Application of Fe₃O₄@SiO₂/MWCNT Film on Glassy Carbon Electrode for the Sensitive Electroanalysis of Levodopa

Mohammad Reza Ganjali^{1,2,*}, Hadiseh Salimi³, Somayeh Tajik⁴, Hadi Beitollahi⁴,
Morteza Rezapour⁵, Bagher Larijani⁶

¹ Center of Excellence in Electrochemistry, School of Chemistry, University of Tehran, Tehran, Iran

² Biosensor Research Center, Endocrinology & Metabolism Molecular-Cellular Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

³ Department of Chemistry, Graduate University of Advanced Technology, Kerman, Iran

⁴ Environment Department, Institute of Science and High Technology and Environmental Sciences, Graduate University of Advanced Technology, Kerman, Iran

⁵ IP Department, Research Institute of the Petroleum Industry (RIPI), P.O. Box 14665-137, Tehran, Iran

⁶ Diabetes Research Center, Endocrinology & Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

*E-mail: ganjali@khayam.ut.ac.ir

doi: 10.20964/2017.06.88

Received: 28 February 2017 / Accepted: 14 April 2017 / Published: 12 May 2017

A Fe₃O₄@SiO₂/MWCNT (FSCNT) film was coated on a glassy carbon electrode, and then electrochemical oxidation behavior of levodopa was considered in PBS (pH 7.0) by cyclic and differential pulse voltammetry (CV and DPV). The obtained results showed that the new electrode has an electrocatalytic activity in oxidation of levodopa which causes a remarkable enhancement in its oxidation current. In the optimum conditions, the anodic peak current indicated a linear relation versus levodopa concentration in the range of 1.0×10^{-5} to 6.0×10^{-4} M with detection limits of 2.0×10^{-6} M (signal-to-noise = 3). This method was used to the measurement of levodopa in urine samples.

Keywords: Levodopa; Fe₃O₄@SiO₂/MWCNT nanocomposite; Glassy carbon electrode; Voltammetry

[FULL TEXT](#)

© 2017 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).