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Influence of Rainfall on the Physicochemical Characteristics: A Study of Aththanagalu Oya River Basin, Sri Lanka

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Abstract

The environmental situations and value of the river are intentionally influenced by varying climatic circumstances and social events, and rainfall actions that affect the water quality of the river basins. The objective of the present study was to investigate the changes in the physicochemical characteristics of the Aththanagalu Oya under different rainfall events. The water samples were collected in six locations (Alawala-Up Stream, Aththanagalle Bridge, Weediyawatta water intake, Gampaha Bridge, Kotugoda Bridge, Seeduwa Bridge) per month for three-year periods (2022,2023 and,2024), and composite water samples from two edges and the middle were analyzed. The correlation between the monthly rainfall and a range of physicochemical parameters, such as pH, Temperature, Electrical Conductivity (EC), Turbidity, Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD), Chlorides, hardness, phosphate, and nitrate, were investigated. The analytical results were obtained and averaged. The pH values were observed to be neutral. EC showed average levels, with a mean value of 0.14 mS/cm. Turbidity exhibited a wide range of variation from the upper watershed to the downstream areas, averaging 43 NTU (5-85 NTU). COD averaged 13 mg/L (5-25 mg/L), and BOD averaged 3 mg/L (2-5 mg/L). Chloride concentrations showed varied values, with an average of 20 mg/L (4-69 mg/L), and the levels increased noticeably near the river mouth. Total hardness averaged 36 mg/L (15-77 mg/L), while averaged nitrates 0.24 mg/L (0.2-0.98 mg/L) and averaged phosphates 0.045 mg/L (0.01-0.11 mg/L were very low. According to the time-series analysis across the upper, middle, and lower basins of the Aththanagalu Oya, turbidity, total hardness, and chloride showed noticeable correlations with rainfall patterns. In the downstream section of the river basin, turbidity increased significantly, which is carried towards the lower basin during intense rainfall. In general, according to the parameters analyzed, pollution levels are very low.

Keywords: *Climate, Water quality, Anthropogenic*