

**POTENTIAL OF GRUMUSOL OF MURUNKAN, SRI LANKA IN
REMOVING PHOSPHORUS FROM WASTEWATER**

S.S.S. Perera, R.A.A.S. Rathnayaka and D.M.S.H. Dissanayaka

*Department of Agricultural Engineering and Soil Science, Faculty of Agriculture
Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka.*

Eutrophication is one of the major environmental consequences occurred due to over enrichment of natural water bodies with phosphorus (P) and nitrogen (N). The study was conducted to investigate the ability of Grumusols (USDA taxonomy: Pellusterts) in *Murunkan*, Sri Lanka to remove P in wastewater. A bulk Grumusols sample was collected from *Murunkan*. Subsoil samples were analysed for pH (soil/distilled H₂O: 1:2.5), Cation Exchange Capacity (CEC), Electrical Conductivity (EC), Total Dissolved Solids (TDS), available P, and organic carbon content using standard methods. Phosphorus sorption efficiency (P sorption for unit weight of soil) and percentage (ratio of sorbed P to added P in %) were studied by varying the amount of the adsorbent from 1 gL⁻¹ to 80 gL⁻¹ while keeping the other parameters such as volume (200 ml) and concentration (16 ppm) of initial P solution and contact time (3 hours) constant. Sorption isotherms of P were prepared for Grumusol concentrations of 50 gL⁻¹ and 100 gL⁻¹ by plotting sorbed P against initial P concentrations viz.; 0, 2, 4, 8, 16, and 32 ppm. The best fitted model for P sorption isotherms were identified using Curve Expert software. Initial soil analyses revealed 8.1 of soil pH, 41.25 cmolk⁻¹ of CEC, 124.43 μScm⁻¹ of EC, 49.8 mgL⁻¹ of TDS, 7.9 mgkg⁻¹ of available P and 0.4% of organic matter. A decreasing trend in P sorption efficiency and increasing trend in P sorption percentage against sorbent (Grumusol) concentration were observed. The Grumusol concentration of 4 gL⁻¹ was identified as optimum sorbent concentration to remove P efficiently from synthetic wastewater containing 16 ppm of P. Langumuir model was best fitted with P sorption isotherm of the investigated Grumusol (R²=0.99). These results emphasize the high potential of the investigated Grumusols to remove P from wastewater.

Keywords: Wastewater, Phosphorus sorption isotherms, Grumusol