Influence of Selected Soil Properties on Soil Organic Carbon (SOC) Levels in Mangrove Soil: A Study from Rekawa Lagoon, Southern Sri Lanka

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ABSTRACT

Carbon that is stored and sequestered in marine coastal ecosystems, such as mangroves, salt marshes and seagrass meadows is termed as Blue Carbon, which plays an important role in the global carbon cycle and climate change mitigation. It has long been known that mangroves which are confined to tropical and subtropical latitudes, have higher rates of net primary production and carbon sequestration capacity. This study, therefore evaluated the influence of some selected soil physicochemical properties on the soil organic carbon (SOC) content in mangrove soil, in Rekawa mangrove forest in Southern coast of Sri Lanka. The effects of pH, soil salinity, conductivity, soil moisture content (%), soil bulk density, soil porosity, phosphate content and nitrate content on soil organic carbon were examined along selected six transects covering periphery, middle and water edge zonation and the influence was quantified as correlations. Results indicate that soil organic carbon content was positively correlated with soil salinity, conductivity, soil moisture content, and soil porosity, (Spearman rank correlations; $P<0.001$) while it was negatively correlated with soil bulk density and nitrate content (Spearman rank correlations; $P<0.05$). Among the measured properties, pH and phosphate content showed no significant correlation with SOC. Final Generalized Linear Model (GLM; AIC = 142.04), improved by stepwise elimination, significantly explained the SOC as a function of soil porosity, soil salinity and soil bulk density ($P<0.05$). Furthermore, it is recommended to investigate the influence of other soil physicochemical factors which were not discussed in this study on SOC content and stability in future studies and the outcome/s will be highly beneficial in future to challenge the environmental crisis conditions such as global warming and climate change.
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Keywords: Blue carbon, Mangroves, Physico-chemical, Rekawa, SOC