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ANTIMICROBIAL ACTIVITY OF THYMBRA CAPITATA AND ITS MAJOR COMPONENTS AGAINST GARDNERELLA SPP

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Introduction: Bacterial vaginosis (BV) is a common vaginal disorder that affects women in reproductive age. This condition is characterized by a shift in the vaginal microflora from the dominant beneficial *Lactobacillus* to an overgrowth of strictly and anaerobic bacteria. It is noteworthy that BV involves the presence of multispecies biofilm, mainly composed by *Gardnerella* spp.. A major issue related to BV is the recurrent failure of conventionally antibiotic therapies. Therefore, essential oils (EOs) have been considered as a possible treatment option. *Thymbra capitata* EO has already demonstrated a good potential to eradicate bacteria.

Goals: The aim of this work was to assess the antimicrobial activity of EOs from *T. capitata* and their main components against *Gardnerella* isolates.

Methods: Two EOs and five commercial compounds were used. The minimal inhibitory concentration (MIC) and minimal lethal concentration (MLC) were determined against *Gardnerella* isolates. Synergistic effects between the components were evaluated by the checkerboard method. Also, EOs, the compounds and some combinations, were tested on a *Gardnerella* biofilm.

Results: EOs showed different antimicrobial activities with values of MIC and MLC ranging from 0.04 to 0.08 $\mu\text{L}/\text{mL}$ and from 0.08 to 0.16 $\mu\text{L}/\text{mL}$, respectively. Carvacrol, which is the major component of the EO, had the best antimicrobial activity against all *Gardnerella* isolates, whereas *p*-cymene appeared to have the lowest activity. Regarding the interactions in planktonic cultures, the combination of carvacrol and *p*-cymene had the best interaction, resulting in a synergistic effect, followed by the combination between α -terpinene and *p*-cymene that resulted in a synergism/ partial synergism. On biofilm, the compounds showed distinct effects, being linalool the component with the highest percentage of biofilm biomass reduction, while α -terpinene and γ -terpinene did not show any effect. EOs resulted in small percentages of biofilm biomass reduction. However, a combination of compounds between carvacrol, linalool and *p*-cymene seemed to have a better effect than the compounds individually and the EOs.

Discussion/conclusions: We concluded that the components from *T. capitata* showed potential antimicrobial activity against *Gardnerella* spp.. Importantly, specific combinations of compounds showed better effects against planktonic cells and biofilms due to synergistic interactions that can result in better antimicrobial activity.