Abstract

Charles University in Prague
Faculty of Pharmacy in Hradec Králové
Department of Pharmaceutical botanic and ekology

Candidate: Nikol Vavřichová
Supervisor: Ing. Kateřina Macáková Ph.D.
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Iron is a trace element which is necessary for function of an organism. There is no specific excretion mechanism for iron, therefore any deflection causes deficiency or abundance. Iron abundance leads to hemochromatosis. An application of iron chelators is a treatment of choice for hemochromatosis. There are three clinically used chelators for treatment of iron overload: deferoxamine, deferasirox and deferiprone. These drugs are inappropriate for therapy (side effects, dosage form). Therefore there is a place for serching for new types of medicine for treatment of hemochromatosis.

Flavonoids are natural substances with positive influence on a human organism. The most investigated effects are antioxidant and chelating activity. As flavonoids are metabolised in a human body, there is an arising question if flavonoid metabolites are also able to chelate iron ions. For this work we chose derivates of benzoic acid: benzoic acid, 3 – hydroxybenzoic acid, 4 – hydroxybenzoic acid, 2,4 – dihydroxybenzoic acid, 4 – methoxysalicylic acid, 3,4 – dihydroxybenzoic acid and hippuric acid. Chelation activity was measured by spectrophotometry, using ferozine as an indicator. Results were compared with deferoxamine as standard. Our measurement was carried out in deifferent pH levels (4,5, 5,5, 6,8, 7,5).

The best chelator of the tested substances was 3,4 – dihydroxybenzoic acid in pH 7,5. The results were compared to the values of deferoxamine. The structure influence on iron chelating activity was deduced from our results. The ability to chelate iron ions was shown up by the substances with aromatic ring having two hydroxyl groups or one methoxyl group. The highest chelating activity was observed on the substance having two hydroxyl groups bonded to the neighbouring carbons in an aromatic ring. These findings indicate that it is necessary for a substituent to have free electrons that can be shared with iron ions. Because of possible side effects the reducing activity was investigated. The ability to reduce ferric ions was observed only by 3,4 – dihydroxybenzoic acid and it was the highest in medium of low pH (4,5), whereby it has reduced 20% of ferric ions.