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Spectroscopic and Thermal Behaviour of Complex Compounds Useful for Magnesium Supplementation

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SUMMARY. We present the synthesis of three Mg(II) complexes potentially useful for magnesium supplementation in human and veterinary medicine: magnesium chloro-aspartate, $Mg(C_4H_6O_4N)Cl.3H_2O$; magnesium citrate, $[Mg(H_2O)_6][MgC_6H_5O_7(H_2O)]_2.5H_2O$, and magnesium orotate, $[Mg(C_5H_3O_4N_2)_2].8H_2O$. These compounds were characterized by IR and Raman spectroscopy and their thermal behaviour was investigated by means of thermogravimetric measurements and differential thermal analysis, working in oxygen atmosphere.

RESUMEN. "Comportamiento Espectroscópico y Térmico de Compuestos Complejos Utiles para la Suplementación de Magnesio". Se presenta la síntesis de tres complejos de Mg(II) potencialmente útiles para la suplementación de este elemento en medicina humana y veterinaria: cloro-aspartato de magnesio, $Mg(C_4H_6O_4N)Cl.3H_2O$; citrato de magnesio, $[Mg(H_2O)_6][MgC_6H_5O_7(H_2O)]_2.5H_2O$; y orotato de magnesio, $[Mg(C_5H_3O_4N_2)_2].8H_2O$. Estos compuestos se caracterizaron a través de sus espectros de IR y Raman y su comportamiento térmico fue investigado por termogravimetría y análisis térmico diferencial, trabajando en corriente de oxígeno.

INTRODUCTION

Magnesium is the second most common intracellular electrolyte and the fourth most abundant cation in the human body [1,2]. Although it cannot be considered as a trace metal for the higher organisms, in recent years a number of disorders and diseases clearly related to hypomagnesemia could be established [3,4]. On the other hand, in certain geographic regions the low levels of Mg(II) generate a series of well known disorders in ruminants and other animals [5,6].

These situations prompted the search of systems adequate for magnesium supplementation in both human and veterinary medicine, and magnesium therapy has become an important issue in contemporary medicine and pharmacology [3,7].

One of the most relevant questions arising in this context is to find optimal routes for magnesium administration. This implies a selection of complex compounds or salts which lead to a rapid and efficient resorption of Mg(II) without upsetting the pH or the ionic equilibria in body fluids. Possible side effects arising from the anionic and/or ligand components of the proposed systems should also be minimized.

Different Mg(II) complexes have been proposed in recent years for the supplementation of this element [3,7]. One of them, magnesium-L-hydrogenaspartate chloride trihydrate, Mg(L-HAsp) $Cl.3H_2O$, which allows oral administration, has awaken great medical interest because it presents a potentially broad range of therapeutic activity [7,8].

As part of a research project devoted to the physicochemical characterization of new inorganic medicines we have initiated some work

KEY WORDS: Mg(II) complexes, Mg-supplementation, IR and Raman spectra, Thermal Behaviour.
PALABRAS CLAVE: Complejos de Mg(II), Suplementación de Mg, Espectros de IR y Raman, Comportamiento Térmico.

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