J. Int. Environmental Application & Science, Vol. 8 (1): 1-9 (2013)

Optimization of *Pseudomonas aeruginosa* Adsorptionfrom Air onto Clinoptilolite using Response Surface Methodology

Abbas Rezaee*

Department of Environmental Health, Faculty of Medical Sciences, Tarbiat Modares University

Received March 12, 2012; Accepted July 02, 2012

Abstract: The aim of this research was to study the *Pseudomonas aeruginosa* adsorption from air by clinoptilolite using response surface methodology approach. Experimental design was applied as an alternative to conventional methods for the optimization of experimental procedure. Mathematical equations were derived by computer simulation programming with a least squares method using Design-Expert software. The obtained equations were employed to assess the effects of clinoptilolite dose (g), air flow rate (L/min) and initial microbe concentration (CFU/mL) on the efficiency of clinoptilo litefor *Pseudomonas aeruginosa* adsorption. Statistical checks (R^2= 0.96 and R^2_{adj}= 0.92) indicated that the model was acceptable for representing the experimental data. The results showed that maximum adsorption efficiency was achieved at the following optimum conditions: an initial microbe concentration of 2207246 (CFU/mL), a clinoptilolite dose of 3 (g) and an airflow rate of 1.5 (L/min). The removal efficiency of *Pseudomonas aeruginosa*after optimization was 99.5%. The Langmuir, Freundlich and Dubinin–Radushkevick isotherm models were used to describe *Pseudomonas aeruginosa* adsorption onto clinoptilolite. In accordance with the obtained correlation coefficients, the adsorption data showed that the Freundlich model was the most suitable for modelling *Pseudomonas aeruginosa* adsorption onto clinoptilolite(R^2 = 0.948). Also, the results indicated that the pseudo-second order kinetic model was the best of the kinetic models (R^2 = 0.999).

Keywords*: Adsorption, Pseudomonas aeruginosa, clinoptilolite, Response surface methodology*

* *Corresponding: E-mail address: rezaee@modares.ac.ir Tel/Fax: +982182883575;*