



An Analysis of the Effects of Various Essential Oils on the Growth of *Staphylococcus aureus*

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Introduction

Streptococcus aureus is a bacteria which infects at least 1.78 million people per year and has a prevalence rate of 18.1 million or more (Carapetis et al. 2005). Prior research into the effects of natural products in the treatment of the pathogen suggests some promise from *Melaleuca alternifolia* (tea tree oil) and other astringent natural products (Halcon et al, 2004). The alternative hypothesis for the experiment is that there will be a significant decrease in the growth of *S. aureus* treated with tea tree (*M. alternifolia*) oil, lavender (*Lavandula sp.*) oil, and spearmint (*M. spicata*) oil compared to growth of *S. aureus* without added products.



Materials and Methods

S. aureus was cultured on 27 Petri dishes with nutrient agar. In the center of each dish was placed a disk saturated with either tea tree (*M. alternifolia*) oil, lavender (*Lavandula sp.*) oil, spearmint (*M. spicata*) oil, combinations of two, combinations of all three oils, and no oils (only *S. aureus*). An additional 3 Petri dishes with nutrient agar were left undisturbed as a control. All Petri dishes were incubated for 48 hours and zones of bacterial inhibition were measured in mm after 24 and 48 hours.

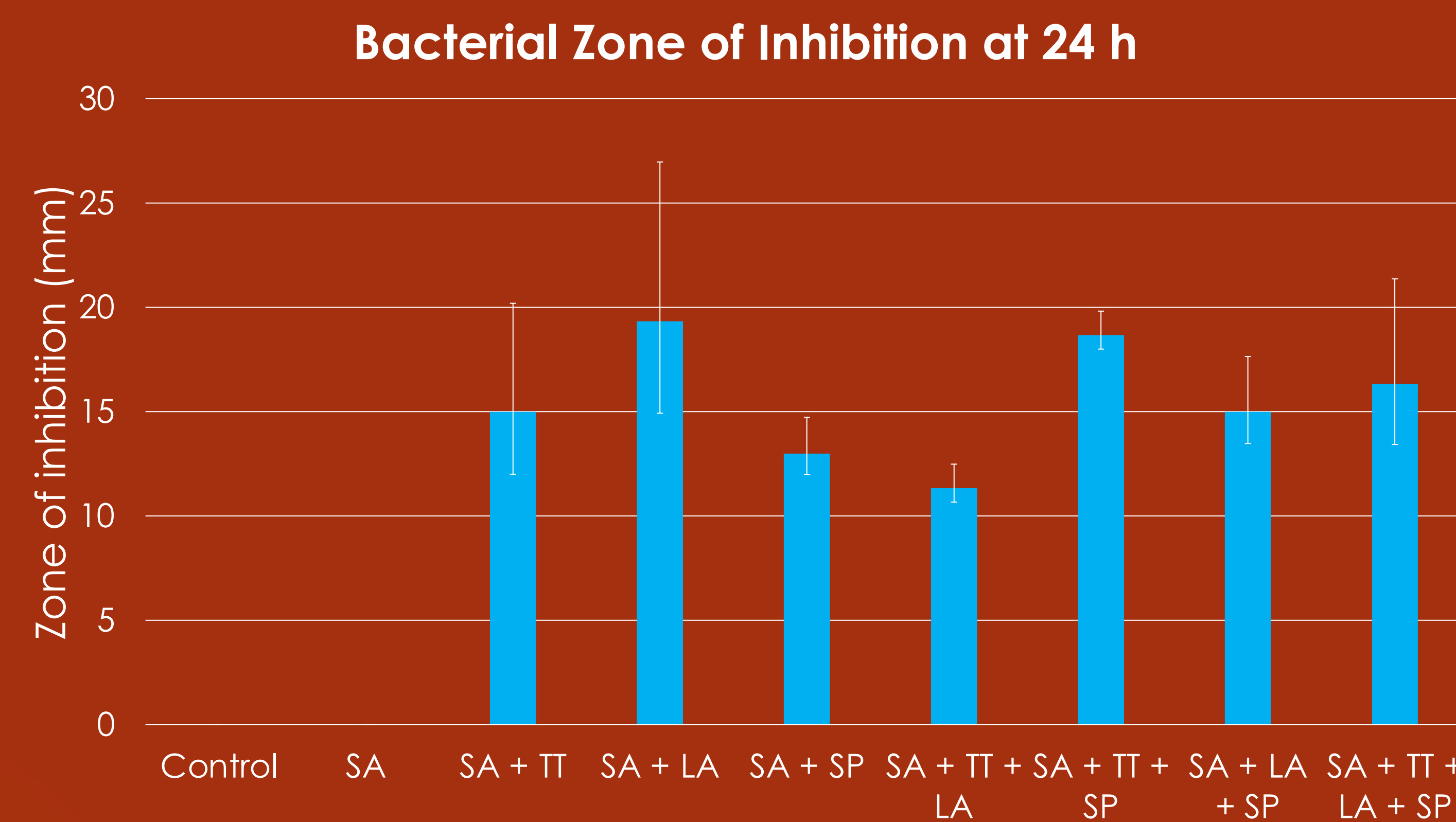


Figure 1. Zones of inhibition after 24 hours of *S. aureus* exposed to tea tree (*M. alternifolia*), lavender (*Lavandula sp.*), spearmint (*M. spicata*), and combinations ($\bar{x} \pm SD$).

