

# Synthesis and Characterization of Amphiphilic Complexes of Organoantimony(V) with derivatives of hydroxamic acids

Bruno R. Do Prado<sup>1\*</sup> (PG), Cynthia Demicheli<sup>1</sup> (PQ), Victor R. Otati<sup>1</sup> (IC)

<sup>1</sup> Universidade Federal de Minas Gerais \* brunomeadow@hotmail.com

Avenida Presidente Antônio Carlos, 6627 - Pampulha, Belo Horizonte - MG, 31270 – Departamento de Química, ICEx.

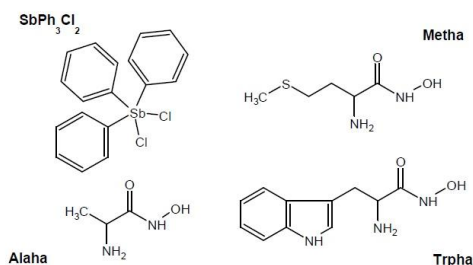
Palavras Chave: Antimony, leishmania, amphiphile, complex, drug, hydroxamic acid

## Introduction

The first-line drugs for the treatment of leishmaniasis are still pentavalent antimonials developed 70 years ago. Such compounds have several limitations due to the long period and forms of administration, toxic effects and appearance of resistance<sup>1</sup>. The World Health Organization and others related entities strongly support the research of simpler and safer drugs, as well for oral and topical administration<sup>2</sup>.

Hydroxamic acid-containing compounds, -CONHOH, play an important role on biological systems, which is related to its ability to form metal complexes. They are also known as constituent of siderophores, growth factors, food additives, antibiotics, tumor inhibitors, antifungal agents and cell division factors<sup>3</sup>.

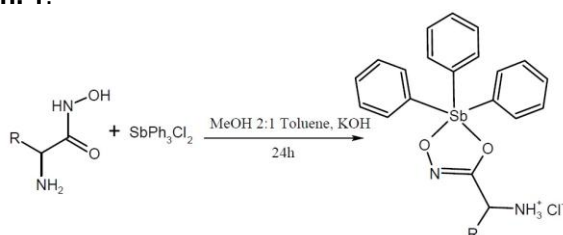
The objective of this work is the synthesis and characterization of triphenylantimony(V) complexes with ligands hydroxamic acids derivatives from amino acids, **Fig. 1**, to achieve more effective and selective drugs for the treatment of leishmaniasis.



**Figure 1.** Representation of  $\alpha$ -alaninehydroxamic acid (Alaha),  $\alpha$ -methioninehydroxamic acid (Metha) and  $\alpha$ -tryptophanehydroxamic acid (Trpha) and dichloride triphenylantimony(V).

## Results and Discussion

The general procedures of synthesis are showed on **Sch. 1**.



**Scheme 1.** General procedures of synthesis.

The complexes are soluble in water and in organic solvents. The values of molar conductivity in water for the complexes, **Tab. 1**, are consistent with the presence of electrolytes 1:1 stoichiometry.

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**Table 1.** Values of elemental analyses and molar conductivity for the synthesized complexes (**calculated**)

Complex	C / %	H / %	N / %	$\Lambda_m / \text{S.cm}^{-1}.\text{mol}^{-1}$
SbAlaha	51,33 (51,30)	3,92 (4,51)	5,05 (5,70)	83,2
SbMetha	49,76 (50,07)	4,37 (4,75)	4,45 (5,08)	85,1
SbTrpha	57,66 (57,41)	4,09 (4,49)	6,36 (6,93)	82,5

The ESI-MS(+) analysis, **Tab. 2**, showed the positive-charged 1:1 Sb-ligand species, supporting the formation of cationic complexes. We observed in the ESI-MS(-) the  $[\text{ML}+\text{Cl}-\text{H}]^-$  species, which contain chloride adducts.

**Table 2.** Important signals of ESI-MS(+) and ESI-MS(-) for the synthesized complexes (**calculated**)

Complex	$[\text{ML}]^+$	$[\text{ML}+\text{Cl}-\text{H}]^-$
SbAlaHa	455,0426 (455,0719)	489,0345 (489,0330)
SbMetHa	515,0771 (515,0753)	549,0349 (549,0363)
SbTrpHa	570,1183 (570,1141)	604,0769 (604,0752)

The IR spectrum of complexes shows moderate intensity bands between 3030-2500  $\text{cm}^{-1}$ , and also in the region 2140-2080  $\text{cm}^{-1}$  due to  $\nu\text{NH}_3^+$ . A new band appears on 1570  $\text{cm}^{-1}$  and is signed to  $\nu\text{C}=\text{N}$ . We propose that the ligands are in enolic form and the coordination to the metal occurs via both deprotonated oxygen atoms, forming a five membered ring.

## Conclusion

It were synthesized three novel cationic complexes of organoantimony(V). Their amphiphilic feature might be an important key to prepare topical formulations for cutaneous leishmaniasis.

## Acknowledgement

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