



Methyl orange removal from aqueous solutions by natural and treated skin almonds

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Received 7 December 2009; Accepted 26 April 2010

ABSTRACT

The aim of this study was to explore the feasibility of using skin almonds (SA), a new agricultural sorbent, for the removal of hazardous dye methyl orange (MO). The first objective of this work was to examine the influence of different chemical treatments on the adsorption capacity of SA. The treatment of SA with alkaline solution as well as with salt solution decreased the sorption ability for MO, whereas the acidic treatment increased markedly the sorption ability for the anionic dye. The next objective was to evaluate the properties of the adsorbent, the effect of the contact time, the temperature, the dye concentration and the particles size. Adsorption of the dye on both adsorbents (natural and treated) has been monitored through the Langmuir, Freundlich and Redlich-Peterson adsorption isotherm models and it was shown that the adsorption process followed as Freundlich isotherm, which led to the higher correlation coefficient. Two kinetic models, pseudo second order and Elovich equation were employed to analyze kinetics data. It was found that the pseudo second-order was the most relevant to describe the adsorption behavior. In addition, the activation energy was also determined based on the pseudo-second order rate constants.

Keywords: Adsorption; Dye; Kinetic; Methyl orange; Skin almonds

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