

Electrochemical detection of paracetamol at multi wall carbon nanotubes/titanium dioxide composite modified electrode.

Abstract

Electrochemical behaviour of paracetamol at the multi wall carbon nanotubes/titanium dioxide (MWCNT/TiO₂) composite film modified glassy carbon electrode (GCE) via solvent casting method was studied. It is shown that the MWCNT/TiO₂/GCE exhibits remarkable improvement in analytical response as compared to other electrodes. Comparing the responses of the MWCNT/ TiO₂/GCE with that obtained at the unmodified glassy carbon electrode, the peak currents were enhanced significantly by 8.5 folds (oxidation peak) and 11.0 folds (reduction peak), which showed stable response with enhanced selectivity and sensitivity. A linear calibration plot having a correlation coefficient of 0.991 was obtained in the concentration range of 0.01-0.12 mM paracetamol. The detection limit for the detection of paracetamol was calculated as 11.77 μ M based on 3 σ /m. The method was applied in the determination of paracetamol in commercial tablets. The recoveries of the composite modified electrode obtained were 95.2 and 96.2 % for five determinations.

Keyword: Multi wall carbon nanotubes; Titanium dioxide nanoparticles; Composite; Paracetamol; Cyclic voltammetry.