

Isothiocyanate L-argininato copper(II) complexes : solution structure, DNA interaction, anticancer and antimicrobial activity.

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Streszczenie

L-argininato copper(II) complexes have been intensively investigated in a variety of diseases due to their therapeutic potential. Here we report the results of comprehensive structural studies (ESI-MS, NIR-VIS-UV, EPR) on the complexes arising in aqueous solutions of two ternary copper(II) complexes with molecular formulas from crystal structures, $[\text{Cu}(\text{I-Arg})_2(\text{NCS})](\text{NCS})\cdot\text{H}_2\text{O}$ (**1**) and $[\text{Cu}(\text{I-Arg})(\text{NCS})_2]$ (**2**) (I-Arg = L-arginine). Reference systems, the ternary $\text{Cu}(\text{II})/\text{I-Arg}/\text{NCS}^-$ as well as binary $\text{Cu}(\text{II})/\text{NCS}^-$ and $\text{Cu}(\text{II})/\text{I-Arg}$, were studied in parallel in aqueous solutions by pH-potentiometric titration, EPR and VIS spectroscopy to characterize stability, structures and speciation of the formed species over the broad pH range. Comparative analysis of the obtained results showed that at a pH close to 7.0 mononuclear $[\text{Cu}(\text{I-Arg})_2(\text{NCS})]^+$ is the only species in water solution of **1**, while equilibrium between $[\text{Cu}(\text{I-Arg})(\text{SCN})]^+$ and binary $[\text{Cu}(\text{I-Arg})_2]^{2+}$ was detected in water solution of **2**. According to DNA binding studies, the $[\text{Cu}(\text{I-Arg})_2(\text{NCS})]^+$, $[\text{Cu}(\text{I-Arg})(\text{SCN})]^+$ and $[\text{Cu}(\text{I-Arg})_2]^{2+}$ species could be considered as strong minor groove binding agents causing, in the presence of H_2O_2 , the involvement of ROS in plasmid damage. The human carcinoma cells (A549 cell line) were generally significantly more sensitive to cytotoxic and antiproliferative effect of compounds **1** and **2** than human normal cells. The studied compounds shown antimicrobial activity against bacteria belonging to *Enterobacteriaceae* family.

Słowa kluczowe

L-Arginine, Isothiocyanate ions, Potentiometric, NIR-Vis-UV and EPR spectroscopies, Free radicals, Cytotoxic and antiproliferative potential, Antimicrobial properties

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