

ABSTRACT

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Title of Thesis: Assessment of iron chelation by 4-acyl-5-pyrazolones by direct spectrophotometry.

Iron chelators are used to treat a variety of acquired or inherited hematological disorders and diseases, in which the human body is overloaded by dangerous iron. This pathological deviation is observed mostly in patients with anemias treated with regular blood transfusions. Iron accumulation leads significantly to increased morbidity and mortality if untreated. At present, other potential indications of iron chelators are intensively studied, especially the treatment of acute myocardial infarction, certain types of cancer or malaria. In the first two tested indications, pH drop plays an important role.

The subject of this thesis is to verify the iron-chelating properties of selected chelators from 4-acyl-5-pyrazolone group by use of direct spectrophotometry at different pathophysiologically important pHs. Two substances were chosen from this chemical group – phenyl- and thienylderivatives of the basic structure, whose chelating properties had been successfully verified using ferrozine screening method.

Both of the tested substances showed promising chelating properties with ferric ions at pH 4.5 and 5.5. At these pHs, the stoichiometric ratio 3:1, chelator:iron was observed. Contrarily, at pH 6.8 and 7.5 as well as with ferrous ions, iron chelation was not proven by this method.

Finally, it should be noted that both substances appeared as interesting chelators, because they had low affinity to ferric ions at physiological pHs, however, the affinity increased when pH was decreasing.