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Title	N-pyridoxylidenehydrazine-N', N'-diacetic acid. III. formation of metal chelates in solution
Sub Title	
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Publisher	共立薬科大学
Publication year	1988
Jtitle	共立薬科大学研究年報 (The annual report of the Kyoritsu College of Pharmacy). No.33 (1988.) ,p.144- 144
JaLC DOI	
Abstract	
Notes	抄録
Genre	Technical Report
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AN00062898-00000033-0144

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No. 33 (1988)

N-Pyridoxylidenehydrazine-*N'*,*N'*-diacetic Acid. III. Formation of Metal Chelates in Solution*

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N-Pyridoxylidenehydrazine-*N'*,*N'*-diacetic acid (1) and related compounds were prepared. Compound 1 has two sets of chelating groups in the molecule, *i.e.* iminodiacetic acid (IDA) and pyridoxal (PL) Schiff base moieties, and was assumed to be a good model compound for the studies of hepatobiliary imaging as well as metal chelation.

The results of biodistribution and scintigraphic studies in experimental animals showed that the ^{99m}Tc complexes of 1 and *N*-(3-hydroxy-4-pyridylmethylene)-hydrazine-*N'*,*N'*-diacetic acid (2) were good hepatobiliary tracers. But a considerable accumulation of the radioactivity in the liver and kidneys was noted and this was assumed to be due to the presence of polymeric forms of ^{99m}Tc. In an effort to avoid the polymerization of ^{99m}Tc and to improve the yield of the ^{99m}Tc chelate, metal chelate formation of 1 and related hydrazines in solution was studied by means of absorption spectroscopy.

Compound 1 and *N*-pyridoxylidene-*N'*-methylhydrazine (3) in methanol formed Cu(II) chelates of the same spectral character, which indicated the chelation of the phenolate oxygen and the hydrazine nitrogen atoms to Cu(II). The compositions of the chelates were 1:1 for 1 and 1:2 for 2, indicating that 1 acts as a tri- or tetradentate ligand. Compound 2 formed a 1:1 Cu(II) chelate similar to that of 1 but *N*-pyridoxylidene-*N'*,*N'*-dimethylhydrazine and *N*-pyridoxylidene-*N'*,*N'*-diphenylhydrazine did not form chelates under similar conditions. Addition of an equimolar or excess amount of Co(II), Ni(II), Zn(II), Cd(II) or La(III) salts to 1 in methanol gave rise to absorption assignable to the chelate of 1, whereas 2 did not form metal chelates under the same conditions.

We conclude that the IDA moiety in 1 and 2 coordinated metal ions and enhanced the stability of the metal chelates. However, the stability constants of 1 with Cu(II) and other di- and trivalent metals were not as high as we had expected.

* 本報告は *Chem. Pharm. Bull.*, **35**, 4695−4699 (1987) に発表.
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