Green composite adsorbent (biopolymer-activated carbon): synthesis and application for methylene bleu removal

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Abstract. A new composite adsorbent of biopolymer and activated carbon was prepared by ionic gelatinization method at ambient in order to eliminate methylene blue dye from aqueous solution in continuous mode using a controlled glass column. The prepared composite adsorbent was characterized by infrared spectroscopy (IRTF) and scanning electron microscopy (SEM-EDX). Effects of the parameters on dye adsorption such as bed height, initial concentration and flow rate were also studied. Obtained results show that the bed service time increases with increasing bed height and decreases with the increase of the initial concentration and the flow rate. The adsorption dynamics of methylene blue obeys Thomas model with a correlation coefficient R2 = 0.99. The Thomas model shows an increase of the absorbed capacity q_e according to the initial concentration and the flow rate, while this model's constant KTH decreases according to the concentration range.

Keywords: Composite adsorbents, biopolymer, activated carbon, methylene blue, adsorption.