Estradiol Valerate Determination in Whole-Blood Samples using FFT Square Wave Voltammetry and Supported Liquid Membrane Micro-Extraction

Mahboubeh Morshedi¹, Zahra Mofidi¹, Parviz Norouzi^{1,2,*}, Bagher Larijani³, Shirin Shahabi¹

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

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

³ Diabetes Research Center, Endocrinology & Metabolism Research Institute, Tehran University of Medical Sciences, Tehran, Iran

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

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Herein, a new analytical technique based on fast Fourier transmission square wave voltammetry (FFTSWV) coupled with Flat Sheet Supported Liquid Membrane (FSSLM) was used for the extraction and subsequent determination of estradiol valerate (EV) in whole blood samples. First, EV was extracted from the blood sample through a PTFE membrane soaked in 1-octanol into a buffer solution, and then it was oxidized on a carbon paste electrode modified with cerium carbonate nanospheres. The effect of different separation parameters such as membrane solvent, pH of donor and acceptor phases, and extraction time on the recovery of EV was investigated. This coupled technique showed two linear calibration regions. Based on the first calibration region ($10\text{--}500\text{ ng mL}^{-1}$), the detection limit of the method was 2 ng mL^{-1} with R-square of 0.995. Under the optimal conditions, EV was effectively extracted from the whole blood sample with recovery percentage of 52% and pre-concentration factor of 1.5. Considering the complex media of the blood sample, this assay can be a competitive analytical method for the determination of EV in complex samples like blood.

Keywords: Estradiol valerate, Supported Liquid Membrane, FFT Voltammetry, Extraction

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