

Copper(II) and nickel(II) complexes with coumarin derivatives: Structure and biological evaluation

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Transition metals and, especially, their metal ions count several years of research and scientific interest focused on their biological role.[1] Transition metal complexes of different drugs have been shown to significantly improve their biological activity, showing at the same time new therapeutic potential. Copper(II) and nickel(II) compounds have shown bacteriostatic, antineoplastic, anticancer, antifungal, antiviral, antioxidant and cytotoxic activity.[2,3]

The aim of the study was to synthesize novel metal complexes of the biologically interesting coumarin derivative coumarin-3-carboxylic acid, in order to characterize their structure and examine their biological activity. We conducted the synthesis of Cu(II) and Ni(II) with the ligand coumarin-3-carboxylic acid, in the absence or presence of the nitrogen-donor co-ligands 1,10-phenanthroline (phen) and imidazole (Himi).

The characterization of the newly-synthesized complexes was carried out by spectroscopic and physicochemical techniques. The structural determination for two of the complexes was accomplished by single-crystal X-ray diffraction. The *in vitro* biological study of the complexes involved their interaction with calf-thymus (CT) DNA, bovine and human serum albumins (BSA and HSA) and the evaluation of their antioxidant activity.

The complexes were found to bind to CT DNA tightly *via* intercalation as monitored by UV-vis spectroscopy and viscosity studies and *via* their ability to displace ethidium bromide (EB) from its adduct with CT DNA. In addition, the complexes bind tightly and reversibly to both serum albumins studied. The complexes have shown noteworthy scavenging activity towards DPPH and ABTS radicals and the ability to reduce H₂O₂.

References:

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