

# PHOSPHORUS REMOVAL FROM WASTEWATER USING ADSORBENT CUM CONSTRUCTED WETLAND

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Eutrophication is one of the major concerns of life of water bodies. Algal blooms are observed in most of the water bodies due to nutrients leached from agricultural, urban and industrial sources. Excess nutrients, especially Phosphorus (P) and Nitrogen (N) are the major factors contributing to excess algal growth. A study was conducted to identify sorbents to remove P in water. Five soils were collected based on their clay structure. Montmorillonite and Kaolinite mix soil in Murunkan, acidic clay soil in Badullu oya river basin, low humic clay soil and soil from an ant hill in Anuradhapura were collected, air dried and sieved (2 mm). Based on the physico-chemical characteristics, Murunkan soil showed a better performance in P removal, compared to other soils. Phosphorous removal efficiency was measured at different pH (1-11), soil dosage (5-125 g L<sup>-1</sup>), initial P concentration (1-24 mg L<sup>-1</sup>) and contact times (1-5 hour). Sorption data were modeled using Langmuir and Freundlich adsorption isotherms. Results showed that the best performance of adsorption of P into Murunkan soil was obtained under pH 4 and pH 8-9 at 50 g L<sup>-1</sup> soil dosage with 3 hour contact time up to 5 mg L<sup>-1</sup> of PO<sub>4</sub><sup>3-</sup> concentration. About 90% of P had been removed at pH 4 and pH 8 - 9. Sorption of phosphorus into Murunkan soil was better represented by Freundlich Isotherm model. Murunkan clay soil was most suitable for P in the runoff and wastewater. Further studies are needed for field implementation such as constructed wetland and buffer zone to reduce the P load in water bodies.

**Keywords:** Constructed wetlands, Eutrophication, Isotherms, Phosphorous removal, Wastewater