Study of complex formation with 2-hydroxyiminocarboxylates: specific metal binding ability of 2-(4-methylthiazol-2-yl)-2-(hydroxyimino)acetic acid.

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Complex formation properties of a novel water soluble thiazolyloxime 2-(4-methylthiazol-2-yl)-2-(hydroxyimino)acetic acid (H_3L^1) with Cu^{2+} and Ni^{2+} were investigated in solution by potentiometrical and spectral (UV–Vis, EPR, NMR) methods. All Cu^{2+} and most of Ni^{2+} complex species detected in solution were found to have square-planar MN_4 core with oxime and heterocyclic nitrogen atoms which was rationalized in terms of destabilizing effect of repulsive interaction between oxygen atom of carboxylic group and nitrogen atom of thiazole ring in *N*,*O*-coordinated ligand conformation. It has been found that stability of metal complexes in a series of oxime ligands is dependent upon basicity of nitrogen atom of oxime group. The thiazolyloxime forms less stable complexes with Cu^{2+} but stronger ones with Ni^{2+} ions when compared to parent 2-(hydroxyimino)propanoic acid. The lower stability obtained for Cu^{2+} complexes was elucidated in terms of negative inductive effect of the thiazole and nitrile substituents as well as an effect of intramolecular attractive interaction between thiazolyl sulfur and oxime oxygen atoms in thiazolyloxime. In the case of Ni^{2+} the complexes formed are square-planar and it is why thiazolyl ligand is more effective in metal ion binding than simple 2-(hydroxyimino)propanoic acid forming only octahedral species. The solid state structure of the Co^{3+} complex $K_3[Co(HL^1)_3]\cdot 5.5H_2O$ (**1**) was studied by X-ray analysis. The thiazolyloxime ligand is coordinated to Co^{3+} via oxime nitrogen and carboxylate oxygen atoms forming five-membered chelate rings.Coordination properties of 2-(4-methylthiazol-2-yl)-2-(hydroxyimino)acetic acid with Cu^{2+}, Ni^{2+} and Co^{3+} were investigated by potentiometry, UV–Vis, EPR, and NMR spectroscopy and X-ray crystallography.

Słowa kluczowe

Crystal structure, Metal binding, Oxime, Thiazole, 3d-Metals