

Vanadium and cancer treatment: Antitumoral mechanisms of three oxidovanadium(IV) complexes on a human osteosarcoma cell line

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We report herein the antitumor actions of three oxidovanadium(IV) complexes on MG-63 human osteosarcoma cell line. The three complexes: VO(oda), VO(oda)bipy and VO(oda)phen (oda=oxodiacetate), caused a concentration dependent inhibition of cell viability. The antiproliferative action of VO(oda)phen could be observed in the whole range of concentrations (at 2.5 μ M), while VO(oda)bipy and VO(oda) showed a decrease of cell viability only at higher concentrations (at 50 and 75 μ M, respectively) (pb 0.01). Moreover, VO(oda)phen caused a decrease of lysosomal and mitochondrial activities at 2.5 μ M, while VO(oda) and VO(oda)bipy affected neutral red uptake and mitochondrial metabolism at 50 μ M (pb 0.01). On the other hand, no DNA damage studied by the Comet assay could be observed in MG-63 cells treated with VO(oda) at 2.5–10 μ M. Nevertheless, VO(oda)phen and VO(oda)bipy induced DNA damage at 2.5 and 10 μ M, respectively (p b 0.01). The generation of reactive oxygen species increased at 10 μ M of VO(oda)phen and only at 100 μ M of VO(oda) and VO(oda)bipy (p b 0.01). Besides, VO(oda)phen and VO(oda)bipy triggered apoptosis as determined by externalization of the phosphatidylserine. The determination of DNA cleavage by agarose gel electrophoresis showed that the ability of VO(oda)(bipy) is similar to that of

VO(oda), while VO(oda)(phen) showed the highest nuclease activity in this series. Overall, our results showed a good relationship between the bioactivity of the complexes and their structures since VO(oda)phen presented the most potent antitumor action in human osteosarcoma cells followed by VO(oda)bipy and then by VO(oda) according to the number of intercalating heterocyclic moieties.

Synthesis and characterization of ammonium acesulfamate

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Ammonium acesulfamate, (NH₄)C₄H₄NO₄S, was prepared by reaction of acesulfamic acid and ammonium carbonate in aqueous solution, and characterized by elemental analysis and ¹H and ¹³C NMR spectroscopy. Its crystal and molecular structure was determined by single crystal X-ray diffraction methods. The substance crystallizes in the orthorhombic space group *Pnma* with *Z* = 4 molecules per unit cell. The NH₄⁺ ion generates medium to strong hydrogen-bonds with the carbonylic oxygen, the iminic nitrogen and the sulfonyl oxygen atoms of the acesulfamate anion. The FTIR spectrum of the compound was also recorded and is briefly discussed.

Review: Natural oxalates and their analogous synthetic complexes

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Metal oxalates, commonly classified as organic minerals, are widely distributed in Nature, occurring in mineral deposits or as biominerals in plants, fungi and lichens or in the form of deposits, of different kinds, in animal tissues. Eighteen natural species of this type have so far been reported and investigated. In the first part of this review we give an overview on the general characteristics of these minerals, including also some comments on their environmental effects. The central part of the review is devoted to the discussion of the synthetic oxalates, analogous to the natural species, including the usual procedures employed for their synthesis and the thorough analysis of their crystallographic and structural peculiarities. The thermal, spectroscopic and magnetic properties of these complexes are also discussed in detail. Some comparisons with related coordination compounds are also made along the text.

Vibrational spectra of $\text{CdC}_2\text{O}_4 \cdot 3\text{H}_2\text{O}$ and CdC_2O_4

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The infrared and Raman spectra of $\text{CdC}_2\text{O}_4 \cdot 3\text{H}_2\text{O}$ are recorded and discussed on the basis of their structural peculiarities and in comparison with the spectra of other previously investigated metallic oxalates. The spectra of the anhydrous CdC_2O_4 were also recorded, showing a totally similar spectroscopic behavior, and suggesting a closely related structural arrangement.

An analysis of the carboxylate stretching vibrations in some Cu(II) complexes of amino acids

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The behavior of the stretching vibrations of the carboxylate groups in twenty one Cu(II) complexes of amino acids (aa) of general composition $\text{Cu}(\text{aa})_2$ or $\text{Cu}(\text{aa})_2 \cdot n\text{H}_2\text{O}$ is analyzed on the basis of previously reported vibrational spectroscopic data and on the structural characteristics of these complexes. Some general trends are pointed out and discussed. In all cases, the spectroscopic results are consistent with the monodentate binding of the COO^- groups with the metal center. Brief comments on the spectroscopic behavior of the carboxylate groups in a series of polymeric Cu(II) complexes of dipeptides are also presented.

Copper in plants: An essential and multifunctional element

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TABLE OF CONTENTS

1. INTRODUCTION
2. COPPER IN BIOLOGICAL SYSTEMS
 - 2.1. General aspects
 - 2.2. Characteristics of copper sites in proteins
3. COPPER UPTAKE BY PLANTS
4. COPPER TRANSPORT IN PLANTS
5. COPPER CONTAINING SYSTEMS IN PLANTS
 - 5.1. Copper in electron-transfer proteins
 - 5.2. Copper oxidases
 - 5.3. Copper in dismutation
 - 5.4. Other systems related to copper reactions
6. COPPER DEFICIENCY IN PLANTS
7. ACKNOWLEDGMENTS
8. REFERENCES