

Antimicrobial potential of extracts and fractions from *Merostachys pluriflora*; a native bamboo from Atlantic Forest, Brazil.

GAGLIANO, J.¹ & FURLAN, C. M.¹

¹ Instituto de Biociências, Universidade de São Paulo, SP, Brasil

e-mail: jgagliano@usp.br

Brazil is the country with the highest diversity of bamboo species in the New World, with 34 genera and 232 native species [1]. Knowledge about the medicinal applications of native bamboos is extremely underdeveloped in comparison to Asian species. This study aimed to evaluate the antimicrobial activity of extracts from leaves and culms of *Merostachys pluriflora* Munro ex. C. G. Camus. Plant material (leaves and culms) was collected, dried at 40°C, powdered and macerated in ethanol 70% for 7 days at room temperature in the dark. Extracts were lyophilized and crude extracts (CE) were fractionated by partition: hexane (HP), dichloromethane (DP), ethyl acetate (EAP) and hydromethanolic phase (HMP), EAP from leaves was subjected to semi-preparative HPLC and five phenolic compounds were isolated and tested. The antimicrobial activity was evaluated against two gram-negative bacteria *Pseudomonas pally* and *Escherichia coli*, and a gram-positive *Bacillus subtilis*, using the broth microdilution method [2] followed by Resazurin assay as an indicator of cell viability. Leaf extract and phases were inactive to reduce *Escherichia coli* and *Bacillus subtilis* growth. For culms, in assay using *E. coli*, CE and EAP showed MIC₅₀ of 0.47 mg/mL. For *B. subtilis* only DP from culms and isolated fraction EA3 showed growth inhibition, MIC₅₀ values of 0.84 mg/mL and 0.98 mg/mL, respectively. In the assay using *P. pally*, DP and HMP from leaves showed inhibition with MIC₅₀ values of 0.13 mg/mL and 0.20 mg/mL, respectively; for culms, DP, HMP and CE showed MIC₅₀ values of 0.20 mg/mL, 0.32 mg/mL and 0.34 mg/mL, respectively. All isolated phenolics showed high inhibition against *P. pally*, all presenting MIC₅₀ values below 200 µg/mL. Resazurin assay showed a bacteriostatic effect against all bacteria tested. Bamboos are described in the literature as possessing high antimicrobial activity, some studies report the antiseptic action of vinegar produced from leaves and culms of different species of Asian bamboos [3,4]. Bamboos are sources of substances known as flavonoids C-glycosides; these substances are described in the literature with several biological activities [5]. Some authors suggest that more lipophilic flavonoids may also disrupt microbial membrane [6], this may explain why most lipophilic samples, such as dichloromethane phase showed a higher activity against organisms tested. However, more studies are needed to identify the substances from *M. pluriflora* responsible for bacterial inhibition effect.

[1] Filgueiras, T. S. & Gonçalves, A. P. S. 2004. A Checklist of the basal grasses and bamboos in Brazil (Poaceae). The Journal of the American Bamboo Society 18: 7-18.

[2] Carneiro, V.A.; Santos, H.S.; Arruda, F.V.S.; Bandeira, P.N.; Albuquerque M.R.J.R.; Pereira, M.O.; Henriques, M.; Cavada, B.S.; Teixeira, E.H. 2011. Casbane diterpene as a promising natural antimicrobial agent against biofilm-associated infections. Molecules 16: 190-201.

[3] Gallón, A. I. M., Torres, E. C., Cabrera, C.G. 2011. Actividad antiséptica de vinagre de *Guadua angustifolia* Kunth. Revista Cubana de Plantas Medicinales 16(3):244-252.

[4] Sulaiman, O., Murphy, R. J., Hashim, R., Gritsch, C. S. 2005. The inhibition of microbial growth by bamboo vinegar. J. Bamboo and Rattan, 4(1): 71–80.

[5] Afifi, F. U., Shervington, A., Darwish, R. 1997. Phytochemical and biological evaluation of *Arum palaestinum*. Part 1: Flavone C-glycosides. Acta Technologiae et Legis Medicamenti, 8(2), 105–111.

[6] Cowan, M. M. 1999. Plant products as antimicrobial agents. Clinical Microbiology Reviews, 12(4): 564–582.