



Kinetic Model of the Sorption of Cu^{2+} and Pb^{2+} From Aqueous Solution Using Carbonized *Treculia Africana* Husk as Biomass

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Abstract: The sorption kinetics of model (Cu^{2+} and Pb^{2+}) from aqueous solution using carbonized *Africana* brad fruit (*Treculia Africana*) husk was investigated. The effect of contact time, variation in mass and particle size of adsorbent and adsorption isotherms were studied. The time-dependent experiment showed rapid sorption between 15-30 minutes with maximum sorption at 30mins, after which the rate of adsorption became almost constant. The sorption capacity is dependent on its particle size. A particle size of 150 μm , recorded 88.0% and 88.9% sorption capacity for Cu and Pb respectively. While, 84.7% and 80.9% sorption capacity was observed for a particle size of 300 μm for Cu and Pb respectively. Adsorption decreased with increase in mass of biomass. The linear isotherm parameters (q_m , K_L and S_f) for Langmuir model showed that *Treculia Africana* husk has a high adsorption capacity for Pb than Cu, with q_m value of 0.067 and 0.062 respectively. The adsorption coefficient (k_l) was observed as 49.75 and 40.32 for Pb and Cu respectively. The S_f value was obtained as 0.002 and 0.0025 respectively. The separation parameters (S_f) for the two metals are less than unity indicating that the biomass is a very good adsorbent for the metals. The Freundlich sorption isotherm constant observed K_f value of Pb as 1.05, greater than 1.02 of Cu obtained and $(1/n)$ adsorption intensity as 0.23 for Pb and 0.20 for Cu, indicating preferential sorption of Pb, by the biomass. The sorption process is not obeying the pseudo-first and second order models for both metals.

Keywords: *Heavy metal sorption process, Adsorption isotherms and pseudo-order models*

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