

Spectroscopic Characterization and Biological Activity of Hesperetin Schiff Bases and Their Cu(II) Complexes

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The three Schiff base ligands, derivatives of hesperetin, HHSB (N-[2,3-dihydro-5,7-dihydroxy-2-(3-hydroxy-4-methoxyphenyl)chromen-4-ylidene]isonicotinohydrazide), HIN (N-[2,3-dihydro-5,7-dihydroxy-2-(3-hydroxy-4-methoxyphenyl)chromen-4-ylidene]benzhydrazide) and HTSC (N-[2,3-dihydro-5,7-dihydroxy-2-(3-hydroxy-4-methoxyphenyl)chromen-4-ylidene]thiosemicarbazide) and their copper complexes, CuHHSB, CuHIN, and CuHTSC were designed, synthesized and analyzed in terms of their spectral characterization and the genotoxic activity. Their structures were established using several methods: elemental analysis, FT-IR, UV-Vis, EPR, and ESI-MS. Spectral data showed that in the acetate complexes the tested Schiff bases act as neutral tridentate ligand coordinating to the copper ion through two oxygen (or oxygen and sulphur) donor atoms and a nitrogen donor atom. EPR measurements indicate that in solution the complexes keep their structures with the ligands remaining bound to copper(II) in a tridentate fashion with (O^- , N, O_{ket}) or (O^- , N, S) donor set. The genotoxic activity of the compounds was tested against model tumour (HeLa and Caco-2) and normal (LLC-PK1) cell lines. In HeLa cells the genotoxicity for all tested compounds was noticed, for HHSB and CuHHSB was the highest, for HTSC and CuHTSC—the lowest. Generally, Cu complexes displayed lower genotoxicity to HeLa cells than ligands. In the case of Caco-2 cell line HHSB and HTSC induced the strongest breaks to DNA. On the other side, CuHHSB and CuHTSC induced the highest DNA damage against LLC-PK1.

Słowa kluczowe

genotoxic activity, Schiff bases, copper complexes, flavonoids, HeLa, Caco-2, LLC-PK1

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