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Research paper

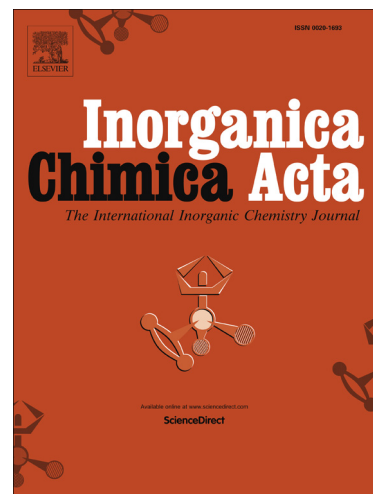
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## Complex Formation Reactions of Gallium(III) and Iron(III/II) with L-Proline-Thiosemicarbazone Hybrids: a Comparative Study

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### Abstract

Three novel gallium(III) and iron(III) complexes with L-proline-thiosemicarbazone hybrids, namely [GaCl(L-Pro-FTSC-2H)]·0.7H<sub>2</sub>O·0.5CH<sub>3</sub>OH (**1**·0.7H<sub>2</sub>O·0.5CH<sub>3</sub>OH), [GaCl(dm-L-Pro-FTSC-2H)]·0.4H<sub>2</sub>O (**2**·0.4H<sub>2</sub>O) and [FeCl(L-Pro-FTDA-H)]Cl (**3**) were synthesised and comprehensively characterised by spectroscopic methods (<sup>1</sup>H, <sup>13</sup>C NMR, UV-vis), ESI mass spectrometry and X-ray crystallography. The complexes are soluble in biological media to allow for assaying their antiproliferative activity. The complexes were tested in three human cancer cell lines, namely HeLa, A549 (non-small cell lung cancer), LS174 and nontumorigenic MRC5. Complex formation equilibrium processes of L-Pro-FTSC with gallium(III), iron(II) and iron(III) ions were investigated in solution. The formation of mono-ligand iron(II) and gallium(III) complexes with pentadentate ligands and relatively low aqueous solution stability was found. Between iron(III) and the ligands, a redox reaction takes place via the oxidative cyclisation of the thiosemicarbazones.

**Keywords:** Thiosemicarbazones, Gallium(III), Iron(III), Antiproliferative activity

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