

The effects of erythromycin, gentamicin and Melaleuca alternifolia (Tea Tree Oil) on Pseudomonas aeruginosa and Escherichia coli

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1. Tea tree oil (TTO) has antimicrobial properties. In this study, we investigated the effects of an antimicrobial synergy consisting of TTO and the antibiotics gentamicin or erythromycin versus gram-negative bacteria *Pseudomonas aeruginosa* (*P. aeruginosa*) and *Escherichia coli* (*E. coli*).
2. Gentamicin, had minimum inhibitory concentration (MIC) values of $8 \pm 3 \mu\text{g/mL}$ and $4 \pm 1 \mu\text{g/mL}$ versus *P. aeruginosa* & *E. coli*, respectively. On the other hand, the respective values for erythromycin were $160 \pm 25 \mu\text{g/mL}$ and $141 \pm 9 \mu\text{g/mL}$.
3. The effects of different concentrations of TTO on the MIC values of antibiotics versus the bacteria were examined to determine the effects of a synergy on bacterial susceptibility. Compared to their control values, both of the antibiotics in synergy with TTO displayed dose-dependent reductions in their MICs. Statistically significant ($P < 0.05$) results were obtained in every case when TTO was used at 2.5 and 5%.
4. We hypothesize that these effects are due to the disruption of bacterial efflux pumps by TTO. Implications of this study include lowering the dose-dependent toxicity of antibiotics by increasing the susceptibility of bacteria.