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Unconventional Strategies for Combating Multidrug Resistant Bacterial Biofilms

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Abstract : Biofilms are complex biological communities which are hard to be eliminated by conventional antibiotic administration and implemented in eighty percent of humans infections. Green remedies have been used for centuries and have shown obvious effects in hindering and combating microbial biofilm infections. Nowadays, there has been a growth in the number of researches on the anti-biofilm performance of natural agents such as plant essential oil (EOs) and propolis. In this study, we investigated the antibiofilm performance of various natural agents, including four essential oils (EOs), cinnamon (Cinnamomum cassia), tea tree (Melaleuca alternifolia), and clove (Syzygium aromaticum), as well as propolis versus the biofilm of both Gram-positive pathogenic bacterium Staphylococcus aureus and Gram-negative pathogenic bacterium Pseudomonas aeruginosa which are major human and animal pathogens rendering a high risk due to their biofilm development ability. The antibiofilm activity of the tested agents was evaluated by crystal violet staining assay and detected by scanning electron and fluorescent microscopy. Antibiofilm performance declared a potent effect of the tested products versus the tested bacterial biofilms.

Keywords : biofilm, essential oils, electron microscopy, fluorescent
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