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Factorial design for optimizing the removal of aluminium from aqueous solutions by adsorption on *Typha domingensis* phytomass

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A B S T R A C T

Typha domingensis phytomass is used as a biosorbent for aluminium ions removal from aqueous solution. A full 2^3 factorial design of experiments is used to obtain the best conditions of biosorption of Al^{3+} from water solutions. The three factors screened are temperature, pH, and biosorbent dosage. Two levels for each factor are used; pH (2.5 and 6.0), temperature (25 and 45°C), and phytomass loading weight (0.5 and 1 g/50 ml). Batch experiments are carried out using 50 ml solutions containing 7 mg/L Al^{3+} simulating its concentration in a real wastewater effluent. Aluminium concentration in solutions is determined using ICP-OES; the removal percentages of aluminium are then evaluated. The results are analyzed statistically using the Minitab 15 statistical software to determine the most important factors affecting aluminium removal. The results revealed that pH is the most significant factor affecting aluminium ions uptake onto *Typha* phytomass.

Keywords: Biosorption; pH; Temperature; Phytomass loading weight; Biosorbent characterization

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