# A Comparative Study of the Antimicrobial & Synergistic Properties of Select Essential Oils and Clinical Disinfectants against Gram-positive & Gram-negative Clinical Isolates in vitro, Year III

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Antimicrobial resistance is a worldwide epidemic that continues to spread out of control. With the emergence of superbugs such as Methicillin-resistant Staphylococcus aureus and Carbapenem-resistant Enterobacteriaceae resulting from inadequate sanitation practices in clinical settings, the need for an alternative form of disinfectant therapy is detrimental. In this study, the in vitro activities of select clinical disinfectants and plant essential oils were observed to determine their potential as antimicrobial agents, both alone and in conjunction, against clinical isolates of gram-positive Staphylococcus aureus and Staphylococcus epidermidis and gram-negative Escherichia coli and Klebsiella pneumoniae. In addition, quantities of each essential oil were varied to determine minimum bactericidal concentration (MBC) ranges. Individual results determined that clinical disinfectants displayed antimicrobial potential (countable numbers or complete inhibition of bacterial colonies) in only 25 percent of overall applications; however, essential oils exhibited antimicrobial potential in 95 percent of overall applications. Results of synergism determined that essential oil and clinical disinfectant synergism exhibited a higher antimicrobial potential than the overall individual results, as 99.4 percent of oil-disinfectant combinations exhibited antimicrobial potential. MBC ranges varied for both the individual and synergistic applications of this experimentation, as results ranged from concentrations of 0.1 mL or less to 0.5 mL or greater against certain microbes.