ABSTRACT

Charles University in Prague

Faculty of Phramacy in Hradec Králové

Department of Pharmaceutical Botany

Candidate: Martina Šulcová

Supervisor: Assoc. Prof. Ing. Kateřina Macáková, Ph.D.

Title of the diploma thesis: Interaction of chalcones with transition metals II.

Copper is one of the essencial elements in human body which is involved in the functioning of many enzymes and metabolic pathways. Although it appears in trace amounts in the body, its functions are irreplaceable. However, the ion level must be kept in balance by the various mechanisms of the body. If there is an excess or deficiency of copper in the body, this condition can lead to the development of health issues.

Chalcones are substances belonging to the group of flavonoids. Their polyphenolic structure does not have a closed ring C. Studies describe their anticancer, anti-inflammatory, antiviral, antidiabetic, antibacterial, antioxidant, immunosuppressive and other properties.

Chosen substances in the group of dihydrochalcones (naringin dihydrochalcone, neohesperidin dihydrochalcone, phloretin, phlorizin) and chalcones (isoliquiritigenin, licochalcone A) were tested for their chelation and reduction activity of the copper ions in this diploma thesis. The activity was measured at different pH environments (7.5; 6.8; 5.5 and 4.5) and in DMSO environment spectrophotometrically using hematoxylin and bathocuproinedisulfonic acid disodium salt indicators. Based on the results, relationships between structure and effect were derived.

The strongest chelating agent was licochalcone A. The double bond plays an important role in the formation of stable complexes. The presence of free hydroxyl groups was important for the reducing activity. The strongest reducing agent was neohesperidin DHC. This happens probably due to the presence of a sterically hindered catechol group in its molecule. Another significantly reducing substance was licochalcone A, which did not contain any of the documented reduction-promoting substituents in its structure and its activity needs to be documented by further experiments.

Key words: chalcones, dihydrochalcones, copper, chelation, reduction