

## Abstract

Chlortoluron is a herbicide from the group of substituted ureas and it is used for weed control in production of cereals and poppy. Substituted ureas are widely used but these substances are known for their high mobility in soil, persistence and contamination of underground water. Therefore, the development of analytical methods suitable for residual concentrations determination is necessary.

This thesis deals with the determination of chlortoluron using carbon paste electrode (CPE) by the methods of differential pulse voltammetry and high-performance liquid chromatography with electrochemical (HPLC-ED) and spectrophotometric (HPLC-UV) detection. The aim of the work was to find optimal conditions suitable for chlortoluron determination. Further, the possibility of using miniaturized carbon paste electrode (mCPE) and usability of tested methods for determination of chlortoluron in model samples of river water and soil were studied.

Concentration dependences in deionized water were measured by the method of DPV in the Britton-Robinson (BR) buffer (pH = 3) and methanol (10 %, v/v). The limit of detection was  $3,7 \cdot 10^{-7} \text{ mol} \cdot \text{dm}^{-3}$  in the case of CPE and  $8,7 \cdot 10^{-8} \text{ mol} \cdot \text{dm}^{-3}$  in the case of mCPE. Also, concentration dependences were measured using HPLC with mobile phase containing BR buffer (pH = 4) and methanol (60 %, v/v) with working electrode potential 1300 mV and detection wavelength 243 nm. The limit of detection was  $3,3 \cdot 10^{-8} \text{ mol} \cdot \text{dm}^{-3}$  for HPLC-ED and  $1,1 \cdot 10^{-8} \text{ mol} \cdot \text{dm}^{-3}$  for HPLC-UV. The determination of chlortoluron in model samples of river water and soil was not significantly influenced by the matrix.

**Keywords:** substituted ureas, chlortoluron, differential pulse voltammetry, high-performance liquid chromatography, carbon paste electrode