

Biosorption of phosphorus, total suspended and dissolved solids by dried *Phragmites australis*: isotherm, kinetic and interactive response surface methodology (IRSM) in oil and soap-derivatives industrial wastewater

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ABSTRACT

Releasing phosphorus (P) in contaminated water straightforwardly into the sea-going condition prompts asset misfortune and simulates eutrophication in existence of nitrogen. In this manner, expelling P from squander streams is basic. In this investigation, *Phragmites australis* as an ease biosorbent was intended to viably adsorb P, total suspended solids (TSS), and total dissolved solids (TDS) from genuine modern wastewater. *P. australis* was portrayed through Fourier-transform infrared spectroscopy examination, trailed by SEM investigation, studying the influenced parameters, lastly, isotherm and active adsorption explore additionally occurred. *P. australis* was found to have favored P, TSS, and TDS biosorption capacity. The Freundlich isotherm fits the biosorption procedure satisfactorily of phosphorus, TSS, and TDS with $R^2 = 0.998, 0.999, \text{ and } 0.999$, respectively. Then again, the pseudo-first-order kinetics demonstrates fits biosorption procedure of TSS with $q_e = 117.436 \text{ mg g}^{-1}$ however, pseudo-second-order kinetics shows well fits the biosorption of P and TDS with $q_e = 6.5189 \text{ and } 1,250 \text{ mg g}^{-1}$. Hence, *P. australis* is an ecological neighborly and minimal effort sorbent for P evacuation.

Keywords: *Phragmites*; Phosphorus; TSS; TDS; Kinetics; Isotherm; IRSM.

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