

## **Antimicrobial Effects of Essential Oils on *Staphylococcus aureus***

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Essential oils are aromatic volatile compounds obtained from plants through a distillation process. The many components of these oils confer different properties, making them useful in many different fields such as food, perfumery, cosmetics, and medicine. Essential oils are an effective form of alternative medicine because they possess many antibacterial, antifungal, and antiviral properties and can be purchased over the counter without a prescription.

The goal of our research is to evaluate the antimicrobial effectiveness of two essential oils: saro (*Cinnamosma fragrans*), and patchouli (*Pogostemom cablin*) (Aromatics International). We tested the antimicrobial properties of these oils *in vitro* on *Staphylococcus aureus*, a strain of bacteria that is able to cause skin infections. Additionally, we determined if these oils act synergistically when the two essential oils were blended together.

We used a time kill assay to evaluate the antimicrobial effectiveness of the oils. The microorganisms were inoculated in suspensions containing distilled water, a surfactant, and different concentrations of essential oil (1%, 2%, and 3%). These solutions were then plated onto trypticase soy agar at different time intervals to evaluate how quickly and effectively the essential oil inhibited bacterial growth. The minimum inhibitory concentration (MIC) was calculated for each oil.

After plating the different concentrations of single oils, we then combined the two oils together in a blend, repeating the above process. To determine if synergistic effects occurred, we used the MIC values to calculate the fractional inhibition concentration index (FIC<sub>index</sub>). The FIC<sub>index</sub> gave us insight to see whether antagonistic, additive, or synergistic effects took place when the oils were blended.