Abstract

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Iron is important trace element necessary for human organism. When excess it develops free radicals and structures of organism are harmed. It can lead to organ failure. Excess is solved with chelators, the most used is deferoxamine. But his terapeutic regimen is disadvantageous and it has a lot of side effects. That's reason for searching for substances with better features.

This paper focuses on studium of iron-chelating activity of selected alkaloids from family Amaryllidaceae. Concretely, it's galanthamine, undulatine, buphanisine, caranine, 1-O-acetylbulbisine, homolycorine, tazettine, galanthamine, chlidanthine, ambelline, haemanthamine, haemanthidine, hamayne, 9-O-demethylgalanthine and lycoramine. As standard for comparison of activity was used deferoxamine. Activity was measured by spectrophotometer. As indicator was used ferrozine. Chelatation was measured for ferrous ionts and for total iron, where hydroxylamine as reduction agent was used. Ferrous ionts was measured also with pH alteration.

Highest activity reached deferoxamine in all executed measurements. In measurement of Fe^{2+} ionts in the ratio 1:1 alcaloid:Fe^{2+} showed activity close to deferoxamin chlidanthine, buphanisine, undulatine, lycoramine, haemanthamine, 1-O-acetylbulbisine, 9-O-demethylgalanthine and ambelline. With pH alteration showed all alkaloids low or none activity. Galanthamine had none activity in all measurements.

Structure-activity relationship shows that activity decreases when nitrogen is bonded in 5 membered heterocycle with bound methyl substituent. Activity increases with acetylation of the molecule. For alkaloids of galanthamine structure, the location of -OH group in position 3 near to double bond in position 4, causes complete lost of chelating acitivity. By hydrogenation of the circle, or substitution -OH group with $-OCH_3$ group, are created molecules with good chelating activity.

It was also studied ability to reduce ferric ionts to ferrous ionts. None activity was found.