

## **Abstract of the Doctoral Dissertation**

of Wioleta Anna Białobrzeska, MSc

*“Analysis of the Correlations Between the Electrochemical and Spectroscopic Properties of the Selected 9,10-anthraquinone Derivatives and Their Biological Activity”*

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The doctoral dissertation has been carried out in the Analytical Chemistry Department of the University of Gdańsk.

In recent years, 9,10-anthraquinone derivatives — group of the plant origin compounds — are in the focus of the wide group of researchers due to their possibility of use as potential drugs and medical substances. 9,10-anthraquinone derivatives exhibit high structural diversity, exploit various mechanisms of actions in the living organisms, and show exceptionally high variability in the case of cytotoxicity. Due to their biochemical activity these compounds can be used in medicine, cosmetology, and especially in oncological treatment.

The main purpose of the present doctoral dissertation was to analyse the correlations between the electrochemical and spectroscopic properties of the selected 9,10-anthraquinone derivatives and their biological activity. We characterised new 9,10-anthraquinone derivatives comprising piperasine, piperidine, and hydroxyl substituents located in the position 1, 4, 5, and 8 of the 9,10-anthraquinone ring. The purpose of the literature and experimental studies included in the present doctoral dissertation was to display the most significant properties of the 9,10-anthraquinone derivatives.

This dissertation also covers the characterisation of 9,10-anthraquinone derivatives concerning the mechanism of non-covalent interaction with DNA and cardiolipin. Moreover, we determined the influence of oxygen on the 9,10-anthraquinone derivatives. For this purpose we conducted the electrochemical and spectroscopic analyses which were used as the basis to determine the relations between the biological activity and the physicochemical properties.

All the 9,10-anthraquinone derivatives were tested for their anti-proliferative activity *in vitro* on the selected cell lines.