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THERMODYNAMICS, KINETICS AND EQUILIBRIUM STUDIES OF URANIUM SORPTION BY *Gracilaria corticata* RED ALGA

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Abstract

In this research, the capability of uranium biosorption by dried biomass of the red algae was investigated in a batch system. For the screening of the most appropriate biosorbent, they were placed in 0.5 mmol/L uranium solution with different pH for 3hrs of contact times. The obtained results showed that the species of the *Gracilaria corticata* (*J. Agardh*) are having the maximum rate of the biosorption. Sorption equilibrium was reached within 3hrs of contact time (at pH 4.5), and the results of the kinetic studies showed that the sorption of uranium followed pseudo-second order kinetic model ($R^2=0.999$). The maximum uranium biosorption capacity (q_{max}) by *Gracilaria corticata* alga was 200 mg/g. The biosorption of uranium was found to be an endothermic process with ΔH° of +0.260 kJ/mol. The values of ΔG° (293K) and ΔS° obtained were -0.504 kJ/mol and +1.083 J/mol.K, respectively. The feasibility and spontaneous nature of the sorption process was elucidated by these values. Freundlich isotherm constants, K_F and n , were 0.72 and 0.94, respectively ($R^2=0.988$).

Key words: biosorption, *Gracilaria corticata*, kinetics, thermodynamics, uranium

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