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## Novel metal complexes derived from N<sub>2</sub>S<sub>2</sub> donor sets; synthesis, structural characterization and biological activities

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The synthesis of ligand systems with N<sub>2</sub>S<sub>2</sub> donor sets that include imine, an amide, thioether and thiolate moieties and their metal complexes are achieved. The new Schiff-base ligands; N-(2-((2,4-diphenyl-3-azabicyclo[3.3.1]nonan-9-ylidene)amino)ethyl)-2-((2-mercapto ethyl)thio)acetamide (H<sub>2</sub>L<sup>1</sup>) and N-(2-((2,4-di-p-tolyl-3-azabicyclo[3.3.1]nonan-9-ylidene)amino)ethyl)-2-((2-mercaptoethyl)thio)acetamide (H<sub>2</sub>L<sup>2</sup>) were synthesised from the reaction of amine precursors with 1,4-dithian-2-one in the presence of triethylamine as a base in the CHCl<sub>3</sub> medium. Complexes of the general formula K<sub>2</sub>[M(L<sup>n</sup>)Cl<sub>2</sub>], (where: M = Mn (II), Co(II) and Ni(II)) and [M(L<sup>n</sup>)], (where: M = Cu(II), Zn(II) and Cd(II); n =1-2, expect [Cu(HL<sup>2</sup>)Cl]) were reported. The entity of ligands and complexes including their purity were confirmed using elemental microanalysis (C.H.N.S), atomic absorption (A.A), chloride content, molar conductance, melting point and thermal analysis technique. while the molecular structures were elucidated with FT-IR, UV-Vis, magnetic susceptibility, <sup>1</sup>H, <sup>13</sup>C and DEPT <sup>13</sup>CNMR and mass spectroscopy. The prepared ligands and their complexes were tested against a range of bacterial strains (G<sup>+</sup> and G<sup>-</sup>) and fungi species. The tested compounds indicated that; the ligands have not shown any antimicrobial activity against *E. coli*. The Cd(II) complex for ligands H<sub>2</sub>L<sup>1</sup> and H<sub>2</sub>L<sup>2</sup> display the higher antimicrobial activity, compared with the other complexes. The H<sub>2</sub>L<sup>1</sup> and H<sub>2</sub>L<sup>2</sup> ligands have not shown any activity against *Candida albicans*. All complexes for ligands (H<sub>2</sub>L<sup>1</sup> and H<sub>2</sub>L<sup>2</sup>) exhibited less activity against *Candida albicans*, compared with other types of fungi. These results are quite comparable with some commercial drugs that used for bacterial and fungi species.

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