ABSTRACT

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Title of diploma thesis: Copper-chelating properties of isoflavonoids

Copper is an essential trace element that plays a crucial role in our organism. It is involved in many physiological processes. On the other hand, free copper may be toxic for the organism and therefore copper homeostasis must be carefully controlled. Copper chelators represent a promising component of therapeutic strategies not only in absolute but also in relative (local) excess of copper. Especially substances which are expected to have a lower risk for side effects, such as isoflavones, may be beneficial in the treatment of Wilson's disease as well as neurodegenerative diseases or cancer. Isoflavones belong to one of the subclasses of flavonoids. Their biological effects are quite large - anti-inflammatory, antioxidant, cardio- and neuroprotective and anti-tumor.

In this diploma thesis chelating properties of a group of ten isoflavones were tested by two indicators - hematoxylin and bathocuproin. In order to determine the chelating properties, a spectrophotometric measurement was used. It is a precise and rapid method. From the tested compounds, only four showed the chelation of cupric ions - biochanin A, genistein, genistin and prunetin. These chelating agents contain the same chelating place, but they have different additional substituents that affected the efficacy of copper chelation. The most significant chelation was reached at pH 6.8. When comparing with lower and higher pH, the chelating effects were weaker. In the presence of a strong indicator bathocuproin, these compounds were not able to significantly chelate cupric or cuprous ions at any tested pH.

It was confirmed that the structural assumption for chelation of copper ions is the 4-keto-5-hydroxy group in isoflavones. Although these substances are capable of chelation, the chelating potential is relatively small.