International Journal of ChemTech Research
CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.12 No.02, pp 70-80, 2019

Mathematical Modeling of Fixed-Bed Columns for the Adsorption of Methylene Blue on to Fired Clay Pot

Mohammad Abid Muslim Altufaily[1]*, Nesrin Jassim AL-Mansori[1], Alaq Fadhil Manthoor AL-Qaraghulee[1]

[1]University of Babylon/College of Engineering, Babil, Iraq, 2018

Abstract : continues and patch adsorption study in a fixed-bed column was carried out by using fired clay pot as an adsorbent for the removal of methylene blue (MB) from aqueous solution.The effect of flow rate, influent MB concentration and bed depth on the adsorption characteristics of adsorbent was investigated at pH 7. Five kinetic models Thomas, Yoon–Nelson and Clark were applied to experimental data to predict the breakthrough curves using nonlinear regression and to determine the characteristic parameters of the column that are useful for process design, while a bed-depth service time (BDST) model was used to express the effect of bed depth on breakthrough curves and to predict the time needed for breakthrough at other conditions. The Yoon –Nelson and Clark models were found suitable for the description of whole breakthrough curve. The BDST model was successfully applied to analyze the column performance and to evaluate the model parameter. The empty bed residence time model (EBRT) has been used to correlate the fixed bed pilot plant experimental results and also it was found that the adsorbent exhaustion rate decreased with increasing EBRT. Error analysis was carried out to test the adequacy and accuracy of the model equations.
Key Words : Design Models, Adsorption, Fired clay pot.

Mohammad Abid Muslim Altufaily *et al* /International Journal of ChemTech Research, 2019,12(2): 70-80.

DOI= http://dx.doi.org/10.20902/IJCTR.2019.120210

*****