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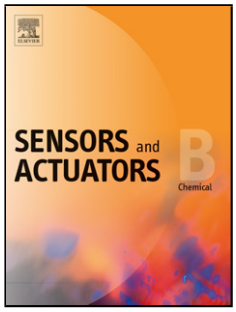

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Author: Habibollah Bagheri Mazaher Ahmadi Tayyebeh Madrakian Abbas Afkhami

PII: S0925-4005(15)30070-8
DOI: http://dx.doi.org/doi:10.1016/j.snb.2015.07.013
Reference: SNB 18738

To appear in: *Sensors and Actuators B*

Received date: 8-3-2015
Revised date: 28-6-2015
Accepted date: 2-7-2015

Please cite this article as: H. Bagheri, M. Ahmadi, T. Madrakian, A. Afkhami, Preconcentration and spectrofluorometric determination of L-tryptophan in the presence of D-tryptophan using a chiral magnetic nanoselector, *Sensors and Actuators B: Chemical* (2015), http://dx.doi.org/10.1016/j.snb.2015.07.013

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Preconcentration and spectrofluorometric determination of L-tryptophan in the presence of D-tryptophan using a chiral magnetic nanoselector

Habibollah Bagheri, Mazaher Ahmadi, Tayyebeh Madrakian*, Abbas Afkhami

Faculty of Chemistry, Bu-Ali Sina University, Hamedan, Iran

Abstract

In this study, a synthetic chiral magnetic nanoselector was prepared by immobilizing bovine hemoglobin on modified silica coated magnetic nanospheres. The functionalized magnetic nanospheres had a core–shell structure, with an average diameter of 65 nm. The properties of the produced nanospheres were characterized by X-ray diffraction, FT-IR and transmission electron microscopy. The prepared nanospheres were used for determination of L-tryptophan in presence of D-tryptophan. The basis of method was on enantioselectivity of immobilized hemoglobin on magnetite surface. Furthermore the enantioselselectivity site of hemoglobin confirmed by molecular modeling method. The results showed that L-tryptophan became adsorbed at pH 7.0. The adsorbed amino acid was then desorbed with acetonitrile/ HCl (1:1) and determined with spectrofluorometric method at 358.0 nm wavelength. The calibration curve was linear in the range 0.50- 33.00 ng mL^{-1} of L-tryptophan with a detection limit of 0.01 ng mL^{-1}. Furthermore, the prepared nanospheres method has been employed for the determination of L-tryptophan in urine samples.

Keywords: L-tryptophan; D-tryptophan; Hemoglobin; Magnetite Nanospheres; Spectrofluorimetry; Molecular Docking.

*Corresponding author. Tel. / Fax: +98-813-8380709

E. mail: madrakian@basu.ac.ir, madrakian@gmail.com

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