

Synthesis, characterization and bio-activity of S-2-picolylthiocarbamate (S2PDTC), some of its Schiff bases and their Ni(II) complexes and X-ray structure of S-2-picolyl- β -N-(2-acetylpyrrole)dithiocarbamate

ABSTRACT

A new dithiocarbamate ligand, S-2-picolylthiocarbamate (S2PDTC) was synthesized using 2-picolylchloride hydrochloride. Tridentate Schiff bases were prepared by condensation of S-2-picolylthiocarbamate (S2PDTC) with pyridine-2-carboxaldehyde (NNS), 2-acetylpyrrole (NNS) and 2-acetylthiophene (NSS), while a bidentate Schiff base (NS) was prepared by condensing the S2PDTC with 2-acetylfuran. Complexes of S2PDTC and its Schiff bases with Ni(II) salts were synthesized and characterized by elemental analyses and various physico-chemical techniques. A square-planar structure has been proposed for the diamagnetic $[\text{Ni}(\text{S2PDTC})_2]$ and $[\text{Ni}(\text{NNS}) \cdot \text{Cl}]$ complexes while $[\text{Ni}(\text{NS}) \cdot \text{Cl}]$ complex was dimeric. Complexes of $[\text{Ni}(\text{NNS})_2]$ and $[\text{Ni}(\text{NSS})_2]$ were paramagnetic with octahedral stereochemistry. S2PDTC showed activity against bacteria and fungi (inhibitory zones above 15 mm). The NS and NSS Schiff bases showed activity toward a number of the bacteria assayed, while the NS and NSS Schiff bases, and the $[\text{Ni}(\text{NNS}) \cdot \text{Cl}]$ and $[\text{Ni}(\text{NS}) \cdot \text{Cl}]$ complexes were found to be active only against *C. lypolytica* (2075). S2PDTC proved moderately active against HT-29 and weakly active toward CEM-SS with CD50 values of 9.5 and 24.0 $\mu\text{g cm}^{-3}$, respectively, while among its Schiff bases reported herein, only the NNS Schiff base showed strong activity toward CEM-SS (Human cell T-lymphoblastic leukemia) and HT-29 (Human colon adenocarcinoma cells) with CD50 values of 2.3 $\mu\text{g cm}^{-3}$. All of the Ni(II) complexes were inactive against CEM-SS cancer cells.

Keyword: S-2-picolylthiocarbamate (Hydrazine carbodithioic acid pyridinium-2-yl methyl ester chloride); Bidentate NS Schiff base; Tridentate NNS and NSS Schiff bases; Ni(II) complexes; Dithiocarbamate derivative