Simultaneous Determination of Dopamine and Tyrosine Using Poly-glycine/Nafion/MWCNTs Functionalized Plastic-based Miniature Electrochemical Platform

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In this study, a novel, simple, low cost and reproducible method is developed to fabricate plastic-based miniature electrochemical platform (PMEP), which integrated three electrodes including a polyglycine/Nafion/MWCNTs modified carbon paste electrode (p-Gly/Nafion/MWCNTs/CPE), a Pt wire counter electrode (CE) and an Ag/AgCl wire reference electrode (RE). The p-Gly/Nafion/MWCNTs/CPE is prepared by drop-coating and in situ electrochemical polymeric deposition. The p-Gly/Nafion/MWCNTs functionalized PMEP (p-Gly/Nafion/MWCNTs/CPE-PMEP) demonstrates excellent electrocatalytic properties for the oxidation of dopamine (DA) and tyrosine (Tyr). Under the optimum conditions, the peak currents of DA and Tyr increase linearly with their concentrations in the ranges of 0.025-10 μM DA and 0.2-40 μM Tyr. And the detection limits ($S/N=3$) are 0.008 μM and 0.07 μM , respectively. Furthermore, the proposed p-Gly/Nafion/MWCNTs/CPE-PMEP is applied to simultaneous determination of DA and Tyr in human serum samples.

Keywords: Dopamine; Tyrosine; Plastic-based miniature electrochemical platform (PMEP); Poly-glycine/Nafion/MWCNTs modified carbon paste electrode (p-Gly/Nafion/MWCNTs/CPE)

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