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Temporal Variation of Water Quality in Nilwala River, Southern Province, Sri Lanka

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Abstract

This study intended to investigate the temporal variation of water quality of the Nilwala river in the Matara district and to determine how the changes in rainfall affect to river water quality. Water samples were collected monthly from March 2019 to October 2019 (considering the second Inter monsoon season and first inter-monsoon season) at eight locations along the main river. Water quality parameters such as chemical oxygen demand (COD), biological oxygen demand (BOD), pH, electrical conductivity, temperature, alkalinity, hardness, chloride, nitrate and phosphate were analyzed using APHA 23rd edition of standard methods for the examination of water and wastewater. Experimental results were statistically analyzed by Two-way ANOVA using Minitab 17. The pH, EC, temperature, alkalinity and nitrate concentration showed statistically significant differences among the months ($p < 0.001$) and those showed statistically significant differences with monthly rainfall ($p < 0.001$). There is a statistically significant relationship between rainfall and month ($p < 0.001$). There is a statistically significant relationship between rainfall and sampling location ($p < 0.001$). The highest rainfall was recorded from August to November (2nd inter-monsoon season) and secondly from March to May (1st inter-monsoon season) was recorded. Conductivity, pH and temperature were decreased from March to June. This may be due to 1st inter monsoon rainfall. Conductivity was increased during August-November. Flooding can increase conductivity when it washes salts and minerals from the soil into the water. Nitrate concentration in the majority of the locations was increased during March-May. Total alkalinity, pH and nitrate were increased from August to November. The temperature of river water at all locations decreased from August-November. In conclusion, the pH, EC, temperature, alkalinity and nitrate concentration showed statistically significant differences among each month. It may be due to variation of rainfall. Upper part of Nilwala River had a higher rainfall than lower basin.

Keywords: Conductivity, Nilwala River, pH, temporal variation, Water quality