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Removal of Cr VI from water using green chemistry

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Removal of water pollutants is one of the most global environmental challenges of the 21st century due to discharges of toxic substances from anthropogenic activities. This investigation aimed at testing the kinetic and isothermal parameters of Chromium (Cr VI) adsorption by apricot stone powder as natural adsorbent. The adsorption capacities measured as the amount of metals adsorbed per unit mass of adsorbent and the percentage of adsorption was calculated. Using of 0.5 gm sample size of Apricot stone powder has significant removed almost 90% of Cr VI with an initial concentration of 100 ppm within 120 min. A significant increase in the removal of Cr VI with increase in the apricot stone sample size and increase in media temperature. A remarkable efficiency for apricot stone powder was in the range of metal concentration of 50 to 300 ppm, and 120 min was the optimum contact time for effective adsorption. The optimum time for highest percentage removal of Cr VI was determined by kinetics to be around 30 min, and optimum pH was 1.5. it is obvious that 1.0 gm dose is the most efficient adsorbent dose, and the ideal temperature is 25-30^{0}C.The pseudo second order kinetic model was more suitable for describing the adsorption system and the Freundlich isotherm generates a satisfactory fit to the experimental data as indicated by correlation coefficients and average percentage error than Langmuir isotherm. The thermodynamic parameters ΔG^o,ΔH^o and ΔS^o were also studied and found that the sorption was feasible, spontaneous and endothermic in nature. The positive value of entropy change suggested the increased randomness.

Keywords: Pollution, Apricot stone, Adsorption, Heavy metals, Aqueous solution, pH

Biography

Mohamed R Elsheref is a biomedical and pharmaceutical representative, He worked as a Research Assistant in the Chemistry Department, Faculty of Science, Damanhur University, Albuhera, Egypt, 2010. He is a member of Life Makers Developmental Organization, (Education is Power Project), 2013- Present. He earned his Master in Physical Chemistry, Alexandria University in 2017, Biochemistry Diploma, 2014, Zagazig Univesity, Damanhur University, Albuhera, Egypt. He is Member of Life Makers developmental organization, (Education is Power Project) June 2013- Present. Participate in campaigns to attract and inspire new volunteers, and in campaigns to open literacy classes at Alexandria suburbs and underprivileged villages. He is a member of Benna group for publication, 2015-Present, and volunteering in Benna project of translating useful websites to the Arab world.

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