

Electrochemical oxidation of paracetamol mediated by nanoparticles bismuth oxide modified glassy carbon electrode.

ABSTRACT

Nanoparticles of bismuth oxide (Bi₂O₃) have been mechanically attached on the surface of a glassy carbon electrode. Electrochemical performance of nanoparticles of Bi₂O₃/GC modified electrode shows stable response with enhanced selectivity and sensitivity. Voltammetric determination of the oxidation of paracetamol in 0.1 M KH₂PO₄ electrolyte solution by solid phase voltammetry has shown electrocatalyzing effect. Observation revealed a high peak toward the origin of paracetamol oxidation current, which showed 2.0 times increment as compared to bare GC electrode. The sensitivity under conditions of cyclic voltammetry is significantly dependent on pH and temperature. The variation of scan rate study shows that the system undergoes diffusion-controlled process. Calibration plot reveals linearity from the range 5.0×10^{-7} to 1.5×10^{-3} M with a correlation coefficient of 0.994. The detection limit was estimated to be 2.0×10^{-7} M. Based on interference studies, most amino acids have negligibly affected the current response of paracetamol. Practically, nanoparticles of bismuth oxide (Bi₂O₃) modified GC electrode could be used for the determination of paracetamol in blood plasma samples.

Keyword: Cyclic voltammetry; Modified GCE; Nanoparticles Bi₂O₃; Paracetamol.