecological balance of River Musi. The industrial effluents are released into several sewers which ultimately reach Musi.
In the present study an attempt is made to identify the levels of toxic metals in Musi at Vikarabad, at Hyderabad and at Valigonda.

I. INTRODUCTION

In spite of numerous efforts by the Government, River Musi remains a huge health hazard. High levels of toxic heavy metals like Cadmium, Nickel, Lead and Arsenic were found to bioaccumulate in leafy vegetables grown in the areas around Musi (1).
The waters are heavily loaded with several pollutants including heavy metals. These waters are widely used for irrigation purposes downstream in Nalgonda, where the possibilities of bioaccumulation are even more significant. Toxic heavy metals cause kidney, cardiovascular, nervous and bone diseases including ulcers and cancers.
The heavy metals are persistant. They can bioaccumulate and case lots of physiological problems like kidney disfunction and disrupt the metabolism and functioning of vital organs.
In the present study an attempt is being made to document and compare the concentration of metals in the waters of Musi at Vikarabad, at Hyderabad and at Valigonda in Nalgonda District.

II. METHODOLOGY

The water samples were carefully collected from Vikarabad, the origin of Musi. The natural spring waters were collected in the temple tank of Bugga Ramalingeswara Swami Temple.
The second sample was collected at the Musi river near Salarjung Museum in Hyderabad by which time the river accumulates maximum effluents and is highly polluted. The third sample was collected at Akkampally village, Valigonda, in Nalgonda District. These waters are used extensively for irrigation and other farming purposes.
The metals like Aluminum, Zinc, Lead, Manganese and Mercury were assessed using standard methods as given by APHA 22nd Edition 2012.

III. RESULTS

Aluminium levels showed 0.1 mg/liter of sample water in all three areas.

A. Zinc

In Vikarabad Zinc was just 2 mg/liter, while at Hyderabad it was 15 mg/l and at Valigonda it was 12 mg/litre.

B. Lead

Lead levels were relatively low at Vikarabad showing 0.06 mg/liter while at Hyderabad it was 0.2 mg/liter and at Valigonda, 0.4 mg/liter.

C. Manganese

Manganese was relatively low at all the three regions.

D. Mercury

Mercury was a little high at Vikarabad, while at Hyderabad and Valigonda it showed acceptable readings.

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Table 1: Metal content of Musi River at different places

S. No	Parameters	Requirement as per IS:10500-2012		Results		
		Acceptable limit	Permissible limits in the absence of alternate sources	Vikarabad	Hyderabad	Valigonda
1	Aluminium as Al^{+++}, mg/l	0.03max	0.2 max	0.1	0.1	0.1
2	Zinc as Zn^{++}, mg/l	5 max	15 max	2	15	12
3	Lead as Pb^{++}, mg/l	0.01 max	0.3 max	0.06	0.2	0.4
4	Manganese as Mn^{++}, mg/l	0.1 max	0.3 max	0.06	0.01	0.01
5	Mercury as Hg^{++}, mg/l	0.001 max	No relaxations	0.004	0.001	0.001

IV. DISCUSSION

Aluminium is a potentially toxic metaland its toxicity can cause Aluiminium poisoning and might lead to Aluminium induced bone disease, microlytic anemia and neurological dysfunction.

Zinc toxicity can lead to severe nausea, vomiting, painful cramps and diarrhea.

The waters at Hyderabad and Valigonda showed very high contents of Zinc. If these waters contaminate the ground waterin the adjoining areas, a lot of damage will be caused. Manganese is an essential ingredient in the manufacture of dry cell batteries, glass, fireworks, leather and textile manufacturing. Mercury poisoning can cause several neurological problems such as numbness, anxiety, physical tremors, and depression and memory problems. The physiological impacts of higher levels of toxic metals are very evident. The waters of Musi can cause potential health hazards to the population close to its banks and using groundwater for domestic purposes. The metals could bioaccumulate into the vegetables and greens grown on its banks. These metals can, thus, enter into the food chain and cause even larger damage. Hope in the coming years some more concerted efforts are made to decrease the hazards of the polluted waters of Musi.

