Abstract

The anodically oxidized boron doped diamond electrode was used in this study to investigate the electrochemical behaviour of quinoline and its derivative quinine in the anodic area in the aqueous medium, namely using methods of cyclic voltammetry (CV), square wave voltammetry (SWV) and square wave adsorptive stripping voltammetry (SWAdSV) and to adress their potential in voltammetric analysis. It was found by means of SWV that quinoline exhibits one anodic signal in BR buffer in the range of pH 3.0 – 12.0. Quinine shows one anodic signal in the range pH 2.0 – 5.0 later; at higher pH values other 2 to 4 less distinctive signals are formed, i.e, the mechanism is influenced by the presence of quinuclide ring and functional groups at the quinoline skeleton of quinine. It was proved by cyclic voltammetry that the anodic electrode reaction of quinoline is controlled by diffusion; for quinine the results are rather ambiguous. Using the optimized parameteres of SWV (E_{step} = 5 mV; f = 40 Hz and A = 50 mV) and media of BR buffer pH 5,0, linear dependence peaks height of quinoline on its concentration in the range of $1\cdot10^{-7}$ to $1\cdot10^{-4}$ mol.l^{-1} was obtained with limit of detection $3.53\cdot10^{-7}$ mol.l^{-1}. The concetration dependence of quinine under the same conditions is not linear in the range of $6\cdot10^{-7}$ to $1\cdot10^{-4}$ mol.l^{-1} and has rather a sigmoidal shape. That may be caused by adsorption of the substance on the electrode surface, limit of detection $3.97\cdot10^{-7}$ mol.l^{-1} was achieved. Further The detection limit for quinine $1.03\cdot10^{-8}$ mol.l^{-1} was achieved by SWAdSV using accumulation time t_{acc} = 5 s and accumulation potential E_{acc} = +1200 mV. This method did not succeed for quinoline.