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Antibiofilm effect of some main components of essential oils on *E. coli* biofilm

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The term biofilm was created to describe the sessile form of microbial life, characterized by adhesion of microorganisms to biotic or abiotic surfaces, with consequent production of extracellular polymeric substances. It has been noticed that the main chemical components of essential oils have promising antibacterial activity that can be explored as an effective alternative to control biofilms. The objective goal of this study was to assess the antibiofilm effect of eugenol, geraniol and terpine-4-ol on against *Escherichia coli*. Biofilms were developed within the 96-well microtiter plates in the presence of the main components of the essential oils from for the tests, we used eugenol (major component of cinnamon essential oil), geraniol (major component of essential oil of palmarosa) and terpin-4-ol (major component of essential oil of green tea). Cell suspensions (100 μL of 1×10^8 cells ml^{-1} in TSB) and composts components (100 μL of solution of composts) were pipetted into each well and incubated for 24 h at 37°C in an orbital shaker at 120 rpm. The composts were dissolved in DMSO (2.0 %) and saline water (0.85 %) with tween 80 (0.5 %) in order to obtain final concentrations of eugenol 0,76%, geraniol 0,76% and terpine-4-ol 0,38%. Biofilms were characterized, before and after treatment, by total biomass, through crystal violet (CV), and number of cultivable bacterial cells, expressed as log CFU per cm^2 . Terpine-4-ol essential oil did not have any effective antimicrobial action against culturable cells. Conversely, eugenol and geraniol showed a promising antimicrobial activity against *E.coli* biofilms as it was observed a significant reduction of the cultivable biofilm-growing cells. All composts showed high activity against biomass than in the reduction of the viable cells entrapped in biofilms. The results suggest the possibility of using these compounds as in antibiofilm surfaces such as in the paper used in food industries.

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