The Inhibitory Effects of Essential Oils on Staphylococcus epidermidis Biofilms on Stainless Steel and Glass

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This paper is an exploration of the inhibitory effects of Tea Tree and Thieves® Essential Oils on Staphylococcus epidermidis biofilm growth on Borosilicate glass and Stainless Steel washers. This topic was chosen because of the threat antibiotic-resistant S. epidermidis biofilm growth on medical devices in hospitals pose on patients with predisposing conditions and/or artificial medical implants. This paper suggests to answer the questions of whether or not EOs inhibit biofilm growth, which EO tested is more effective, and which surface the EOs can inhibit growth on. The method included a preliminary MIC of the EOs, a biofilm formation procedure, and the CV Assay. The EOs were tested at their MIC and ½ MIC, and there were positive and negative control groups. The growth media used was TSB + 1% glucose + 1% Tween, the bacteria to media ratio was 1:100, and the incubation period was 16-18 hr at 37°C at 100 rpm. A total of 4 full trials was performed with each OD reading representing an average of 3 trials. There does appear to be an inhibition in growth when an EO is present on both glass and stainless steel, but an ANOVA test determined that the EOs were able to inhibit biofilm growth on glass only. In both the washers and glass, Tea Tree EO appeared to be more effective in inhibiting biofilm growth. This experiment yielded useful results that support the potential idea of utilizing EOs in settings outside of the home, such as hospitals to reduce the amount of S. epidermidis biofilm-caused infections.

Awards Won: