

## Vibrational Spectrum of Bis(pyrrolidine-N-carbodithioato)-oxovanadium(IV): A New Insulin-Mimetic Vanadyl Complex

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**SUMMARY.** It has been recently found that bis(pyrrolidine-N-carbodithioato)-oxovanadium (IV) is an orally active insulin-mimetic complex. In order to facilitate the characterization and rapid identification of this interesting drug, we have recorded its infrared and Raman spectra and made an assignment of its most characteristic bands. On the basis of this analysis some structural peculiarities of the complex are also discussed.

**RESUMEN.** "Espectro Vibracional de Bis(pirrolidinio-N-carboditioato)oxovanadio (IV): Un Nuevo Complejo Insulino-Mimético de Vanadilo". Recientemente se ha demostrado que el bis(pirrolidinio-N-carboditioato)-oxovanadio (IV) es un complejo con actividad insulino-mimética, administrable oralmente. A efectos de facilitar la caracterización y rápida identificación de esta interesante droga, hemos registrado sus espectros infrarrojo y Raman y realizado la asignación de sus bandas más características y en base a este análisis se discuten algunas peculiaridades estructurales del complejo.

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### INTRODUCTION

Although the main abnormality in insulin-dependent diabetes mellitus is hyperglycemia due to deficiency of insulin<sup>1</sup>, there are many serious secondary complications such as arteriosclerosis, renal disfunctions, cardiac abnormality and ocular disorders. At present, severe diabetes can be only controlled by daily injections of insulin, and thus, the development of compounds that allow insulin replacement or insulin mimetics on oral administration would be very useful<sup>1,2</sup>.

The finding that blood glucose levels of rats with streptozin (STZ)-induced diabetes are normalized by treatment with different vanadium compounds and complexes has stimulated research on insulin-mimetic vanadium compounds<sup>1-7</sup>.

Recently, Sakurai *et al.*<sup>8</sup> demonstrated that the complex bis(pyrrolidine-N-carbodithioato)-oxovanadium (IV) (Fig. 1) is very effective for

normalizing both the serum glucose and free fatty acids levels in STZ-rats. When the complex was administered orally or by intraperitoneal injection at a dose of 10 mg V/kg body weight, to Wistar rats with STZ-induced diabetes, the serum glucose level decreased to the normal range within 2 or 3 days, and was maintained in the normal range by daily administration of 5 mg V/kg.

McCormick<sup>9</sup> reported the preparation of this complex, together with those of other dithiocarbamate compounds in 1968, but they were scarcely characterized. Therefore, and in order to advance in a better characterization of this novel insulin-mimetic agent and to facilitate its rapid identification, we have performed an analysis of its infrared spectrum, complemented with information obtained from the corresponding Raman spectrum.

**KEY WORDS:** Oxovanadium(IV) complex, Insulin-mimetic activity, IR spectrum, Raman spectrum, Structural characteristics.

**PALABRAS CLAVE:** Complejo de oxovanadio(IV), Actividad insulino-mimética, Espectro IR, Espectro Raman, Características estructurales.

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