Simultaneous determination of ethionamide and pyrazinamide using poly(l-cysteine) film-modified glassy carbon electrode

Bruno Regis Lyrio FerrazI, Fernando Roberto Figueiredo Leite, Andréa Renata Malagutti

www.elsevier.com/locate/talanta

PII: S0039-9140(16)30185-0
DOI: http://dx.doi.org/10.1016/j.talanta.2016.03.058
Reference: TAL16439

To appear in: *Talanta*

Received date: 29 January 2016
Revised date: 16 March 2016
Accepted date: 17 March 2016

Cite this article as: Bruno Regis Lyrio FerrazI, Fernando Roberto Figueiredo Leite and Andréa Renata Malagutti, Simultaneous determination of ethionamide and pyrazinamide using poly(l-cysteine) film-modified glassy carbon electrode *Talanta,* http://dx.doi.org/10.1016/j.talanta.2016.03.058

Simultaneous determination of ethionamide and pyrazinamide using poly(L-cysteine) film-modified glassy carbon electrode

Bruno Regis Lyrio Ferraz[*1], Fernando Roberto Figueiredo Leite, Andréa Renata Malagutti

Department of Pharmacy, Federal University of Vales do Jequitinhonha e Mucuri, MGT 367 Highway – Km 583, Diamantina, MG, Brazil.

[*]E-mail address: brunoferraz96@hotmail.com

ABSTRACT

A selective, simple and rapid square wave voltammetry method, based on electropolymerization of L-cysteine (poly(L-Cys)) on a glassy carbon electrode (GCE), was developed in this study for simultaneous determination of ethionamide and pyrazinamide. Electroanalytical and electrochemical properties of the poly(L-Cys)/GCE were investigated by cyclic voltammetry (CV), square wave voltammetry (SWV), electrochemical impedance spectroscopy (EIS) and scanning electrochemical microscopy (SECM). The cyclic voltammetry studies revealed an remarkable electrocatalytic activity of poly(L-Cys)/GCE on ethionamide and pyrazinamide at pH 1.0. The best potential separation between the reduction peaks of the drugs in a mixed solution was found to be 0.14 V. It was also found that pyrazinamide exhibits a reversible wave with E_{pc} and E_{pa} at −404 mV and −347 mV (versus $E_{Ag/AgCl}$), respectively, while ethionamide presents an irreversible reduction peak at E_{pc} = −536 mV. The optimized calibration curves for simultaneous determination of ethionamide and pyrazinamide exhibited good and high linear responses within the concentration range 2.38 – 248.0 μmol L^{-1} and 0.476 – 51.2 μmol L^{-1}, respectively. The limit of detection was found to be 0.531 μmol L^{-1} for ethionamide and 0.113 μmol L^{-1} for

[1] Phone: 55-38-3532-1230; Fax: 55-38 3532-1223