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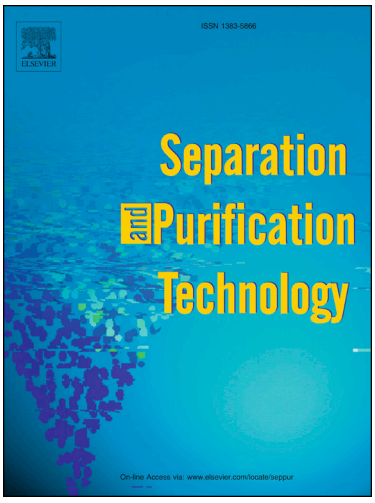

Efficiency maximization of fixed-bed adsorption by applying hybrid statistical-phenomenological modeling

Mateus Gustavo Sausen, Fabiano Bisinella Scheufele, Helton José Alves, Melissa Gurgel Adeodato Vieira, Meuris Gurgel Carlos da Silva, Fernando Henrique Borba, Carlos Eduardo Borba

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Efficiency maximization of fixed-bed adsorption by applying hybrid statistical-phenomenological modeling

Mateus Gustavo Sausen[1], Fabiano Bisinella Scheufele[2,*], Helton José Alves[2], Melissa Gurgel Adeodato Vieira[3], Meuris Gurgel Carlos da Silva[3], Fernando Henrique Borba[1], Carlos Eduardo Borba[1]

[1]*Postgraduate Program, West Parana State University, UNIOESTE, Campus of Toledo, Rua da Faculdade 645, Jd. La Salle, 85903-000, Toledo, PR, Brazil.*

[2]*Department of Engineering and Exact Sciences, Federal University of Paraná, Sector of Palotina, Pioneiro St. 2153, 85950-000, Palotina, PR, Brazil.*

[3]*School of Chemical Engineering, State University of Campinas, UNICAMP, Cidade Universitária Zeferino Vaz, 13081-970, Campinas, SP, Brazil.*

Abstract: The objective of this work was to maximize the efficiency of the ciprofloxacin (CIP) removal in fixed-bed column, packed with SGC650H resin, by the optimization of the volumetric flow rate (Q) and bed height (H_{bed}). For this, a hybrid procedure based on statistical and phenomenological modeling was used. Based on a central composite rotatable design (CCRD) the conditions of Q and H_{bed} were defined to obtain breakthrough curves, wherein only 8 of a total of 11 assays were experimentally obtained. Based on the resin textural characterization and molecular dimensions analysis of the ciprofloxacin, phenomenological models were employed to describe the experimental data. The most accurate mathematical model for the breakthrough curves description, namely, adsorption on the sites model (AS) was validated with the experimental results of the CCRD and further used to predict other experimental

* Corresponding author. Tel.: +55 44 3211 8500; fax: +55 44 3211 8501
E-mail address: fabianoscheufele@ufpr.br (F.B. Scheufele).

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