Cadmium removal by Ziziphus sawdust and determination of isotherms and kinetic of adsorption process

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Abstract
The objective of this study, which took place in the year 2014 is the analysis of using Ziziphus sawdust as a cheap adsorbent for the removal of cadmium from effluents. The experiments were conducted in batch system and the effect of pH, the amount of adsorbent, contact time and the initial concentration of cadmium were examined. The most common isotherms and kinetics of adsorption were applied to analyze cadmium adsorption and the reaction rate; also the morphological characteristics of Ziziphus sawdust were determined before and after the separation process by using scanning electron microscope (SEM). According to the results, the maximum efficiency of cadmium adsorption was 98.33% which was obtained in pH of 5 and contact time of 30 minutes and 10 g/L of adsorbent. With the increase of initial concentration of cadmium, the amount of the adsorbed metal increased, but the removal percentage decreased. Langmuir isotherm showed the highest consistency. The analysis of kinetic indicated that cadmium adsorption is consistent with the second-degree kinetic adsorption model (R^2=1). According to the high efficiency of cadmium removal by the sawdust of Ziziphus, this method can be used as an efficient and cheap way for the removal of cadmium.

Keyword: Cadmium Removal, Sawdust of Ziziphus, Adsorption Kinetic, Adsorption Isotherm.