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MWCNT/CdSe quantum dot modified glassy carbon electrode for the determination of clopidogrel bisulfate in tablet dosage form and serum samples

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Abstract

In this study, clopidogrel (CLP), which is an antiplatelet agent widely used in the prevention of ischemic stroke, was analyzed using functionalized multi-walled carbon nanotubes (fMWCNTs) and CdSe quantum dots (QDs) modified glassy carbon electrode. The dependence of intensities of currents and potential on pH, concentration, scan rate, nature of the buffer was further investigated. The oxidation process exhibited mixed diffusion under adsorption controlled process depending on pH. For the analytical application, adsorptive stripping differential pulse voltammetric (AdSDPV) technique was used and all operational parameters were optimized. The plot of peak current vs CLP concentration consisted of a linear segment in the concentration range between 2.0×10^{-6} M and 4.0×10^{-5} M and the detection limit (3σ) was obtained 7.55×10^{-8} M in pH 2.14 phosphate buffer solution. Moreover, in order to evaluate the analytical applicability of the proposed method, it was applied to the determination of CLP in serum samples with linear range of 2.5×10^{-6} - 1.5×10^{-5} M and the detection limit value of 2.99×10^{-7} M. Determination of CLP in tablet dosage form Atervix[®] was also proposed with acceptable recovery values.

Keywords: Clopidogrel, carbon nanotube, quantum dots, voltammetry, determination

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