Comparative Adsorption Studies of Raw and Activated Orange Peel Powder on Removal of Dyes

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Abstract

The main purpose of this study is the comparative adsorption of by-product raw and activated orange peel powder on removal of dyes from aqueous solution. The research work focused on the adsorption of effective sorbent (orange peel) which can be used for the removal of methylene blue and congo red dyes from an aqueous solution. The orange peel sample was collected from a fruit stall in local market. The activated orange peel powder was prepared by using the thermal method. The orange peel powder samples were characterized by SEM, XRD and TG-DTA analysis. The comparison of sorption behaviors between raw orange peel (ROP), and activated orange peel (AOP) was studied in batch adsorption equilibrium experiment by using methylene blue and congo red dyes solutions. Sorption capacities were examined using different experimental parameters such as pH, initial concentration of dye solutions and dosage of the sorbent. The optimum pH of methylene blue and congo red was 5 and 2, respectively. The optimum adsorbent dose was found to be 0.06 g for ROP and AOP with both dyes. It was found that the removal percent of congo red was greater than that of methylene blue by using ROP and also AOP is more effective for the methylene blue.

Key words: orange peel, activated orange peel, sorption capacities, dyes, removal

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