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BIOSORPTION OF ZINC FROM AQUEOUS SOLUTIONS USING DRIED ACTIVATED SLUDGE

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Abstract

The aim of present research was to investigate biosorption of dried activated sludge for the removal of Zn(II) ions from aqueous solution. Batch process for the biosorption of Zn(II) ions was conducted to determine equilibrium and adsorption characteristics of the biosolids. The Maximum biosorption of zinc from aqueous solutions with initial concentration of zinc (100 ppm) was 88.5% for 3.5 h contact time. The biosorption kinetics for the removal processes were described by Morris–Weber, Lagergren and pseudo second order models. Langmuir, Freundlich and Dubinin–Radushkevick (D-R) were applied to estimate biosorption capacity, intensity and energy. The experimental data were perfectly fitted to Langmuir and Freundlich proposed models. The thermodynamic parameters for the adsorption process such as ΔH , ΔS and ΔG were evaluated. It was concluded that dried activated sludge had great potential to remove Zn(II) ions from the aqueous solutions at various concentrations of metal ions. Also it was found that temperature had negative impact on zinc biosorption. A 90% desorption efficiency using 0.1 M H₂SO₄ solution was achieved. The dried activated sludge was successfully used for the removal of heavy metals from actual wastewater from domestic wastewater treatment plant.

Key words: activated sludge, adsorption isotherm, biosorption, Langmuir model, Zinc ion

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