22046 | Unravelling the potential of essential oils components to block bacterial social behaviours for infections control

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Background & Aim: The alarming growth and evolution of bacteria resistant to antibiotics leads to a decrease in the effectiveness of treatments. Besides, multi-drug resistant bacteria can thrive, communicate, and form biofilms that are even more challenging to eliminate and take most responsibility for causing infections in humans. In this project, it was studied the potential of two essential oil (EO) components (Carveol and Cis-6-nonen-1-ol) alone and combined with less effective antibiotics to interfere with bacterial pathogenicity and antibiotic resistance. To this end, their ability to inhibit bacterial communication, i.e., quorum-sensing (QS), and biofilm formation was assessed using the biosensor *Chromobacterium violaceum*. **Methods:** Firstly, the QS inhibition potential of selected EO components and the resistance profile of *C. violaceum* to a set of antibiotics were assessed by disc-diffusion assay. Then, the minimum inhibitory and bactericidal concentrations (MIC/MBC) for the antibiotics classified as resistant were determined using the microdilution method and plating in solid medium, respectively. Biofilm prevention studies were also conducted for both EO components alone and dual-combinations of EO components and antibiotics and the results analyzed in terms of biomass produced (crystal violet staining), metabolic activity (alamar blue staining) and culturability (colony forming units (CFU) per milliliters) of biofilm cells. **Results:** *C. violaceum* was most resistant to amoxicillin, oxacillin and fusidic acid. Cis-6-nonen-1-ol at ¼ MIC enhanced the antibiofilm effect of all antibiotics tested. Carveol at ½ and ¼ MIC displayed a higher effect on the reduction of biomass production and biofilm cells inactivation than Cis-6-nonen-1-ol at ¼ MIC. **Conclusions:** Both EO components displayed antibiofilm properties and the ability to boost antibiotics action, which leads to believe that using these phytochemicals could be a promising strategy to minimize the widespread multi-resistant bacteria.

Keywords: Quorum-Sensing Inhibition, Biofilms, Antibacterial Resistance, Essential Oils Components, Antibiotics.

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