The Fabrication of in Situ Triton X-100 on Multi-Walled Carbon Nanotubes Modified Gold Electrode for Sensitive Determination of Caffeine

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A new type of modified electrode based on a multi-walled carbon nanotubes (MWCNTs) was fabricated onto gold electrode (Au) and used to determine the electrochemical behavior of caffeine (CAF) in the presence of triton X-100 (TX-100). The MWCNTs/Au and TX-100...MWCNTs/Au were prepared by simple and rapid method. The fabricated TX-100...MWCNTs/Au showed excellent electrochemical catalytic activities towards CAF with bare AuE by differential pulse voltammetry (DPV) and offer anodic peak at 1.45 V. The oxidation potential of CAF at the TX-100...MWCNTs/Au shifted negatively and the anodic peak currents were greater than MWCNTs/Au and bare Au. In the optimum conditions, the voltammogram peak current of CAF for TX-100...MWCNTs/Au increased linearly and the linear range was from 0.58 to 11.50 μM . The limits of detection ($S/N=3$) for CAF was 0.08 μM . The recoveries of the CAF from spiked tea samples were 83.9–100.3%. The proposed method has high potential for use as a sensitive sensor for detection of CAF in beverage samples.

Keywords: Caffeine; Multi-walled carbon nanotube; Differential Pulse Voltammetry; Triton X-100

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