



Rhamnolipids as an alternative fungicide against plant pathogens

Fernando Lucas Satoru Fugita¹, Itamar Soares Mello², Luiz Alberto Beraldo Moraes¹

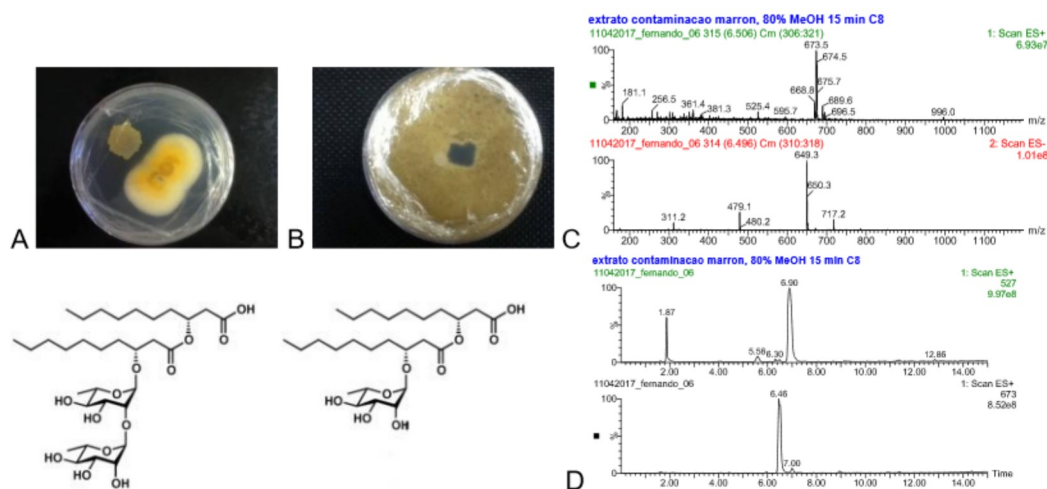
¹Faculty of Philosophy, Sciences and Letters at Ribeirão Preto

²Embrapa Meio Ambiente – Jaguariúna, SP

Av. Bandeirantes, 3900, Ribeirão Preto, SP

fernandofugita@hotmail.com

Rhamnolipids are potent natural glycolipid biosurfactants often biosynthesized by *Pseudomonas aeruginosa* strains through the fermentation process. As biologically produced molecules, Rhamnolipids are generally reported to have less impact on the environment than conventional surfactants, are usually much better biodegradable and show less toxicity than synthetic surfactants. Rhamnolipids are consisted by one or two L-rhamnose molecules as the hydrophilic portion (Monorhamnolipids (Rha-C10–C10) and Dirhamnolipids (Rha-Rha-C10–C10)) and by a fatty acid moiety, saturated or insaturated, with range between C₈ and C₁₂^[1] as the hydrophobic portion. Many Rhamnolipids have been established as an effective source against Gram-negative, Gram-positive bacteria, fungi^[1] and insects^[2]. *Pseudomonas sp.* **LPNMS 012** showed an antifungal activity on antagonism and antibiosis bioassay against *Colletotrichum gloeosporioides* (Figure A-B). *Pseudomonas sp.* **LPNMS 012** was fermented for five days on PD medium, at 200 rpm and 28 °C. After that, the culture medium was submitted to solid phase extraction at C18 resin and extracted with methanol. The crude extract generated was analyzed by High Performance Liquid Chromatography coupled with Tandem Mass Spectrometry (Acquity Xevo TQ-S, Waters) in both ESI+ and ESI- modes. The mass spectra (Figure C) displayed an arrangement of peaks appointed to Dirhamnolipid (Figure B) (m/z 673 [$M+Na^+$]⁺ and m/z 649 [$M-H^+$]⁻). The chromatogram also displayed a pattern of separation of Monorhamnolipids (527 m/z) and Dirhamnolipid (673 m/z) in ESI+ mode (Figure D).



[1] Haba, E., Pinazo, A., Jauregui, O., Espuny, M.J. et al., 2003. Physicochemical characterization and antimicrobial properties of rhamnolipids produced by *Pseudomonas aeruginosa* 47T2 NCBIM 40044. *Biotechnol. Bioeng.*, 81, 316–322.

[2] Kim, S.K., Kim, Y.C., Lee, S., Kim, J.C. et al., 2011. Insecticidal activity of rhamnolipid isolated from *Pseudomonas sp.* EP-3 against Green Peach Aphid (*Myzus persicae*). *J. Agric. Food Chem.*, 59, 934–93