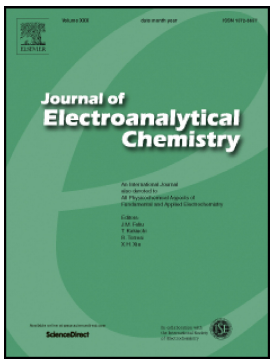

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Electrochemical sensor for the detection of dopamine in real samples using polyaniline/NiO, ZnO, and Fe_3O_4 nanocomposites on glassy carbon electrode

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Abstract

Polyaniline (PANI)-MO (where MO are NiO, ZnO, and Fe_3O_4 nanoparticles) nanocomposites coating on glassy carbon electrode (GCE) was used for the electrochemical detection of dopamine (DA) in the presence of ascorbic acid (AA) and serotonin (SE). The electrochemical response of dopamine on the modified electrode was determined using differential pulse voltammetry (DPV) at physiological pH 7.0. The dynamic range for the dopamine determination was from 2.0×10^{-5} to 2.4×10^{-6} M with detection limits 0.153×10^{-7}, 0.166×10^{-7}, and 0.176×10^{-7} for GCE/PANI-NiO, GCE/PANI-ZnO, and GCE/PANI-Fe_3O_4 sensors, respectively. The LOD value reveals that the best electrode is GCE/PANI-NiO. The common interfering species such as ascorbic acid and serotonin do not interfere over this range of concentrations which show the selectivity of the proposed sensors. The prepared electrode exhibited satisfactory stability when stored at ambient conditions. It has been demonstrated in this study that the GCE/PANI-MO modified electrode can be successfully used for the assay of dopamine in pharmaceutical samples of dopamine hydrochloric injection.

Keywords*: Polyaniline, Metal oxides nanoparticles, Glassy carbon electrode, Dopamine, Cyclic voltammetry, Differential pulse voltammetry*