



Adsorption modeling of Orange G dye on mesoporous activated carbon prepared from Algerian date pits using experimental designs

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ABSTRACT

Activated carbon was prepared from Algerian date pits using physicochemical activation method consisted of zinc chloride (ZnCl_2) treatment and carbon dioxide (CO_2) gasification. The activated carbon produced was characterized by BET surface area, porosity development (total pore volume and micropore fraction). Adsorption of Orange G dye (OG) from water was studied using the prepared activated carbon. A three-factor central composite design (CCD) combined with response surface modeling (RSM) was employed for maximizing OG removal from aqueous solution by the activated carbon based on 20 different experimental data obtained in a batch study, the effects of various parameters such as agitation time, initial dye concentration and adsorbent dosage were studied. The significant factors on experimental designs response were identified from the analysis of variance (ANOVA). FTIR spectral result indicated all the functional groups were involved in the adsorption process. SEM results showed that the surface of the activated carbon was turned from dark to light color after dye adsorption.

Keywords: Activated carbon; Adsorption; Orange G; Central composite design; Response surface modeling

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