

Application of Aquatic Plants for the Remediation of Organochlorine Pesticides from Keenjhar Lake

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Abstract : Organochlorine pesticides bio-accumulate into the fat of fish, birds, and animals through which it enters the human food cycle. Due to their persistence and stability in the environment, many health impacts are associated with them, most of which are carcinogenic in nature. In this study, the level of organochlorine pesticides has been detected in Keenjhar Lake and remediated using Rhizoremediation technique. 14 OC pesticides namely, Aldrin, Deldrin, Heptachlor, Heptachlor epoxide, Endrin, Endosulfun I and II, DDT, DDE, DDD, Alpha, Beta, Gamma BHC and two plants namely, Water Hyacinth and Silvinia Molesta were used in the system using pot experiment which processed for 11 days. A consortium was inoculated in both plants to increase its efficiency. Water samples were processed using liquide-liquid extraction. Sediments and roots samples were processed using Soxhlet method followed by clean-up and Gas Chromatography. Delta-BHC was the predominantly found in all samples with mean concentration (ppb) and standard deviation of 0.02 ± 0.14 , 0.52 ± 0.68 , 0.61 ± 0.06 , in Water, Sediments and Roots samples respectively. The highest levels were of Endosulfan II in the samples of water, sediments and roots. Water Hyacinth proved to be better bioaccumulaor as compared to Silvinia Molesta. The pattern of compounds reduction rate by the end of experiment was Delta-BHC>DDD > Alpha-BHC > DDT> Heptachlor> H.Epoxide> Deldrin> Aldrin> Endrin> DDE> Endosulfun I > Endosulfun II. Not much significant difference was observed between the pots with the consortium and pots without the consortium addition. Phytoremediation is a promising technique, but more studies are required to assess the bioremediation potential of different aquatic plants and plant-endophyte relationship.

Keywords : aquatic plant, bio remediation, gas chromatography, liquid liquid extraction

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