*Konrad Rudnicki*

## Summary of the dissertation entitled

## „ Electrochemical studies of selected veterinary drugs”

The subject of the research of this PhD dissertation is covered in a series of thematically coherent 5 experimental publications describing the application of electrochemical methods to investigate selected veterinary drugs.

In first, this thesis describes the experiments that were performed at the renewable silver amalgam film electrode (Hg(Ag)FE) and glassy carbon electrode modified with single-walled carbon nanotubes (SWCNTs–GCE). Comprehensive voltammteric study revealed that the proposed sensors are effective and reliable tools when it comes to selected veterinary drugs (***salinomycin***, ***monensin*** and ***clorsulon***) testing and determination. Each of the drugs I have analyzed was subjected to electrochemical analysis using the square wave voltammetry (SWV) that required tedious electrochemical parameters optimization. In addition, I developed analytical procedures for the determination of tested compounds that have been validated. I checked the correctness of the developed procedures as the analyzed substances were determined in real samples. For this, I have used multiple standard addition method. With cyclic voltammetry (CV) I obtained information about the nature of the electrode processes (e.g. reduction/oxidation, reversibility) of the investigated drugs. Based on the obtained results, it can be concluded that Hg(Ag)FE and SWCNTs–GCE electrodes can be successfully used in voltammetric determination of electrochemically active veterinary drugs such as: ***salinomycin***, ***monensin*** and ***clorsulon***.

In the second part of my research I have investigated the electrochemical behavior of four fluoroquinolone veterinary drugs: ***marbofloxacin***, ***enrofloxacin***, ***ofloxacin*** and ***ciprofloxacin*** at the interface between two immiscible electrolyte solutions (ITIES) in a macro- and microscopic system. The ion transfer voltammetry (ITV) was used as the electroanalytical technique. For this purpose, besides the traditional ITIES cell, I have designed, developed and produced the innovative micro-platforms based on silica microcapillaries that were used to support the ITIES. , These devices were then characterized

using scanning electron microscopy (SEM) and ITV. Furthermore I have employed the micro-ITIES to determine a number of physicochemical and electroanalytical parameters.

Moreover, I performed a number of additional experiments complementary to the analytical study described above. I have performed the electrochemical corrosion tests of stainless steel, used for the production of farm tools, by contacting these with the ***salinomycin*** solutions. The surface of the analyzed steel was also examined using scanning electron microscopy (SEM). Furthermore, I have developed the procedure for ***monensin*** determination using tandem mass spectrometry with direct infusion electrospray ionization tandem mass spectrometry (DI–ESI–MS/MS). For two of the tested drugs (***monensin*** and ***clorsulon***) the influence of potential interfering agents on the recorded analytical signals was checked. The topographic and electrochemical insights into the modified electrodes surface were revealed with the atomic force microscopy (AFM) and electrochemical impedance spectroscopy (EIS).