



**Sequestration of Ni, Fe and Al Ions from Synthetic Wastewater using
Melia azedarach L. Leaves**

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ABSTRACT

Batch experiments were carried out for sequestration of Ni (II), Fe (II) and Al (III) from ternary solution using Melia azedarach L. leaves (MAL) and Melia azedarach L. leaves ash (MALA). Physicochemical analysis as pH, biosorbent dose, shaking speed, presence of co-ions, contact time and initial metal ions concentration were investigated and optimized. The maximum adsorption efficiencies were 96, 98 and 92.75% for nickel, iron and aluminum ions, respectively at optimized conditions. The presence of co-ions reduced the percentage sorption of metal ions but the effect of anions (~3-5%) was less than that of cations (~8-10%). Freundlich isotherm was best fitted for MAL and Langmuir isotherm for MALA having regression coefficients greater than 0.99. The pseudo second order model was best applicable to all systems. FTIR spectra showed the significant contribution of C-C stretching of aliphatic and aromatic ring and -CN group in MAL and MALA during biosorption phenomenon. The scanning electron micrograph depicted the surface adherence of Ni (II), Fe (II) and Al (III). Batch biosorption assays implemented to real industrial effluents showed the percentage removal of 67, 71 and 77 on MAL and 94, 83 and 86 on MALA for Ni, Fe and Al, respectively.

Keywords: *Melia azedarach* L. Leaves, Freundlich adsorption isotherm, Langmuir adsorption isotherm, Pseudo second order kinetic model, Scanning electron microscopy.
