

Sylwia Smarzewska

Summary of PhD thesis:

“Environmentally friendly electrodes in voltammetry of organic compounds”

The topic of my work was the application of the environmentally friendly electrodes and electrochemical techniques for determination of selected organic compounds. Majority of experiments I performed with the use of square wave voltammetry (SWV), as it is one of the fastest, most advanced and most sensitive electroanalytical techniques currently used for quantification studies. Following the additional assumption of my PhD, to respect priorities of green chemistry philosophy, in all of my research I applied solid electrodes to minimize the harmful effects of the analyzes on the environment.

Experimental part of my PhD associated with the quantitative studies can be divided into three parts:

- a) Application of glassy carbon electrode in determination of methylthiomethyleneisoquinolinium chloride - the first known representative of alkylthiomethylene substituted water-soluble ammonium salts, synthesized by prof. Bałczewski's team (Center of Molecular and Macromolecular Studies, Polish Academy of Sciences)
- b) The use of concanavalin A modified screen-printed carbon electrodes for the quantitative determination of glucose, within the prof. Kurt Kalcher (University of Graz, Austria) project, which goal is to develop biosensors for continuous monitoring of sugar concentration in diabetic patients blood.
- c) Application of the silver based silver amalgam film electrode for the detection of selected biologically active organic compounds such as pesticides (dinotefuran, blasticidin S) or drugs (proguanil).

In addition, the quantification methods developed for selected compounds (dinotefuran, blasticidin S, proguanil) I applied to the analysis of:

- natural samples: carrot juice and rice (pesticides)
urine (drugs)

- pharmaceutical formulation (Malarone)

The last stage of my research was connected with electrode mechanism examination and explanation which parts of tested molecules are responsible for recorded signals and their electrochemical activity.