ABSTRACT

In this current study, the activated carbon was extracted from the pineapple peels via washing the peels for several times with distilled water, and then treated with a 3: 1 solution of sulfuric acid. After that. it was burned in the oven at 455°C to obtain AC_1. The AC_1 was treated with Hummer's solution to obtain AC_2. The selected adsorbents (AC_1, AC_2) were characterized by several analytical techniques including FT-IR analysis, N_2-adsorption desorption, TGA/DTA, SEM and XRD. The efficiency adsorption of AC_1 and AC_2 by adsorption of CV, CR and DR dyes from aqueous solution were studied by a batch adsorption method, and then investigated the effect of parameters like contact time, temperature, adsorbent dose, and pH solution on the adsorption process. The results show that the adsorption was S-type according to the Giles classification and the equilibrium time was 50 min for the three dyes onto AC_1 and AC_2. Also, the results were showed the adsorption capacity of CV, CR and DR had been decreased with the increased temperature at equilibrium. Therefore, this indicates that the adsorption was exothermic nature and was found to follow best fitted with the Freundlich isotherm model. The thermodynamic analysis showed that the adsorption of CV, CR and DR onto AC_1 and AC_2 were spontaneous and exothermic (physical adsorption) which obtained from ΔG^o and ΔH^o, while the negative values of ΔS^o indicated to decreased randomness. According to pH results, it was noticed that the optimum pH for the adsorption were 10 for CV dye and 3 for CR and DR dyes . Also, the adsorption data showed that the percentage of removal for three dyes increases with the increases of adsorbent weights of both AC_1 and AC_2. The kinetics of adsorption were investigated for the three dyes by applying two kinetic models involving the pseudo-first and second-order kinetics. Therefore, the results of adsorption kinetics were shown that the adsorption of CR, CV and DR onto AC_1 and AC_2 fit well the pseudo-second-order model.