

Efficacy of natural wetlands in treating shrimp pond effluents in north western province of Sri Lanka.

P.V.S.L. Gunawardena, U.P.K. Epa* and M. Hettiarachchi

Department of Zoology, University of Kelaniya, Kelaniya, Sri Lanka

*Corresponding Author (E-mail: epa@kln.ac.lk)

Development of shrimp farming industry in Sri Lanka has intensified the environmental problems in brackish water areas and major impacts include eutrophication, siltation, oxygen depletion and chemical pollution in brackish water bodies. The present study investigates the efficacy of natural wetlands in treating shrimp pond effluents in North western Province of Sri Lanka. Three natural wetlands that directly receive shrimp pond effluents were selected for the study. Wetlands were divided into three areas; water inlet, centre and outlet, based on wetland structure and water drainage pattern. From September 2008 to April 2009, water temperature, pH, DO, turbidity, conductivity, salinity and total dissolved solids were recorded in situ biweekly and water samples collected from three areas of each wetland were also analyzed for NH_3 , PO_4^{3-} , chlorophyll and BOD.

The highest amount of total Phosphorus (1.35 mg l^{-1}), chlorophyll-a (17.69 mg m^{-3}), BOD (2.88 mg l^{-1}), turbidity (14.78 NTU) and lowest DO (3.70 mg l^{-1}) were recorded at the inlets and these values were significantly different from those of centers and outlets of the wetlands. The highest mean NH_3 concentration (0.048 mg l^{-1}) was also recorded at the inlet of each wetland, but it did not change towards the outlet. Total dissolved solids, conductivity, salinity, pH and temperature did not vary significantly within the wetland. Wetland reduced 36% of BOD, 39% of chlorophyll and 66% of phosphorus and 11% of turbidity in the polluted water that entered the wetland. Dissolved oxygen concentrations at the outlets of wetlands were 38% - 40% greater than that of inlets.

Results revealed that some of the negative effects of shrimp pond effluents could be reduced by natural wetlands. Rehabilitation and conservation of more wetlands in the shrimp farming areas of North western Province may contribute to reduce the environmental impacts of shrimp pond effluents.