

Abstract

This Bachelor Thesis is focussed on the study of electrochemical behaviour of 4-nitrophenol (4-NP) and the search for optimal conditions for its voltammetric determination at a bismuth film-modified gold electrode (BiF-AuE). Voltammetric behaviour of 4-NP ($c = 1 \times 10^{-4} \text{ mol L}^{-1}$) was investigated using direct current voltammetry (DCV) and differential pulse voltammetry (DPV) in dependence on the pH of the medium used (Britton-Robinson buffers). For both techniques, Britton-Robinson buffer of pH 7.0 was chosen as the optimum medium. Repeatability of the determination of 4-NP ($c = 1 \times 10^{-4} \text{ mol L}^{-1}$) was 0.6 % and 0.9 % for DCV and DPV, respectively. Calibration dependences of 4-NP were measured in the concentration range from 1×10^{-6} to $1 \times 10^{-4} \text{ mol L}^{-1}$ under the optimum conditions. Attained limits of quantification (L_{QS}) were $7.6 \times 10^{-7} \text{ mol L}^{-1}$ and $1.5 \times 10^{-6} \text{ mol L}^{-1}$ for DCV and DPV, respectively. The applicability of the newly developed voltammetric methods for the determination of 4-NP was verified on model samples of drinking water with L_Q $7.5 \times 10^{-6} \text{ mol L}^{-1}$ for DCV at the BiF-AuE and $1.4 \times 10^{-6} \text{ mol L}^{-1}$ for DPV at the BiF-AuE.