Abstract

The subject of this Diploma Thesis has been the study of electrochemical behavior of anticancer drug flutamide (FLD) and one of its metabolites 4-nitro-3-trifluoromethylaniline (NTMA). The aim was to find and define the optimum conditions for the determination of both compounds at a mercury meniscus modified silver solid amalgam electrode (m-AgSAE) and at a carbon film electrode (CFE) using DC voltammetry (DCV) and differential pulse voltammetry (DPV).

This Diploma Thesis follows closely the Bachelor Thesis, defended at the Department of Analytical Chemistry, Faculty of Science, Charles University in Prague. In this Bachelor Thesis, a voltammetric determination of FLD using DCV and DPV at m-AgSAE has been described, with attained limits of quantification (L_Qs) $5.0 \cdot 10^{-6}$ mol.dm^{-3} (for DCV) and $3.0 \cdot 10^{-6}$ mol.dm^{-3} (for DPV).

In presented Diploma Thesis, voltammetric behavior of NTMA has been studied in dependence on the pH of the medium of Britton-Robinson (BR) buffer-methanol (9:1). The optimum conditions have been found for the determination of this substance using DCV and DPV at m-AgSAE and CFE in the cathodic area. As the optimum media, BR buffer-methanol (9:1) of resulting pH^f 8.3 (for both DCV and DPV at m-AgSAE) and of pH^f 5.1 (for both DCV and DPV at CFE) have been chosen. Further, the L_Qs have been obtained upon the measurement of concentration dependences and repeatabilities for particular determinations in concentration ranges of 10^{-5}, 10^{-6} and/or 10^{-7} mol.dm^{-3}: $3.3 \cdot 10^{-7}$ mol.dm^{-3} (for NTMA, DCV at m-AgSAE), $6.5 \cdot 10^{-7}$ mol.dm^{-3} (for NTMA, DPV at m-AgSAE), $2.7 \cdot 10^{-5}$ mol.dm^{-3} (for NTMA, DCV at CFE), $2.4 \cdot 10^{-5}$ mol.dm^{-3} (for NTMA, DPV at CFE), $2.8 \cdot 10^{-5}$ mol.dm^{-3} (for FLD, DCV at CFE), and $7.7 \cdot 10^{-6}$ mol.dm^{-3} (for FLD, DPV at CFE).

It has been unsuccessful to find the optimum conditions for the determination of both studied substances in a mixture in the cathodic area. Voltammetric responses of FLD and NTMA were overlaid and not wholly separated. The applicable conditions for determination of NTMA at CFE in the anodic area have also not been found.