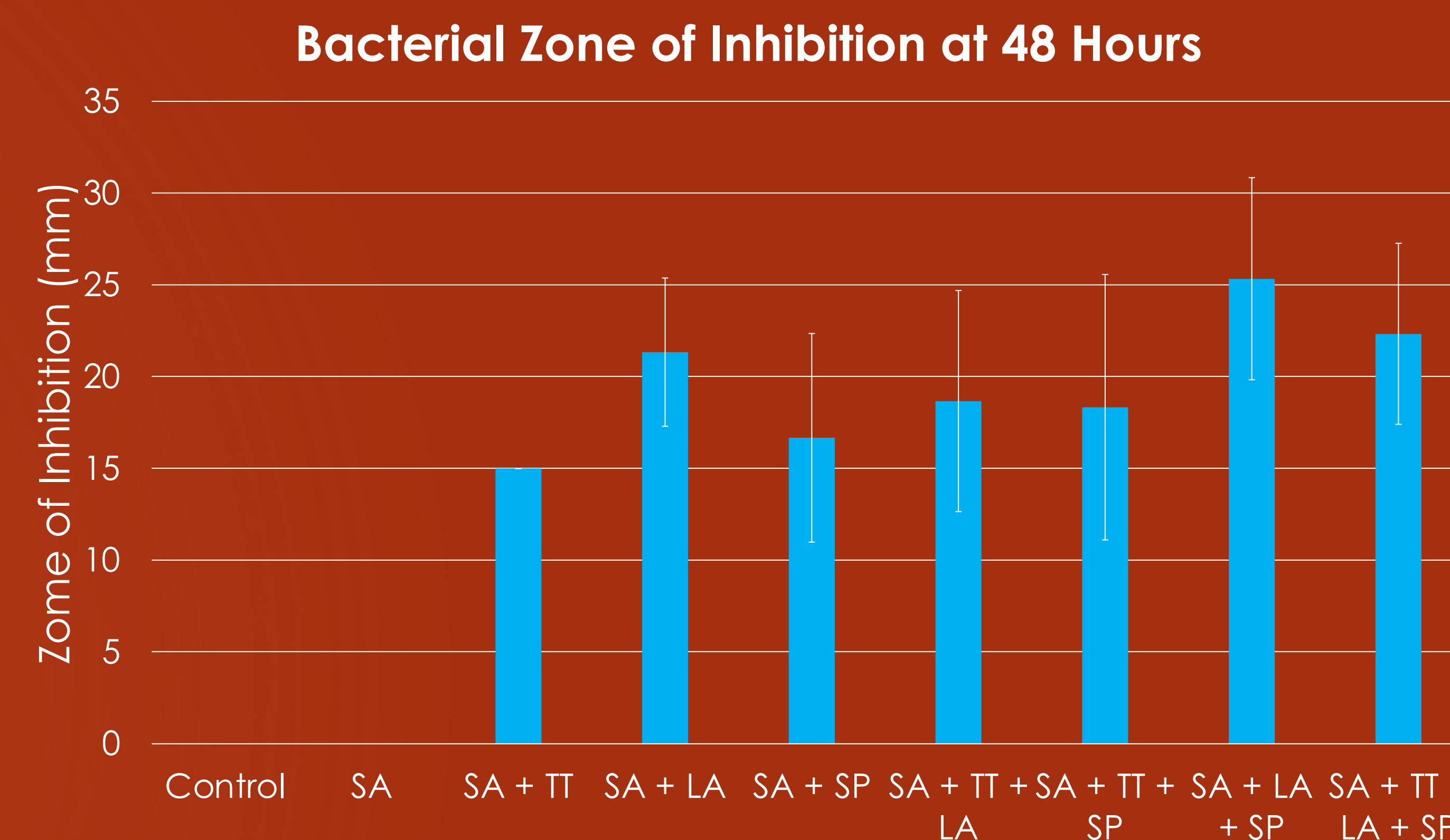


Figure 2. Zones of inhibition after 48 hours of *S. aureus* exposed to tea tree (*M. alternifolia*), lavender (*Lavandula sp.*), spearmint (*M. spicata*), and combinations ($\bar{x} \pm SD$).

Results

There are significant differences at 24 hours between the zones of inhibition of *S. aureus* exposed to tea tree (*M. alternifolia*), lavender (*Lavandula sp.*), spearmint (*M. spicata*), and combinations (1-way ANOVA, $F_{8,18}=11.61$, $p < 0.05$, Figure 1). There are significant differences at 48 hours between the zones of inhibition of *S. aureus* exposed to tea tree (*M. alternifolia*), lavender (*Lavandula sp.*), spearmint (*M. spicata*), and combinations (1-way ANOVA, $F_{8,18}=11.90$, $p < 0.05$, Figure 2).



Discussion

The results of the experiment support the hypothesis that application of *M. alternifolia* oil, *Lavandula sp.* oil, and *M. spicata* oil inhibits growth of *S. aureus*. The results of the experiment are corroborated by research from Halcon et al. (2004) in regards to the *M. alternifolia* oil, Roller et al. (2009) in regards to *Lavandula sp.* oil, and Imai (2001) in regards to *M. spicata* oil. Typical treatments of antibiotics for *S. aureus* may be hampered by issues such as finances, antibiotic resistance, and the issue that only 49% of Americans trust doctors to provide beneficial treatment recommendations (Pew Research 2019). Therefore, the effectiveness of treatment outcomes can be improved in distrustful patients by application of these essential oils so that the patients can benefit from the antimicrobial properties of these natural oils.

Literature Cited

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