

Author's Accepted Manuscript

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PII: S0039-9140(17)30354-5
DOI: <http://dx.doi.org/10.1016/j.talanta.2017.03.057>
Reference: TAL17402

To appear in: *Talanta*

Received date: 18 January 2017
Accepted date: 17 March 2017

Cite this article as: Lawrence Nugbienyo, Andrey Shishov, Sergei Garmonov, Leonid Moskvin, Vasil Andruch and Andrey Bulatov, Flow method based on liquid-liquid extraction using deep eutectic solvent for the spectrofluorimetric determination of procainamide in human saliva, *Talanta*, <http://dx.doi.org/10.1016/j.talanta.2017.03.057>

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Flow method based on liquid-liquid extraction using deep eutectic solvent for the spectrofluorimetric determination of procainamide in human saliva

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Abstract

In the current study, liquid-liquid extraction, using deep eutectic solvent (DES) as a “green” extraction solvent, was coupled with a stepwise injection system for the first time. The suggested approach was applied for the development of spectrofluorimetric method for procainamide determination. The method is based on aspiration of saliva sample and DES (choline chloride with glycerol at a 1:2 molar ratio) solution into the mixing chamber of a flow system, followed by injection of acetonitrile into the mixed DES-sample solution. The extraction process and final phase separation were then promoted by air-bubbling. After phase separation, the DES phase, containing the extracted procainamide, was transported to a spectrofluorimetric detector. The excitation and emission wavelengths were set at 280 nm and 347 nm, respectively. The calibration plot was linear in the range of 5×10^{-6} to 5×10^{-5} mol L⁻¹. The limit of detection, calculated as 3σ of a blank test ($n = 10$), was found to be 1.5×10^{-6} mol L⁻¹. The developed method was successfully applied for the determination of procainamide in human saliva samples, and the analytical results agreed rather well with the results obtained by the reference HPLC-UV method.

Keywords: Procainamide; saliva; liquid-liquid extraction; deep eutectic solvent; stepwise injection analysis; spectrofluorimetry

1. Introduction

Procainamide (*p*-amino-*N*-(2-(diethylaminoethyl)benzamide), (PA) is an antiarrhythmic agent prescribed for the treatment of atrial and ventricular arrhythmias [1]. Elimination of PA occurs through

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