



Adsorption of 4-nitrophenol on palm oil fuel ash activated by amino silane coupling agent

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Received 23 March 2011; Accepted 26 September 2011

ABSTRACT

Adsorption of 4-nitrophenol on palm oil fuel ash activated by amino silane coupling agent was investigated. Experiments were carried out at 30°C as function of contact time, initial concentration (2500–4500 mg l⁻¹) and pH (1–7.4). The equilibrium adsorption data of 4-nitrophenol on activated palm ash were analyzed by Langmuir Freundlich and Temkin models. The results indicated that the Langmuir model provides the best correlation of the experimental data. The maximum adsorption capacity of the activated palm oil fuel ash was determined with the Langmuir equation and found to be 1000 mg g⁻¹ adsorbent at 30°C. Adsorption kinetics data were modeled using the pseudo-first-order, pseudo-second-order and intra-particle diffusion equations. It was shown that pseudo-second-order kinetic equation could best describe the adsorption kinetics. The results obtained in this work indicate that activated palm oil fuel ash is suitable as adsorbent material for adsorption of 4-nitrophenol from aqueous solutions.

Keywords: 4-Nitrophenol; Activated palm oil fuel ash; Adsorption isotherm; Kinetics

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