

RESEARCH REPORT

Effect of a Diffused Essential Oil Blend on Bacterial Bioaerosols

Sue C. Chao* and D. Gary Young

Young Living Essential Oil Company, Payson, UT 84651

Craig J. Oberg

Department of Microbiology, Weber State University, Ogden, UT 84408-2506

Abstract

Thieves, a commercial blend of five essential oils, was tested for its antibacterial activity against *Micrococcus luteus*, *Pseudomonas aeruginosa* and *Staphylococcus aureus* bioaerosols. An aerosol suspension of each bacterial culture was sprayed into a 0.4 m³ enclosed fume hood previously sterilized by ultraviolet light. Thieves essential oil blend was then diffused into the hood for a given time. Depositional sampling results showed a significant reduction ($P < 0.0001$) in the aerosol-borne bacterial load after diffusion of the oil blend. Controls showed no inhibitory effect of oil that may have settled on the exposed plate surfaces during bacterial depositional sampling. Inhibition levels appear to be organism specific. There was an 82% reduction in *M. luteus* bioaerosol, a 96% reduction in the *P. aeruginosa* bioaerosol, and a 44% reduction in the *S. aureus* bioaerosol following 10 min of exposure. Results for the time exposure threshold of diffused oil showed that after only six min a 90% reduction in *M. luteus* viability occurred. Diffusion of the oil blend, Thieves, can significantly reduce the number of aerosol-borne bacteria and may have application in treating air for enclosed environments and preventing transmission of aerosol-borne bacterial pathogens.

Key Word Index

Antibacterial activity, bioaerosols, diffusion, *Cinnamomum zeylanicum*, Lauraceae, *Syzygium aromaticum*, *Eucalyptus globulus*, Myrtaceae, *Citrus limon*, Rutaceae, *Rosmarinus officinalis*, Labiatae.

Introduction

A number of studies on the antimicrobial activities of essential oils and their components show that some oils can have an inhibitory effect on certain microorganisms (1-10). Previous research in our laboratory with Thieves, a blend of five different oils, showed significant antimicrobial activity against a wide range of bacteria with the paper disc diffusion assay (Chao and Oberg, unpublished data). Thieves is a proprietary blend of oils isolated from *Cinnamomum zeylanicum* Blume, *Rosmarinus*

*Address for correspondence