



## ANTIMYCOBACTERIAL ACTIVITY OF PLANT SPECIES FROM PARNA JURUBATIBA: *Humiria balsamifera*, *Kielmeyera membranacea* and *Vernonia crotonoides*.

**Marlon Heggdorne de Araújo, Tatiana Ungaretti Paleo Konno, Denise Oliveira Guimarães, Ivana Correa R. Leal, Elena Lassounskaia, Michelle Frazão Muzitano**

*Universidade Federal do Rio de Janeiro, Campus UFRJ Macaé – Macaé, Rio de Janeiro – Brasil.*

*Universidade Federal do Rio de Janeiro, Campus Fundão – Rio de Janeiro, RJ – Brasil.*

*Universidade Estadual do Norte Fluminense Darcy Ribeiro, UENF – Campos dos Goytacazes, RJ.*

*marlon.heggdorne@gmail.com*

Tuberculosis is still a threat in many regions of the world. Recent estimates report 9 million cases, with 1.5 million deaths [1]. In Brazil the number of reported cases are 76 thousand [2]. Substance from natural products, of different chemical classes, have been investigated and showed antimycobacterial activity [3, 4]. The goal of this study was to evaluate in vitro extracts and fractions of plant species collected in PARNA of Jurubatiba, as the antimycobacterial activity against the strains *Mycobacterium bovis* BCG and *M. tuberculosis* H37Rv as well as checking the cytotoxic effect in RAW 264.7 macrophages. The inhibition of mycobacterial growth was analyzed using the MTT method [5] and cytotoxicity evaluated by specific release of lactate dehydrogenase (LDH) [6]. Samples were tested at concentrations of 0.8, 4, 20 and 100 µg/ml. Plant species *Humiria balsamifera*, *Kielmeyera membranacea* and *Vernonia crotonoides* showed promising activity. Although the crude extract of *H. balsamifera* has not inhibited mycobacterial growth, its fraction in dichloromethane showed inhibition of 94.20±0.07% against *M. bovis* BCG and the 68.95±3.55% against *M. tuberculosis* H37Rv. The crude extract of *K. membranacea* showed inhibition of 74.60±2.34% against *M. bovis* BCG and its fraction in dichloromethane showed 96.83±0.14% against *M. bovis* BCG and 97.40±1.99% against *M. tuberculosis* H37Rv. The crude extract of *V. crotonoides* was the extract with the highest efficiency with inhibition of 94.64±1.26% against *M. bovis* BCG and 94.38±0.96% against *M. tuberculosis* H37Rv. The dichloromethane fraction of *V. crotonoides* showed inhibition of 93.11±0.07% against the *M. bovis* BCG and 94.89±0.60% against *M. tuberculosis* H37Rv. The dichloromethane fraction was the most active for the three plant species. Therefore, these fractions were subjected to analysis by gas chromatography coupled to mass spectrometer (GC-MS) and through this analysis, based on the NIST library, it can suggest the presence of fatty acids and terpenes in most promising fractions, those substances described in the literature having antimycobacterial activity. The specie *Kielmeyera membranacea* was the most potent specie, with MIC<sub>50</sub> of 4.38±1.19 µg/ml. The results demonstrate that plant species tested have promising substances which may contribute to the development of new antituberculosis therapy.

### References:

- [1] WHO, World Health Organization. Global Tuberculosis Report, 2014. Disponível em: <[http://apps.who.int/iris/bitstream/10665/137094/1/9789241564809\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/137094/1/9789241564809_eng.pdf)>
- [2] BRASIL, Ministério da Saúde, Secretaria de Vigilância em Saúde, Departamento de Vigilância Epidemiológica. Programa Nacional de Controle da Tuberculose, 2013.
- [3] OKUNADE, A.L., ELVIN-LEWIS, M.P., LEWIS, W.H. Natural antimycobacterial metabolites: current status. *Phytochemistry*, v. 65, n. 8, p.1017-1032, 2004.
- [4] SALOMON, C.E. e SCHMIDT, L.E. Natural products as leads for tuberculosis drug development. *Current Topics in Medicinal Chemistry*, v. 12, n. 7, p. 735-765, 2012.
- [5] GOMEZ-FLORES, R., GUPTA, S., TAMEZ-GUERRA, R. e MEHTA, R.T. Determination of MIC's for *Mycobacterium avium-M. intracellulare* complex in liquid medium by a colorimetric method. *Journal of Clinical Microbiology*, v. 33, n. 7, p. 1842-1846, 1995.
- [6] MORAES, T.M.S., ARAÚJO, M.H., BERNARDES, N.R., OLIVEIRA, D.B., LASSOUNSKAIA, E., MUZITANO, M.F. and DA CUNHA, M. Antimycobacterial activity and alkaloids prospecting of *Psychotria* species (Rubiaceae) from the Brazilian Atlantic Rainforest. *Planta Medica*, v. 77, n. 9, p. 964-970, 2011.