An Electrochemical Sensitive Sensor for Determining Sulfamethoxazole Using a Modified Electrode Based on Biosynthesized NiO Nanoparticles Paste Electrode

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In this research, we describe a new type of sulfamethoxazole electrochemical sensor based on a carbon paste electrode (CPE) modified with NiO nanoparticle (NiO-NPs) and 1-methyl-3-octylimidazolium tetrafluoroborate (1M3OIMZTFB). The NiO nanoparticle was biosynthesized with a diameter of ~ 18.0 nm by *Mentha aquatic* extract and characterized by AFM, FESEM, XRD and EDS methods. The oxidation peak of sulfamethoxazole was recorded at +1130 mV and +995 mV at surface of CPE and 1M3OIMZTFB/NiO-NPs/CPE. Meanwhile, the oxidation signal of sulfamethoxazole was improved by ~20.32 times compared to unmodified CPE. The 1M3OIMZTFB/NiO-NPs/CPE exhibited good catalytic activity toward sulfamethoxazole with a dynamic range 0.003-400.0 µM and limit of detection 1.0 nM. The 1M3OIMZTFB/NiO-NPs/CPE was used as useful tool for determination of sulfamethoxazole in real samples.

Keywords: Sulfamethoxazole, NiO nanoparticle, Biosynthesis, Electrochemical Sensor

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