

Proceedings Paper

# Novel Organic Salts and Ionic Liquids Based on Mefloquine Drugs for Application in Tuberculosis Treatment

Dário Silva <sup>1,\*</sup>, Miguel M. Santos <sup>1</sup>, Zeljko Petrovski <sup>1</sup>, Raoni S. B. Gonçalves <sup>2</sup> and Luis C. Branco <sup>1</sup>

<sup>1</sup> LAQV-REQUIMTE: Departamento de Química, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal; miguelmsantos@fct.unl.pt (M.M.S.); z.petrovski@fct.unl.pt (Z.P.); l.branco@fct.unl.pt (L.C.B.)

<sup>2</sup> Instituto de Química: Universidade Federal do Rio de Janeiro, 21941-901 Rio de Janeiro, Brazil; raoni.schroeder@gmail.com

\* Correspondence: dmv.silva@campus.fct.unl.pt

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**Abstract:** Tuberculosis (TB) remains a major public health concern and currently is the leading cause of human death by an infectious disease. According to the World Health Organization, around 10 million people were infected with the Mycobacterium tuberculosis in 2018 and 1.5 million deceased. The development of novel pharmaceutical tools to efficiently tackle tuberculosis are in the order of the day due to the rapid development of resistant strains of Mycobacterium tuberculosis. Our group reported different classes of pharmaceutical drugs as organic salts and ionic liquids (API-OSILs) for therapeutical applications including tuberculosis treatment. Herein, we report novel potential formulations of a repurposed drug, the antimalarial mefloquine (MFL), which was combined with suitable and biocompatible counter-ions. Eight mefloquine organic salts were obtained by ion metathesis reaction between mefloquine hydrochloride ([MFLH][Cl]) and several organic acid sodium salts in high yields. One of the salts ([MFLH][MsO]) presented increased water solubility in comparison with [MFLH][Cl]. Moreover, all salts with the exception of [MFLH][AOT] showed improved permeability and diffusion through synthetic membranes. Finally, in vitro activity studies against Mycobacterium tuberculosis revealed that these ionic formulations exhibited up to 1.5-times lower MIC values when compared with [MFLH][Cl], in particular [MFLH][(1R)-CSA], [MFLH][(1S)-CSA] and [MFLH][HEPES]. In the case of meropenem based pharmaceutical ionic liquids, several organic cations were considered using acid-base neutralization reaction. The detailed characterization of the compounds as well as biological studies were also performed.

**Keywords:** tuberculosis; mefloquine; organic salts and ionic liquids with active pharmaceutical ingredients (OSIL-APIs)

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