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Design, synthesis and characterization of a hydrosoluble hydroxi-carboxylated polyaspartamide oxovanadium (IV) conjugate as an antitumoral agent

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Cancer is one of the principal causes of mortality in the world. Nowadays, there are diverse types of treatments against this disease and chemotherapy stands out among them. Vanadium complexes with molecular-organic ligands remain as an interesting option to treat cancer types that the conventional medicine cannot cure; however, these metallic compounds present complications as insolubility and rapid elimination from the organism. The use of a polymer-drug approach arises as an option to overcome this impediment thanks to the inherent high molecular weight of the polymeric ligands. The literature exhibits few researches of hydrosoluble macro-complexes synthesized with a low percentage metal content (0.18-0.36%) that reduces its effectiveness as a therapeutic agent. This investigation presents the design and synthesis of a completely hydrosoluble oxovanadium (IV) complex using a derivatised copolyaspartamide with a higher vanadium content of 3%. Two ligand copolymers with different proportions of side chains were synthesized, both can bind the vanadium oxide ion; although, variations in synthetic conditions (percentage of added vanadium, side chains proportion and concentration of substrates) affected the solubility and yield of the complexes. The characterization of the polymers and macro-complexes was achieved by NMR, IR and UV-Vis techniques demonstrating a high purity of the compounds; the vanadium percentage was determined by Flame-AAS and ICP-OES.

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