

Removal of metsulfuron methyl by granular activated carbon adsorption

Javeed M. Abdul^a, S. Vigneswaran^{a*}, W.G. Shim^b, Jaya Kandasamy^a

^aFaculty of Engineering and IT, University of Technology, Sydney, P.O. Box 123, Broadway, NSW 2007, Australia
Tel. +61 2 95142641, Fax +61 2 95142633, email: s.vigneswaran@uts.edu.au

^bFaculty of Applied Chemical Engineering, Chonnam National University, Gwangju 500-757, South Korea

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ABSTRACT

The removal of metsulfuron methyl (MSM) from aqueous solution (a sulfonyl urea herbicide) was investigated by adsorption both in batch and fixed bed processes. Coal based granular activated carbon (GAC) was used as an adsorbent. The adsorption equilibrium, isotherms and kinetics of MSM were studied and the data was fitted into various mathematical models. The adsorption equilibrium was fitted by Langmuir and Freundlich isotherms. Homogeneous surface diffusion model (HSDM) kinetic equation with Langmuir and Freundlich adsorption isotherm model was successfully applied to predict the adsorption kinetics data for various concentrations of MSM. The average mass transfer coefficients (k_f) were 2.125×10^{-5} and 2.198×10^{-5} m/s with the Langmuir and Freundlich adsorption isotherm model, respectively. The Bohart-Adams, Thomas, and Yoon and Nelson empirical models were attempted to fit long term column adsorption data. Overall, the Thomas model was found to best simulate the fixed bed adsorption of MSM.

Keywords: Adsorption; GAC; Modelling; MSM

* Corresponding author.