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Pollution on the selected stagnant water bodies South Eastern Sri Lanka

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Abstract

Agricultural runoff is a leading source to degrade the quality of stagnant water bodies (SWB) through its substances. The contribution of this agricultural runoff and other improper waste disposal to the SWB's are focused on this study through physical, chemical and biological parameters. These parameters were monitored over a period of six months and the correlations were studied among them for three different SWB's.

The significant negative correlations with higher Pearson product moment correlation coefficients (r^2) were observed among dissolved oxygen (DO) with pH, temperature, NO_3^--N, S^{2-}, chemical oxygen demand (COD), nutrient levels, and *Escherichia coli (E. coli)*. Higher Pearson product moment correlation coefficients were found to have positive correlations of the salinity with nutrient levels and specific conductance (SC). However, the negative correlation was exhibited among salinity with DO and *E coli* having low Pearson product moment correlation coefficients (r^2). Impact of the organic matters on these water bodies were investigated based on the COD values and the effectiveness of this parameter was studied with other parameters. COD positively correlated to NO_3^--N and total organic nitrogen (TON) with relatively higher r^2 value. N/P, COD/P and NO_2^--N /P ratio were used to study the estimation of the denitrifying phosphorus at these water bodies.

Analytical data, correlation investigations and three way ANOVA revealed that the SWB at Sammanthurai was contaminated with significant amount of agricultural runoff, hospital and domestic effluent with least significant difference (LSD , $P<0.05$). The Ninthavur SWB was contaminated with high levels of salt and it had a significant impact on the DO, salinity and total colifrom levels with LSD ($P<0.05$). SWB at Kalmunai was found to be degraded by all types of contaminants mentioned above with LSD ($P<0.05$). The considerable deviation in chemical characteristic of the SWB of Sammanthurai with respect to other locations and it is related to the leaching rate of the agricultural runoff.

Key words: Stagnant water bodies, Pearson product moment correlation coefficients, dissolved oxygen, salinity, nutrient level, chemical oxygen demand.