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REMOVAL OF ANTIMONY METALLOID FROM SYNTHETIC EFFLUENT USING SEAWEED AS A LOW-COST NATURAL SORBENT: ADSORPTION ON A FIXED-BED COLUMN

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Antimony is an environmental pollutant categorized as metalloids. The biosorption of Sb(III) ions from aqueous solutions investigated by Sargassum glaucescens brown alga seaweed in a fixed bed column. Column experiments were carried out to evaluate the effect of bed height and flow rate on the biosorption process and to obtain the experimental breakthrough curves. The highest biosorption capacity of S. glaucescens for Sb (III), was 5.89 mg/g found within a flow rate of 8 mL/min and a bed height of 15 cm. Furthermore, it was observed that by increasing the bed height the breakthrough and exhaustion times increased, while these times reduced as the flow rate rises. The column data obtained under different conditions were fitted to the Yan and Bed Depth Service Time models, which coefficient correlations obtained from Yan's model, were found to be satisfactory. Biosorption-desorption experimental data were evaluated by one-way ANOVA and one-sample t-test methods to investigate the statistical importance of uptake capacities after three cycles for five desorbents.

Keywords: antimony, removal, fixed bed column, seaweed, modeling, Fourier transfer infrared spectroscopy.

Introduction

Industrial activities, such as mining, metal plating, battery, ceramic, accumulator manufacturing generates high volume of liquid effluents containing heavy metals. Release of heavy metals from the environment has created great global concern, recently. Heavy metals are toxic even at very low concentration, so they can be affected on human health [1 – 7]. Antimony (Sb) is a hazardous substance which has been extensively used in a variety of industrial

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