عنوان مقاله:

Optimization of Cu and Zn Removal from Wastewater Using pre-treated Oil Palm Frond (OPF) by Response Surface Methodology

محل انتشار:

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خلاصه مقاله:

An increase in the usage of heavy metals in various industrial processes results in increasing heavy metal wastes that need further treatment . To deserver removal from the effluent , Cu and Zn remain hazardous even at low concentration . the potential of oil palm frond (OPF) pre-treated with alkaline wash as a sorbent to remove Cu and Zn from aqueous solution was investigated in this study. 2g of OFB was treated for 300 min in a 250 ml 1.0M NaOH solution to improve its sorption ability. Response Surface Methodology (RSM) based on Three on Three – Variable Composite Face Centered Design was employed as an experimental design in order to evaluate the effect of initial Zn and Cu concentration (5-100 mg/l) , pH solution (2-9) and biomass loading (0.5-2g) on the sorption process under normal room temperature (25C) The solution pH, initial metal concentration and biomass loading were used as the main process variables , while the sorption performance was based on removal efficiency of two metals. Thecoefficient for determination, R2- for the removal was found to be 0.96 and 0.97 for Cu and Zn respectively . The initial concentration of 89 mg/l, biomass loading of 1.7g and initial pH of 4.5 were been found to be the optimum conditions for the maximum removal of Cu (89.75%) the optimum conditions for highest Zn removal were found to be .initial concentration of 76 mg/l, biomass loading of 1.7 and initial pH of 5.5, to reach the Zn removal of 77.3%

کلمات کلیدی:

Zinc , Copper , Adsorption , Response Surface Methodology , Low-Cost Adsorbents , Oil Palm Frond