

## Development of Electrochemical Platform Based on Carbon Nanotubes Decorated with Zirconium Oxide Nanoparticles for Determination of Nebivolol

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Electrochemical sensor based on carbon nanotubes decorated with zirconium oxide nanoparticles was developed for the determination of nebivolol at the potential of +1.05 V (vs. Ag/AgCl). Nanomaterials were dispersed in an anionic polymer and deposited by simple one-step casting method on glassy carbon electrode. Scanning electron microscopy and energy dispersive X-ray spectroscopy were used to study the surface morphology and structure characterization of deposited film. The sensor has a strongly improved sensitivity ( $9.29 \times 10^{-6} \mu\text{A M}^{-1}$ ). The electrocatalytic peak current of nebivolol shows a linear response from 100 nM to 10 mM with detection limit of 12 nM. Low-cost analysis of drug in serum samples was carried out after adsorption of nebivolol at the nanocomposite using differential pulse voltammetry. In comparison with HPLC method, the electrochemical method ensures faster and simpler quantification of nebivolol in pharmaceutical samples.

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**Keywords:** Nebivolol, Zirconium oxide nanoparticles, Carbon nanotubes, Differential-pulse voltammetry, Nafion

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