COMPETITIVE BIOSORPTION OF Pb(II) AND Ni(II) ONTO NEWLY SYNTHESIZED SPONGY XANTHATE-THIOUREA MODIFIED SPENT GRATED COCONUT

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ABSTRACT

COMPETITIVE BIOSORPTION OF Pb(II) AND Ni(II) ONTO NEWLY SYNTHESIZED SPONGY XANTHATE-THIOUREA MODIFIED SPENT GRATED COCONUT

Plant waste from coconut process output was investigated and develop into a new adsorbent. The raw spent grated coconut was modified to form xanthate-thiourea (XTSGC), and evaluated for treating Pb(II) and Ni(II) from binary metal ion system. Characteristic of XTSGC were investigated in the analysis of FTIR, pH aqueous slurry and pH of zero point charge (pH_{zpc}). The optimum pH for this biosorption process was found at pH 4. Equilibrium time for both metals was achieved after 90 minutes. For Pb(II), the pseudo-second-order was agreed to kinetic data. The Freundlich isotherm model was fitted for Pb(II) isotherm adsorption equilibrium. Based on Freundlich model, the maximum adsorption capacity of Pb(II) was 0.59 mmol/g. The kinetic data from Ni(II) was also fitted to pseudo-second-order. The isotherm data for Ni(II) was well describe by Langmuir isotherm model. The monolayer adsorption capacity of Ni(II) was 0.24 mmol/L. Simultaneous removal of Pb(II) and Ni(II) were related to chemisorption mechanism such as complexation and ion-exchange.

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