

عنوان مقاله:

Removal of acid red 88 from wastewater by adsorption on agro based waste material. A case study of Iranian golden Sesamum indicum hull

محل انتشار:

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خلاصه مقاله:

Background: Colors are very useful in different industries such as textile and leather but when they enter water, can cause many biological and environmental problems. In the present research, a waste agricultural material which is freely available is employed to analyze its efficiency for removing acid dye from contaminated wastewaters. Methods: In this study, batch adsorption experiments were performed in the treatment process of acid red 88 (AR88) by Iranian golden Sesamum indicum (IGSI) seeds hull which is produced abundantly in some countries and especially in Iran up to 1100 kg/ha. Also, the effect of operational parameters like adsorption time, pH, dye concentration and adsorbent dosage was studied on pollutant removing efficiency. The experimental data of AR88 adsorption was fitted to Langmuir, Freundlich and Temkin isotherm models. The scanning electron microscopy (SEM) images for the IGSI were taken before and after adsorption process. Results: The efficiency of dye adsorption on adsorbent was found to be 98.2%. The optimum pH for treatment was 4.5 which is in the acidic range. Enhancing the adsorbent dosage from 0.5 to 2.5 g caused increasing in removal efficiency from 73.85% to 95.85%. Decreasing in dye concentration from 70 to 30 mg/L caused increasing in removal efficiency from 79.73% to 95.83%. The process of adsorption was best fitted to Langmuir model and the amount of dye adsorbed on adsorbent, q_e , was found to be 25 mg/g. Comparison between SEM images before and after dye adsorption, showed the significant difference that was due to the dye loading on adsorbent. Conclusion: The results of present study demonstrated higher dye removal efficiency for AR88 in acidic pHs. Employing the IGSI material in this study proves to be a potential alternative to expensive adsorbents, utilized for the treatment of contaminated industrial waste waters

کلمات کلیدی:

Adsorption, Acid red 88, Waste products, Sesamum, Waste water, Color removal

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