

**TITLE:** ANTIMICROBIAL ACTIVITY OF *LIPPIA GRACILIS* ESSENTIAL OILS ON THE PLANT PATHOGEN *XANTHOMONAS CAMPESTRIS* PV. *CAMPESTRIS* AND THEIR EFFECT ON MEMBRANE INTEGRITY

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**ABSTRACT:**

*Xanthomonas campestris* pv. *campestris* (Xcc) is the causative agent of black rot, a disease that causes serious damage to plants from *Brassicaceae* family. However, there are no chemicals or biological agent commercially registered for the control of this disease. Thus, this study aimed to evaluate the antimicrobial activity and chemical composition of *Lippia gracilis* essential oils (EOs) on Xcc aiming its use as effective biological control. We also investigated the effect of EOs on the integrity of the bacterial cytoplasm membrane. Chemical analysis by GC/MS showed that the major compounds of the seven EOs of *L. gracilis* are thymol or carvacrol. The seven genotypes showed inhibition of bacterial growth with MIC from 700 µg.ml<sup>-1</sup> to 1000 µg.ml<sup>-1</sup>, with the genotype LGRA-106 (rich in thymol) with higher antimicrobial activity. The MIC for thymol and carvacrol were 250 µg.ml<sup>-1</sup>. After exposure to LGRA-106 EO (2x, 1x, 1/2x, 1/4x, and 1/8 x MIC for 5 min, it was observed a decreased cell viability and increased pl fluorescence, which indicates damage to the cytoplasm cell membrane. This study demonstrates that *L. gracilis* EOs have antimicrobial activity and have a potential to be used in the control of black rot. Furthermore this antimicrobial activity is due, at least in part, to bacterial cytoplasm membrane damage.

**Keywords:** Black rot, cruciferous, fluorescence microscopy, flow cytometry, thymol, carvacrol.

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