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Water pollution in Valaichchenai lagoon due to different industrial effluents

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Abstract

The Valaichchenai Lagoon, located in Batticaloa District, is surrounded by several different industries such as fishing harbor, paper mill, rice mills, and shrimp farms. Hence, it acts as a sink for pollutants. However, there is no study on the pollution of the lagoon and there should be an extensive study in this regard to adopt any measures to free the lagoon from further pollution. In this regard, the present study had been undertaken with the aim of identifying the potential industrial effluents by studying the spatiotemporal variation of some surface water chemical parameters of selected points of Valaichchenai lagoon. The present study analyzed some physiochemical parameters (such as pH, Nitrates, Nitrites, Phosphates, Dissolved Oxygen, Turbidity, Salinity and Electrical Conductivity) of the water in selected study sites of the Lagoon. The Significant differences were tested by one-way ANOVA at 5% probability level. According to the results, nitrate ($p=0.00$) and nitrite ($p=0.003$) showed significant difference among locations. High levels of nitrates and nitrites were observed in paper mill discharging area. Further, contribution to total nitrogen was also higher than the level of acceptance (1 mg/L) in all the locations of lagoon. Phosphates did not show significant difference ($p=0.06$) among the locations but comparatively higher level was observed at fishing harbor. Contribution to total phosphorous was also higher than the level of acceptance in all places. Dissolved Oxygen did not shows significant difference ($p=0.078$) among locations but it fluctuated very much and sometimes it was as low as 3.00 mg/L in some points. pH also did not shows significant difference ($p=0.875$) among locations but in paper mill discharging area sometimes pH level reached 4.5, which is detrimental to aquatic organisms. There was significant difference in turbidity ($p=0.00$) among locations and high level of turbidity was observed at paper mill discharging area. Salinity and Electrical Conductivity also showed significant difference ($p=0.00$) among locations. High level of Electrical conductivity was observed at fishing harbor and very low salinity was observed at paper mill discharging area. According to the above findings, it is obvious that paper mill discharges high level of pollutants into the lagoon. The paper mill now is in reduced operation unlike its early days, and it discharges effluents irregularly. However, the fishing harbor and rice mill discharges the wastes continuously. Therefore, fishing harbor and rice mills are another potential polluting industries.

Key words: Aquatic biota, chemical parameters, lagoon, physical parameters, pollution