Abstract

The link between oxidative stress and the enthusiasm to use antioxidant supplements in health and disease has generated a lot of interest in the term oxidative stress, sometimes without adequate understanding of this phenomenon. Arsenic (III) and (V) in general generate free radicals and oxidative stress as a mechanism of its toxicity, therefore, detailed investigations of the redox behaviour of coenzyme Q_{10} in Britton-Robinson (B-R) buffers of pH 2.3-11 using DP-CSV and cyclic voltammetry (CV) at HMDE working electrodes were carried out in an attempt to develop a low cost and precise DP-CSV method for the determination of the tested biomolecule. In the investigated pH range, the DP-CSV of the co enzyme Q_{10} showed well defined cathodic peaks at HMDE electrode. The dependence of the CV response of the developed cathodic peak potential ($E_{p,c}$), peak current ($i_{p,c}$) and the current function ($i_{p,c} / \square^{1/2}$) on the scan rate ($\square$) at the HMDE *vs.* Ag/AgCl electrode suggested the occurrence of electrode coupled chemical reaction of the type EC mechanism in which an irreversible process takes place. The plots of the $i_{p,c}$ of the DP-CSV *vs.* concentrations of the co enzyme Q_{10} were linear over a wide range of concentrations. Thus, a sensitive DP-CSV method was developed for the analysis of the coenzyme. The LOD, LOQ and the linear dynamic range of the developed methods were determined. The validation and application of the developed methods were determined by the analysis of the coenzyme Q_{10} in pharmaceutical formulations. Moreover, a low cost, precise and selective DP-CSV method for the analysis of ultra trace concentration of arsenic (III) -PAN in complicated matrices was achieved. The method provides good correlation with the ICP-MS data for the analysis of ultra trace concentrations of arsenic (III) and arsenic (V) complex species.