

Biocentration of Heavy Metals in Seaweeds of Thoothukkudi Bay (S.India) and Pollution Abatement Measures

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The Thoothukkudi bay, a segment of Gulf of Mannar is known for its seagrass and seaweed potentials. A total of 40 species of seaweeds have been recorded in the bay. In the recent years, this bay is heavily threatened by the discharge of sewage from human settlements and effluents from shore based industries and flyash disposed by coal fired thermal power plant. In order to understand the impact of industrial pollution on the biota, seaweeds and water samples are collected from two different stations viz., highly polluted Thoothukkudi bay (Station I) and less polluted Tiruchendur coast (Station II) and analysed for their heavy metal contents by atomic absorption spectrometry. Algal population samples of *Ulva lactuca* and *Sargassum tenerimum*, the most abundant and perennial species were collected during different seasons viz. premonsoon, monsoon, postmonsoon and summer, dried and used. The content of iron, lead, copper, zinc, and aluminium in filtered seawater from the collection sites was also determined in order to compare metal accumulation in seaweeds under different environmental conditions. Generally the values of heavy metals were in high order both in water and seaweeds of the polluted Station I than in Station II. The mean values of iron, copper, zinc, aluminum and lead recorded in water at Station I and Station II were 32.5, 18.9, 28.8, 41.6, and 0.3 $\mu\text{g/l}$ and 10.4, 6.5, 7.8, 16.5, and 0.1 $\mu\text{g/l}$ respectively. While *Ulva lactuca* of Station I showed the values of 242.7(iron), 103.2(copper), 191.5(zinc), 211.9(aluminum) and 16.2 $\mu\text{g/g}$ (lead) on dry weight basis, the corresponding values for this species at Station II were 162.6, 62.9, 120.8, 85.6, and 9.6 $\mu\text{g/g}$. The values recorded in *Sargassum tenerimum* at Station I and Station II were 198.8 and 107.5 $\mu\text{g/g}$ (iron), 96.7 and 71.7 $\mu\text{g/g}$ (copper), 185.6 and 132.8 $\mu\text{g/g}$ (zinc), 191.2 and 114.6 $\mu\text{g/g}$ (aluminum) and 141.9 and 7.9 $\mu\text{g/g}$ (lead). Generally premonsoon, and postmonsoon seasons registered higher values of metals than monsoon period. The lower values of the heavy metals documented in water and two seaweed species during monsoon period could be attributed to the monsoonal discharge of fresh water into the study area. In the light of the concentration factor calculated for the different metals, the biomagnification potential through food chain is discussed. Considering the fairly high concentration of heavy metals present in water and seaweeds at Station I, pollution abatement and management measures such as installation of sewage treatment plants at shore, utilisation of flyash disposed by thermal power plant by starting new industries for the production of hollow concrete building blocks and implementation of stringent measures to improve the quality of treated effluents discharged by shore based industries are advocated.