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**Construction of an Electrochemical sensor based on Carbon nanotubes/Gold nanoparticles for trace determination of Amoxicillin in bovine milk**

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In this work, a novel electrochemical sensor was fabricated for determination of amoxicillin in bovine milk samples by decoration of carboxylated Multi-Walled Carbon Nanotubes (MWCNTs) with gold Nanoparticles (AuNPs) using ethylenediamine (en) as a cross linker (AuNPs/en-MWCNTs). The constructed nanocomposite was homogenized in dimethylformamide and drop casted on screen printed electrode. Field Emission Scanning Electron Microscopy (FESEM), Energy Dispersive X-Ray (EDX), X-Ray Diffraction (XRD) and cyclic voltammetry were used to characterize the Synthesized Nanocomposites. The results show that the synthesized nanocomposites induced a remarkable synergetic effect for the oxidation of amoxicillin. Effect of some parameters, including pH, buffer, scan rate, accumulation potential, accumulation time and amount of casted nanocomposites, on the sensitivity of fabricated sensor were optimized. Under the optimum conditions, there was two linear calibration ranges from 0.2-10  $\mu\text{M}$  and 10-30  $\mu\text{M}$  with equations of  $I_{pa} (\mu\text{A}) = 2.88C (\mu\text{M}) + 1.2017$ ;  $r = 0.9939$  and  $I_{pa} (\mu\text{A}) = 0.88C (\mu\text{M}) + 22.97$ ;  $r = 0.9973$ , respectively. The Limit of Detection (LOD) and Limit of Quantitation (LOQ) were calculated as 0.015  $\mu\text{M}$  and 0.149  $\mu\text{M}$ , respectively. The fabricated electrochemical sensor was successfully applied for determination of Amoxicillin in bovine milk samples and all results compared with High Performance Liquid Chromatography (HPLC) standard method.

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