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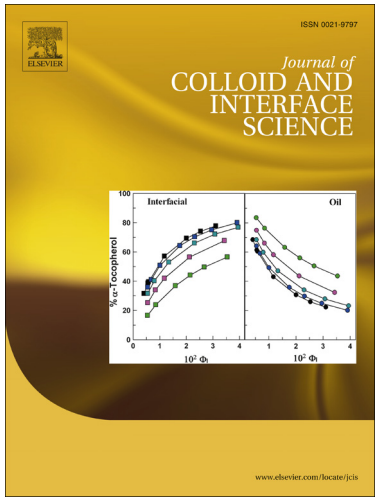

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M. Monier, D.A. Abdel-Latif

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Preparation of L-tryptophan imprinted microspheres based on carboxylic acid functionalized polystyrene

M. Monier[*a,b] and D.A. Abdel-Latif [c]

[a]*Chemistry Department, Taibah University, Yanbu El-Bahr, KSA*

[b]*Chemistry Department, Drexel University, Philadelphia PA, USA*

[c]*Chemistry Department, Faculty of Science, Mansoura University, Mansoura, Egypt*

Abstract

In this work, polymerizable (4-vinylbenzoyl)-L-tryptophan (VBLT) was synthesized and characterized utilizing, elemental analysis, mass spectra, FTIR, ^{1}H and ^{13}C-NMR. VBLT was then copolymerized with styrene and divinylbenzene cross-linker using potassium persulfate free radical initiator. The template L-Trp molecules were then leached out from the cross-linked network leaving selective recognition cavities, which are able to selectively rebind with L-Trp than D-Trp. The obtained molecularly imprinted LT-CPS resin was examined using various instrumental techniques such as SEM and FTIR to be then employed in a series of adsorption experiments to evaluate the essential parameters for efficient selective extraction of L-Trp. The kinetics of adsorption displayed the best fit with pseudo-second-order kinetic model, suggesting chemical sorption as the rate determining step. Additionally, the most effective interpretation of the adsorption isotherm data was acquired by Langmuir isotherm, and the maximum adsorption capacities were 155±2 and 82±1mg/g for L- and D-Trp, respectively. Moreover, chiral resolution of L, D-Trp racemic mixture was performed using column of LT-CPS.

Keywords:
Molecular-imprinting
Tryptophan
4-vinylbenzoic acid
Adsorption

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* Corresponding author. Department of Chemistry,
Taibah University, Yanbu El-Bahr, KSA.
Tel.: 00966532492041.
E-mail address: monierchem@yahoo.com (M.Monier).