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The impact of coal fired thermal power stations on aquatic ecosystem has received relatively little attention. Most of the studies in India and abroad have been directed toward the air emissions. The present studies were undertaken to set detailed insights into the levels of major and minor nutrients in the biotic and abiotic components of water bodies impacted by coal ash. Seven sampling stations were studied at two thermal power stations, situated at different biotopes. Monthly chemical analysis of surface waters and sediments were conducted. Aquatic macrophytes were studied to understand the seasonal fluctuations in nutrient uptake. Selected aquatic vertebrates and invertebrates were investigated to understand the effect of toxic trace metals. A resume of the findings is given below.

1. Out of the several heavy metals studied, Fe had the highest concentration in all the aquatic components. The maximum uptake of Fe in plants were observed in the coal ash impacted regimes. A strong negative relationship existed between the water pH and Fe content. Among bottom dwelling organisms chironomid larva concentrated the maximum Fe levels. In *Typha angustata*, the Fe content in rhizome was greater that the above ground organs. *Potamogeton crispus* from Kolar downstream exhibited, a strong positive correlation between Fe and Mn content of the plant tissue.

2) The maximum Mn in waters and sediments were found in the Sarni ashbund. The values obtained at Kolar downstream was exceptionally high. *Typha angustata* inhabiting Koradi and Sarni ashbunds
accumulated several fold greater Mn levels than the sediments in which they grew. A strong positive correlation between Mn and Co was observed in Typha plants from Koradi ashbund. A similar relationship also existed between Mn and Zn content of Potamogeton crispus from Kolar downstream. The Mn content of fishes and molluscs did not exhibit much variation.

3) The Cu content in the sediments of both reservoirs showed greater concentration than some of the most polluted lakes investigated by other workers. With the increase in sediment organic matter, an increase in sediment Cu was also observed. Similar to Fe, the maximum Cu accrual by Typha plants was observed in the Sarni ashbund. At all the sites, the below ground organs of Typha accumulated the maximum Cu. Among submersed macrophytes Hydrilla verticillata showed maximum affinity for Cu. A concentration gradient ranging from highest levels of Cu in worms (chironomid larva), intermediate levels in molluscs and lowest levels in fishes was observed.

4) Out of the several biotic and abiotic components investigated, emergent macrophyte (Typha angustata) had the highest Zn concentration. In Tawa reservoir, the molluscs had greater Zn concentration than chironomid larva. A strong positive correlation was observed between the Zn content in Typha plants and the soil sediment.

5) The oil effluent canal of Koradi thermal power station had the maximum Ni content in both the waters and sediments. Nickel levels in the sediments of both the rivers investigated were of
the same order. *Typha angustata* growing in Koradi and Sarni ashbunds impacted by coal ash exhibited greater Ni uptake in comparison to the plants from partially impacted station (Koradi reservoir). A linear association was also observed between the Ni content of *Typha* plants and the sediment in which it grew. The Ni content in the bottom dwelling organisms was greater in comparison to fishes.

6) The Co content in the waters and sediments around the sampling sites of Sarni Thermal Power Station was found to be greater than that of Koradi. Unlike Cu, the maximum Co in *Typha* was observed in the populations of Koradi ashbund. A strong negative correlation was found between Co and Mn content of *Typha angustata*. In comparison to emergent macrophytes, submersed macrophytes exhibited lesser affinity for Co. Chironomid larva accumulated greater Co levels in comparison to fishes and molluscs.

7) The maximum total N in sediments of 49.8 ± 13.4 ppm was observed in Koradi reservoir, while the maximum NO$_3$ & NO$_2$ of 3.2 ± 4.2 ppm was found in the surface waters of Tawa reservoir. The mean N levels in emergent macrophytes at different locations ranged between 589.5 to 1392.1 ppm. Elevated temperatures may have been one of the reasons for greater N accrual in *Typha* plants from Koradi reservoir.

8) The mean total P in sediments of Koradi and Sarni ashbunds did not show wide variation, the mean values at these two stations were 87.4 ± 60.3 and 89.5 ± 57.9 ppm respectively. The within
and between site variations were fairly large. The low \( \text{PO}_4^-P \) in waters of Koradi reservoir may be attributed to the scavenging of P by phytoplankton and also by the uptake of aquatic submersed macrophytes.

9) The maximum Ca in sediments of \( 395 + 157.0 \text{ ppm} \) was observed in the Oil effluent canal, similarly the Ca in waters \( (159 + 96.0 \text{ppm}) \) was also highest in the above mentioned site in comparison to other stations. *Typha angustata* from Koradi ashbund accumulated the mean maximum Ca of \( 1125 + 224.7 \text{ ppm} \) and among the submersed macrophytes *Potamogeton crispus* accumulated the mean maximum Ca of \( 1286.1 + 275.2 \text{ ppm} \) in the populations from Koradi reservoir. A strong positive correlation existed between the Ca content in *Typha* plants and the sediments in which they grew at both Koradi and Sarni ashbunds.

10) Similar to Ca, the Oil effluent canal of Koradi thermal power station contained the maximum Mg levels in both the surface sediments and waters. In water the levels of Mg enhanced by a factor of 2 at both the downstream station in comparison to their respective reservoirs, probably due to the ash effluents. The Mg content in *Typha* plants during the entire study period remained fairly constant. A strong positive correlation was observed between Mg and Ni in *Typha* plants from Koradi reservoir and ashbund. In general the submersed and emergent macrophytes had greater Mg content than the sediments and waters.
11) The mean maximum Na content of 706.3 ppm in sediments was observed in the Oil effluent canal of Koradi thermal power station. Emergent macrophytes had greater Na in their tissues than submerged macrophytes. A strong positive correlation was observed between the Na content of Typha plants and the soil sediment in which it grew at both Koradi reservoir and ashbund. In the biotic and abiotic compartments of Kolar downstream, the sediments accumulated the greatest Na concentration.

12) The input of K through ashbund effluents and Oil effluent canal is quite evident in the sampling localities around Koradi thermal power station. In the sampling locations around Sarni thermal power station, the coal ash impacted regions had lesser K levels than the non-impacted regions. Among the aquatic macrophytes, V. spirallis exhibited maximum predilection for K.

13) The pH of surface waters at all the locations were generally on the alkaline side. The minimum pH of 7.17 was observed in the Oil effluent canal and maximum at Koradi reservoir.

14) The sediments of both the Oil effluent canal and Koradi reservoir contained the maximum organic matter. This was attributed to the decomposition of aquatic macrophytes, since at both these sites aquatic plants grew luxuriantly.