Electrochemical Determination of Gliclazide on Magnetic Core-Shell Fe₃O₄@SiO₂ Functionalized Multiwall Carbon Nanotubes Modified Glassy Carbon Electrode

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The report covers the construction of a novel modified glassy carbon electrode (GCE), using magnetic core-shell Fe₃O₄@SiO₂ and multi-walled carbon nanotubes (MWCNTs). The resulting device was then tested as a tool for the sensitive and selective analysis of traces of gliclazide (GLZ). The effects of different parameters, i.e. pH of the test solution, and the scan rate applied during the electrochemical determination process on the performance of the resulting electrode were also assessed. The results obtained under the optimal conditions showed the response of the electrode to gliclazide to be linear over a rather wide range of 5.0×10^{-6} to 8.0×10^{-4} M, and a detection limit of as low as 2.1×10^{-6} M (pH=7.0). The proposed sensor was successfully applied for the determination of gliclazide in real samples.

Keywords: Gliclazide, Magnetic core-shell Fe₃O₄@SiO₂/MWCNT nanocomposite, Glassy carbon electrode, Voltammetry

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