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STRESZCZENIE ROZPRAWY DOKTORSKIEJ W JĘZYKU ANGIELSKIM
Natural polyphenols and their glycosides as a calcium complex compound and their potential application in kidney stones therapy.

The subject of the dissertation is an attempt to optimize the isolation process of plant, which are rich in polyphenol compounds, mainly sugar derivatives of flavonoids, that have an ability of complexing into calcium ions. This property can eventually lead to the dissolution of calcium deposits in the urinary system and inhibition of the formation of calcium oxalate as their primary component.

Dissertation tries to determine the correlation between the chemical composition of the extracts and its ability to inhibit the formation or dissolution of calcium oxalate. The first part of the work consists of a literature review, which presents the current state of knowledge connected with the topic of this dissertation. As the first, was reviewed a review of polyphenol compounds, including their sugar derivatives and their biological activities. The topic of complexes has been described in detail, with particular attention to Ca^{2+} complexing compounds and their potential application of renal calculus therapy. This illness and its treatment are described in the last part of the introduction part.

The second part of the dissertation is divided into two parts and contains a description of our own research conducted within this dissertation, results and their detailed discussion. The second part of the dissertation begins with the introduction of techniques commonly used in the analysis of complex and those are selected by the doctoral student. Seven plants which are rich in polyphenolic compounds, used in the treatment of urinary tract diseases, have not been documented for solubilization of calcium oxalate: hop (*Humulus lupulus L.*), knotweed (*Polygonum aviculare L.*), nettle (*Urtica dioica L.*), cranberry (*Vaccinium macrocarpon*), Maize stigma (*Maize stigma*) and hawthorn (*Crataegus monogyna*). The methods of isolation of biologically active extracts are described. The wide spectrum of methods and the large variety of solvents have been dictated by the necessity of trying to isolate the different types of compounds. Different types of organic compounds have different ability to form complex with calcium ion and one of the aim of this thesis is determine, which of their groups are most effective. The calcium complexation by obtained fractions was analyzed in two way. First the dissolution of calcium oxalate - the main kidney stones and the second - the inhibition its formulation. These capabilities were determined by atomic absorption spectrometry and conductometric titration. In addition, structural changes of model kidney stones (calcium oxalate) after extracts treating, have been determined by microscopic observation. The indirect aim of the dissertation was to determine the correlation between composition (content of polyphenolic compounds, flavonoids, specific compounds content) and the potential activity of the obtained extracts. Isolated materials were determined by both colorimetric and chromatographic methods. The last part of this work is devoted to

the biological activity of selected extracts. The cytotoxicity analysis of selected formulations was performed in Selvita company, which allow check the possibility using this extracts in the pharmaceutical industry. The second part of the biological study was to test *in vivo* in Wistar rats. An effective method of induction of kidney stones was presented and a model of animal therapy was developed. The last part of the paper contains a description of applied research techniques, materials used and description of procedures performed during the experiments.