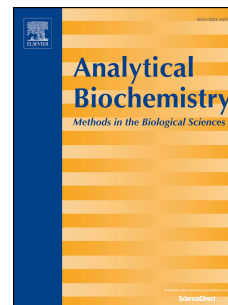


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# Amplified detection of streptomycin using aptamer-conjugated palladium nanoparticles decorated on chitosan-carbon nanotube

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## Abstract

A streptomycin-specific aptamer was used as a receptor molecule for ultrasensitive quantitation of streptomycin. The glassy carbon (GC) electrode was modified with palladium nanoparticles decorated on chitosan-carbon nanotube (PdNPs/CNT/Chi) and aminated aptamer against streptomycin. Modification of the sensing interface was characterized by scanning electron microscopy (SEM), energy-dispersive X-ray (EDS), wavelength-dispersive X-ray spectroscopy (WDX), cyclic voltammetry (CVs), and electrochemical impedance spectroscopy (EIS). The methodologies applied for designing the proposed biosensor are based on target-induced conformational changes of streptomycin-specific aptamer, leading to detectable signal change. Sensing experiments were performed in the streptomycin concentration range from 0.1 to 1500 nM in order to evaluate the sensor response as a function of streptomycin concentration. Based on the results, the charge transfer resistance ( $R_{ct}$ ) values increased proportionally to enhanced streptomycin content. The limit of detection was found to be as low as 18 pM. The superior selectivity and affinity of aptamer/PdNPs/CNT/Chi modified electrode for streptomycin recognition made it favorable for versatile applications such as streptomycin analysis in real samples.

**Keywords:** Aptasensor, Streptomycin, Palladium nanoparticles, Carbon nanotube.

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