

Kinetics and Adsorption Studies of Tetracycline from Aqueous Solution Using Melon Husk

Authors : Ungwanen John Ahile, Sylvester Obaike Adejo, Simon Terver Ubwa, Raymond Lubem Tyohemba, Pius Utange, Mnena G. Ikyagh

Abstract : The adsorption of tetracycline from aqueous solution was carried out using melon husk as a low-cost adsorbent. The adsorption was characterized using standard methods and values obtained were; pH = 7.80, bulk density = 0.43 g/mL, ash content = 2.2 %, moisture content = 8.27 %, attrition = 1%, and iodine number = 552 mg/g. Adsorption capacity was found to vary with initial concentration, adsorbent dosage, pH, contact time and temperature, the maximum adsorption capacity in each case was found to be at; 30 mg/L for concentration, 0.8 g for adsorbent dose, 5 for pH, 60 minutes for time and 30 °C for temperature. FTIR analysis was done to analyses the surface functional groups which shows the presence of O-H stretch, at 3743.92 corresponding to alcohol, phenols, C-H stretch at 2923.27 indicative of alkanes, H-C=O: C-H stretch at 2725.76 corresponding to aldehyde, C-C stretch at 1462.72 corresponding to aromatic, SEM analysis carried out revealed a rough and smooth morphology of the uncontacted and contacted adsorbent respectively. The experimental data judging from the R2 values fitted best into the Temkin isotherm. The fitting of tetracycline adsorption into the pseudo second order kinetic model (R2 of 0.9992) is suggestive of chemisorption for the adsorbent.

Keywords : adsorption, adsorbent isotherm, antibiotics, tetracycline

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