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Modification of Carbon Paste Electrode by Electrochemical Polymerization of Neutral red and its Catalytic Capability towards the Simultaneous Determination of Catechol and Hydroquinone: A Voltammetric Study

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Abstract

In this study, a new electrochemical sensor was developed and fabricated based upon the electrochemical polymerization of neutral red (NR) on the surface of carbon paste electrode (CPE). The newly developed sensor shows electrocatalytic capability towards the simultaneous determination of catechol (CC) and hydroquinone (HQ) in presence of 0.2M phosphate buffer solution (PBS) at pH 7.4 with the scan rate of 50mVs^{-1} . Electrochemical measurements were performed using both cyclic voltammetry (CV) and differential pulse voltammetric (DPV) methods at poly (neutral red) modified carbon paste electrode (PNR/MCPE). The effects of scan rate, concentration and pH variation for CC and HQ was investigated at PNR/MCPE. The proposed sensor exhibits adsorption-controlled type of electrode process, moreover it show good detection limit (LOD) (CC = $6.46\ \mu\text{M}$ and HQ = $4.97\ \mu\text{M}$) and limit of quantification (LOQ) (CC = $21.5\ \mu\text{M}$ and HQ = $16.5\ \mu\text{M}$). Hence, the proposed sensor was successfully applied in the simultaneous determination of CC and HQ with satisfied results.

Keywords: Catechol, Hydroquinone, Neutral red, Modified carbon paste electrode, Cyclic voltammetry.

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