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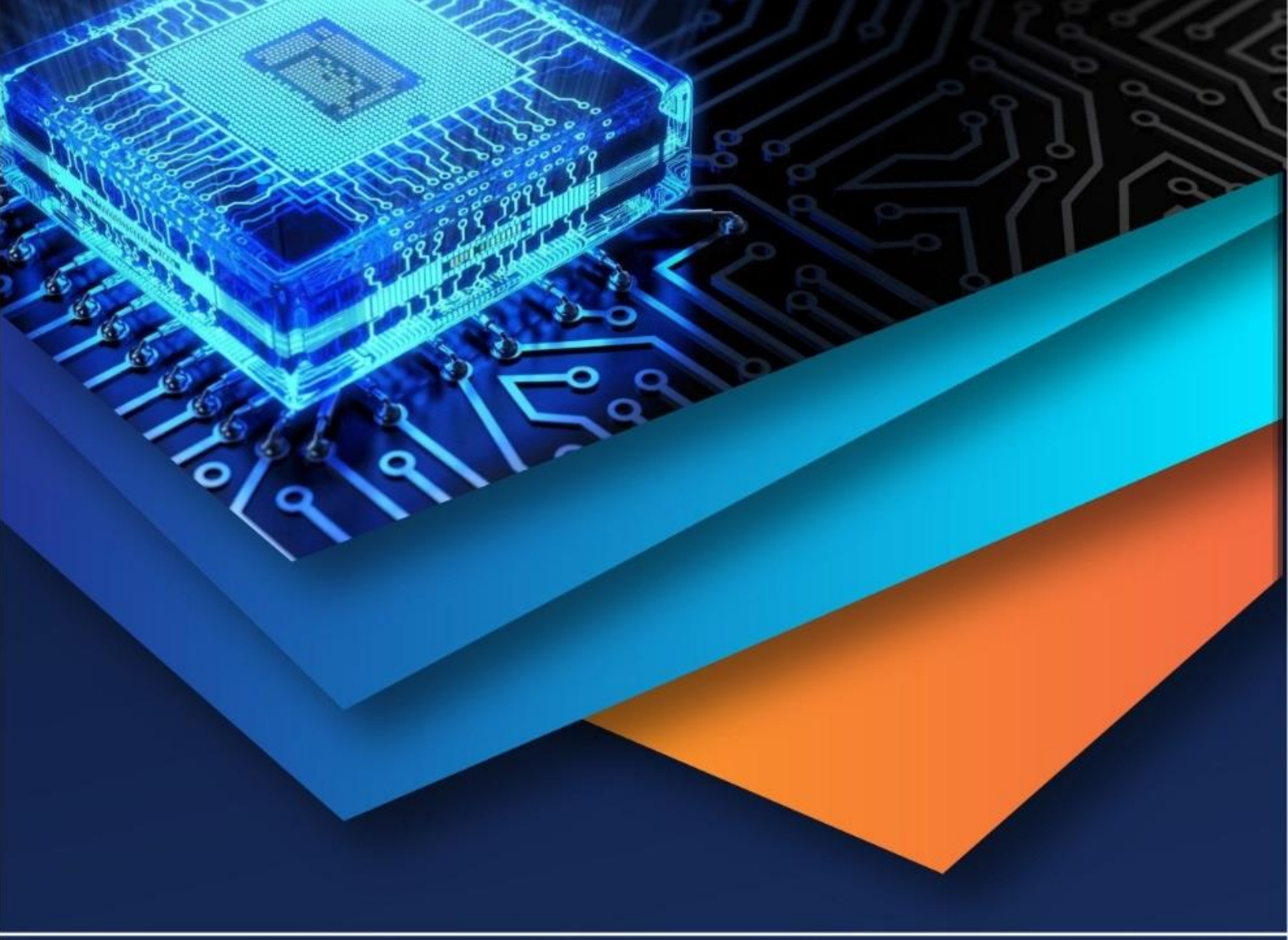

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