Silver Nanoparticles/Carboxylic Short-Chain Multi-Wall Carbon Nanotubes as Electrochemical Sensor for Ultrasensitive Detection of Chloramphenicol in Food

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This research developed a novel electrochemical sensor for determination of chloramphenicol (CAP) in aqueous solutions. The working electrode was fabricated by carboxylic short-chain multi-wall carbon nanotubes (Short-MWNTs-COOH) and silver (Ag) nanoparticle based on glass carbon electrode (GCE). Scanning electron microscope (SEM) and electrochemical impedance spectroscopy (EIS) confirmed that Ag nanoparticle had been successfully electrodeposited onto the modified electrode. Then, some experimental parameters such as pH, scan rate, deposition potential and time were optimized by cyclic voltammetry (CV) and linear sweep stripping voltammetry (LSSV). Under the optimized conditions satisfactory results attained for detection of CAP in the concentration range of 0.3-229 μM and with the detection limit (LOD, S/N=3) of 0.049 μM . This new electrochemical sensor showed many advantages like easy operation, low cost, and high sensitivity, which enables successful determination of CAP in real samples.

Keywords: Chloramphenicol; Silver Nanoparticle; Carboxylic Short-Chain Multi-Wall Carbon Nanotubes; Electrochemical Sensor.

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