عنوان مقاله:

Adsorptive Removal of Methylene Blue in Aqueous Solutions Through Raw and Modified Cantaloupe Peel Wastes: Kinetic and Isotherm Study

محل انتشار:

مهندسی بهداشت محیط, دوره 7, شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 12

نویسندگان:

Mohammad Reza Samarghandi - *Department of Environmental Health Engineering, School of Public Health and Research Center for Health Sciences, Hamadan University of Medical Sciences, Hamadan, Iran*

Kazem Godini - *Environmental Health Research Center, Research Institute for Health Development, Kurdistan University of Medical Sciences, Sanandaj, Iran*

Ghasem Azarian - *Research Center for Health Sciences, Hamadan University of Medical Sciences, Hamadan, IR Iran*

Ali Reza Ehsani - *Department of Environmental Health Engineering, School of Public Health and Research Center for Health Sciences, Hamadan University of Medical Sciences, Hamadan, Iran*

Hassan Zolghadrnasab - *Department of Environmental Health Engineering, School of Public Health and Research Center for Health Sciences, Hamadan University of Medical Sciences, Hamadan, Iran*

خلاصه مقاله:

Since large amounts of agricultural wastes are produced in Iran and these wastes have lignocellulosic nature, the current study was performed to survey the adsorption performance of methylene blue dye from aqueous solutions by means of raw and modified cantaloupe peel. The adsorbents used were characterized using techniques like scanning electron microscope (SEM), as well as Fourier transform infrared spectroscopy (FTIR). In this study, the effects of a few key variables including pH, reaction time, dye concentration, adsorbent dosage and temperature on the adsorption performance were investigated. Optimum values were attained at ۰.۰۴ and ۰.۰۸ g doses of modified and raw cantaloupe peel, pH of ۷ after mixing for ۱۲۰ and ۹۰ minutes for raw and modified cantaloupe peel, respectively. The equilibrium information was fitted to the Langmuir, Freundlich, Temkin, and Dubinin-Radushkevich equations and the respective data for all models were tested. An increase in adsorbent dose and temperature caused the efficiency to rise. The mechanism and rate of adsorption were ascertained by analyzing the experimental data at various contact times according to traditional kinetic equations: pseudo-first-order and second order, Elovich, and intra-particle diffusion. The findings illustrated that the data accorded closely with the pseudo-second-order model. Moreover, it was found that these wastes can be applied to remove environmental pollutants, particularly methylene blue dye.

کلمات کلیدی:

Effluent, Methylene blue removal, Cantaloupe peel waste, Kinetic, Isotherm