



Removal of Cr(VI) from contaminated water using soil rich in kaolinite - ferrinatriite, coffee husk ash and soil rich in kaolinite – goethite: characteristic, isotherm and kinetic study

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ABSTRACT

This study examined the efficiency of Cr (VI) ion removal from contaminated water using locally available adsorbent media. Equilibrium contact time for Cr (VI) removal was observed within 40 min. Adsorption of Cr (VI) followed pseudo second-order kinetics with $R^2 > 0.99$ for the three adsorbent media. Results of the adsorption isotherm show that the Freundlich adsorption isotherm model better described Cr (VI) adsorption into soil rich in kaolinite–ferrinatriite (SRKF), soil rich in kaolinite–goethite (SRKG) and coffee husk ash (CHA) with correlation coefficients; $R^2 > 0.93$. The adsorption capacity of the adsorbent can be arranged in the order of decreasing $CHA > SRKG > SRKF$. These adsorbent materials could be used for the removal of Cr (VI) from wastewater. However further investigation will be required for practical application of these locally available adsorbent materials for removal of chromium from wastewater.

Keywords: Adsorption; Adsorption capacity; Chromium (VI); Kinetics; Isotherm

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