

Abstract

Charles University

Faculty of Pharmacy in Hradec Králové

Department of Pharmacology & Toxicology

Student: Daniela Uramová, MSc.

Supervisor: Prof. Přemysl Mladěnka, Pharm.D., Ph.D.

Title: The copper – chelating activity of xanthen-3-ones derivatives

As a biogenic element, copper participates in many metabolic processes in the human body, it is a part of several enzymes, and its presence is therefore essential for life. On the other hand, free atoms of copper increase the formation of free radicals, and hence copper can be toxic to the body. Therefore, current research has been testing several substances that could be able to interact with copper ions and thus affect its dyshomeostasis in the body. Polyphenolic xanthenes seem interesting, as they possess in addition to these properties also show other positive effects.

The aim of this work was to evaluate the copper-chelating activity of ten closely structurally related synthetic derivatives of xanthen-3-ones. The spectrophotometric measurement was carried out *in vitro* using the hematoxylin and bathocuproine method.

2,6,7-trihydroxy-xanthene-3-one derivatives were shown to be able to chelate copper at all tested pH conditions (5.5; 6.8 and 7.5). However, in a more competitive environment, the resulting complexes are unstable. In some cases, it was possible to estimate the stoichiometry of the complex, which varied from 1:1 to 3:2 to 2:1, xanthone: Cu²⁺. These differences were not confirmed by statistical comparison when the substitution of the phenyl residue in position 9 did not significantly influence the chelating properties of the molecule. The 2-hydroxy, 3-keto group on the xanthone backbone appears to be the chelating site.

Finally, it is important to mention that clinical use of these substances as copper chelators is not realistic.