

## ABSTRACT

Presented Diploma Thesis is focused on electroanalytical determination of the herbicide Aclonifen, which belongs to a group of herbicides derived from diphenylether. These herbicides are used due to their effects - inhibition of protoporphyrinogen oxidase synthesis and also inhibition of biosynthesis of carotenoids. Due to its widespread use in agricultural, toxic effects on humans and because of its negative impacts particularly on aquatic ecosystems there is a need for methods capable of determining the presence of Aclonifen in the environment to monitor its ecological impacts.

Optimal conditions for the determination of Aclonifen have been investigated in BR buffer – methanolic solution and in BR buffer. Electrochemical behavior of the substance has been studied using direct current voltammetry (DCV), differential pulse voltammetry (DPP) and adsorptive stripping voltammetry (AdSV) on the hanging mercury drop electrode (HMDE) and by using TAST polarography and differential pulse polarography (DPP) on the dropping mercury electrode (DME). UV/VIS spectrophotometric detection was used for comparison to electrochemical detection. Used wavelengths were 308 nm and 388 nm.

For electrochemical determination of Aclonifen the above mentioned techniques were used and following results were obtained:

DCV [BR buffer and methanol in solution 1:1 (V:V)]  $L_Q \sim 1 \cdot 10^{-8} \text{ mol} \cdot \text{L}^{-1}$ ;

DCV (BR buffer)  $L_Q \sim 3 \cdot 10^{-8} \text{ mol} \cdot \text{L}^{-1}$ ;

DPV [BR buffer and methanol in solution 1:1 (V:V)]  $L_Q \sim 6 \cdot 10^{-8} \text{ mol} \cdot \text{L}^{-1}$ ;

DPV (BR buffer)  $L_Q \sim 6 \cdot 10^{-8} \text{ mol} \cdot \text{L}^{-1}$ ;

DC AdSV (BR buffer)  $L_Q \sim 1,6 \cdot 10^{-10} \text{ mol} \cdot \text{L}^{-1}$ .

Using the spectrophotometric determination of the substance in BR buffer and methanol in solution 1:1 (V:V), the following limit of quantification was achieved  $L_Q \sim 1,5 \cdot 10^{-6} \text{ mol} \cdot \text{L}^{-1}$ . Absorbance was measured at wavelength  $\lambda_{max} = 308 \text{ nm}$ .

The applicability of the newly developed voltammetric determination techniques and methods of polarographic determination has been verified on model samples of water.