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Spatial and Temporal Variation of Selected Physicochemical Parameters in Chilaw Lagoon in Sri Lanka

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Chilaw Lagoon is an intermittently closed, shallow coastal lagoon located in the North Western province of Sri Lanka. Excessive shrimp farm development has resulted in pollution of the lagoon since the farms extract water from the lagoon and discharge the effluent to the same lagoon.

This study investigated the seasonal and spatial variations of selected water quality parameters at fifteen different locations situated between 7° 29' 17" to 7° 36' 25" N latitude and 79° 47' 19" to 79° 49' 02" E longitude in the Chilaw lagoon for a period of six months (from March to August in 2016). Each water sample was analyzed at the sampling sites for pH, Electrical Conductivity (EC), Salinity, Dissolved Oxygen (DO), Turbidity, Air Temperature and Water Temperature as physical and chemical parameters. Nitrite Nitrogen, Nitrate Nitrogen, Ammoniacal Nitrogen and Dissolved Phosphate were also analyzed.

According to the experimental results, pH values of water in the lagoon fluctuated from 6.7 to 9.3 and exceeded the proposed ambient water quality standards for fish and aquatic life. The lagoon DO levels varied from 1.25 to 6. 79 mg/L and the lower limit does not comply with the tolerance limit for fish and aquatic life. EC values ranged from 2.8 to 55.1 mS/cm and the corresponding Salinity variation was 2 to 35 ppt (parts per thousand). The surface water temperature and the turbidity of the water in the lagoon varied in the range of 27.4 to 33.9 $^{\circ}$C and 0.96 to 50.3 NTU respectively. Ammoniacal Nitrogen was detected from 0.01 to 0.25 mg/L. The maximum Nitrite Nitrogen value was 0.04 mg/L and it was 0.32 mg/L for Nitrate Nitrogen. The maximum level of Orthophosphate was observed as 0.29 mg/L. Therefore, pH, EC, DO, Salinity, Turbidity and nutrients showed a significant spatio-temporal variation that affects the aquatic life in the lagoon critically.

Keywords: *Chilaw lagoon, aquatic life, water quality, seasonal variation, physicochemical parameters*

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