

Adsorption of Cimetidine from Solution on Kaolin, Bentonite and Attapulgite Clay Surfaces

Saadoon A. Isa 1 , Raed J. Al Timimi 2, Jamal S. Al Nimr³, Hamed A Al-Falahi 4

Abstract

This research is concerned with one of applications of adsorption from solution on selected clay surfaces. The target of the work is to investigate the activity of kaolin, bentonite and attapulgite as antidotes in treatment of poisoning by Cimetidine as an gastro intestinal tract (GIT) drug .The technique of U.V / visible spectrophotometry has been utilized for quantitative estimation of adsorption uptake of the drugs by the surfaces in different conditions of temperature, pH and ionic strength. Stomach environments, have been specifically taken into consideration in this study, i.e., its pH and human body temperature. This study exhibited the following results: Bentonite surface appeared of highest adsorptivity followed by attapulgite and then kaolin surface. This sequence of adsorptivity of the three surfaces remained unchanged with the changing of temperature, pH and ionic strength. At constant temperature, the adsorption of cimetidine on bentonite and attapulgite has increased as the acidity of solution increased, but decreased on kaolin surface. At fixed temperature and pH, the adsorption of cimetidine on the three surfaces has increased with increasing the ionic strength of the solution. The quantity of cimetidine adsorption has decreased on bentonite and attapulgite surfaces as the temperature increased (exothermic adsorption). On the other hand, cimetidine adsorption on kaolin appeared endothermic. The results showed full applicability of Freundlich model. Basic thermodynamic function for the adsorption processes were calculated and used for interpretation of the results. Due to higher adsorptivity of bentonite surface in adsorption of cimetidine, it may be used as an antidote for treatment of acute poisoning by the drug if taken in dosages greater than the recommended quantities.