

Vibrational Spectrum of $\text{KBi}(\text{C}_6\text{H}_4\text{O}_7) \cdot 3 \text{H}_2\text{O}$, the Most Simple Species present in Colloidal Bismuth Subcitrate

Gloria E. TOBON-ZAPATA, Susana B. ETCHEVERRY and Enrique J. BARAN

*Centro de Química Inorgánica (CEQUINOR), Facultad de Ciencias Exactas,
Universidad Nacional de La Plata, Casilla de Correo 962, 1900-La Plata, Argentina*

SUMMARY. The infrared and Raman spectra of the title complex, the stoichiometrically most simple species present in the pharmaceutical preparations currently known as colloidal bismuth subcitrate, were recorded and discussed in relation to the known structural characteristics of the compound.

RESUMEN. "Espectro Vibracional del $\text{KBi}(\text{C}_6\text{H}_4\text{O}_7) \cdot 3 \text{H}_2\text{O}$, la Especie más Simple Presente en el Subcitrate de Bismuto Coloidal". Se registraron los espectros de infrarrojo y Raman del complejo del título, la especie estequiométricamente más sencilla presente en el fármaco comunmente llamado subcitrate de bismuto coloidal, y se los discute en relación a las características estructurales del compuesto.

INTRODUCTION

In recent years renewed interest has been developed in the pharmacology of different bismuth compounds, specially after the discovery of its effectivity against the bacterium *Helicobacter pylori*, responsible for chronic gastritis and peptic ulcers. Among the modern bismuth-based pharmaceuticals, preparations based on colloidal bismuth subcitrate (CBS) are the most widely used. The chemistry of this system is very complex, because it is constituted by a number of different polynuclear Bi(III) species in equilibrium¹⁻⁶.

In order to advance in the understanding of the general physicochemical properties of this system; we have initiated some spectroscopic work on species involved in this kind of drug.

The stoichiometrically most simple complex present in these bismuth preparations seems to be $\text{KBi}(\text{C}_6\text{H}_4\text{O}_7) \cdot 3 \text{H}_2\text{O}$, whose crystal structure was first reported by Herrmann *et al.*¹ and further refined by Asato *et al.*⁴. In a first approach, and as shown schematically in Figure 1, the Bi(III) cation is coordinated by three oxygen atoms, one of a terminal carboxylate, one of the central carboxylate and the third one from the deprotonated alcoholic OH-group of citric acid. The other terminal carboxylate group is coordinated to a second Bi(III) ion, as a bidentate lig-

KEY WORDS: Bi(III) citrate, Infrared Spectrum, Raman Spectrum.

PALABRAS CLAVE: Citrato de Bi(III), Espectro de Infrarrojo, Espectro Raman.