

# Antibacterial Effectiveness of Essential Oils Oral Care Product on Oral Pathogens

## Clinical Studies proven GumRx works

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Essential oils are plant derived substances that have been shown to have antimicrobial elements.

### Objective

This study was designed to find if the composite formulation of essential oils had antimicrobial activity against Gram + and Gram – oral bacteria. The essential oils used for the study are peppermint, spearmint, and almond oil as found commercially on GumRx and have reports to be an effective treatment on periodontal infections and inflammation.

### Methods

The antibacterial activity of the essential oils was assessed in three different categories: early, intermediate, and late plaque colonizers. Included in the testing *S. sanguis*, *S. oralis*, *S. gordonii*, *A. naeslundii*, *F. nucleatum*, *A. actinomycetemcomitans* and *P. gingivalis* strains 381 and W82 with *S. aureus* as a non-oral control. A spectrophotometric assessment of inhibition of planktonic growth and growth inhibition zone assay on agar plates using filter paper discs were used for each specimen and stain.

### Results

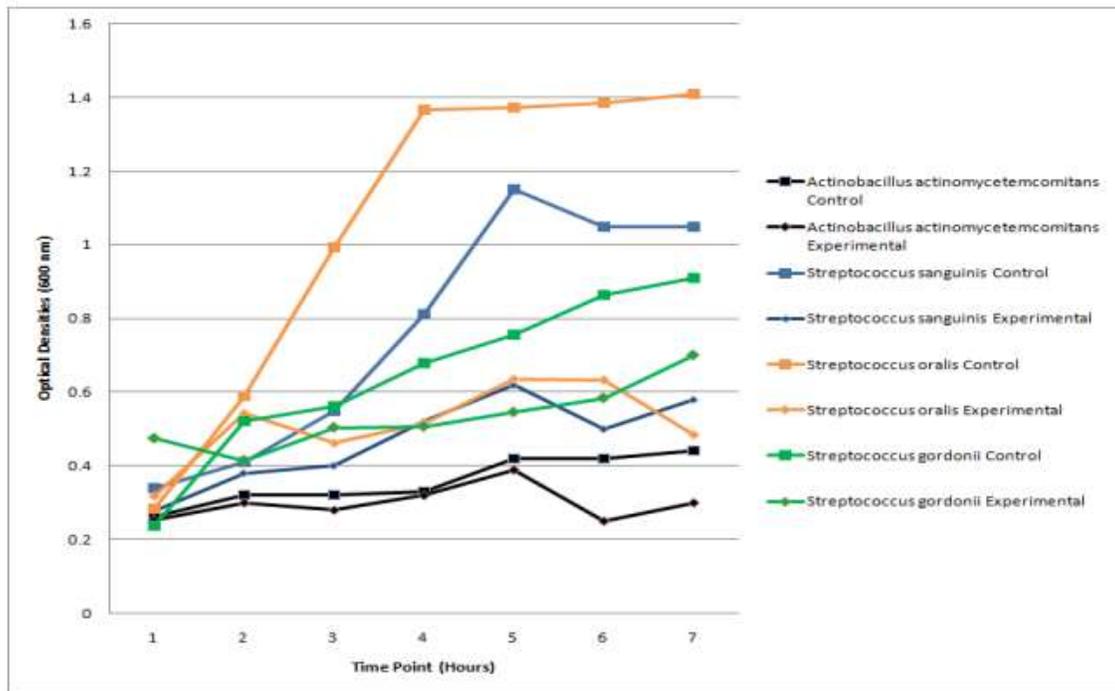
The formulation of essential oils of peppermint, spearmint and almond oils as used in Gumrx inhibited the growth of all species and strains tested using the spectrophotometric assay at 2µl essential oils/ml media or the plate assay at 1µl/mm of filter paper disc. The essential oils proven to be more effective against the Gram – species and strains than against the Gram + species and least effective against *S. aureus*.

### Conclusions

The formula of peppermint, spearmint and almond oil used in GumRx has effective antibacterial activity against Gram + and Gram – oral bacterial although is more effective in Gram – species. This indicates beneficial clinical effects in reducing periodontal inflammation due to the antibacterial effects of the essential oil formula. Further studies are needed to determine the relative antibacterial activity of each oil individually.

Figure 1

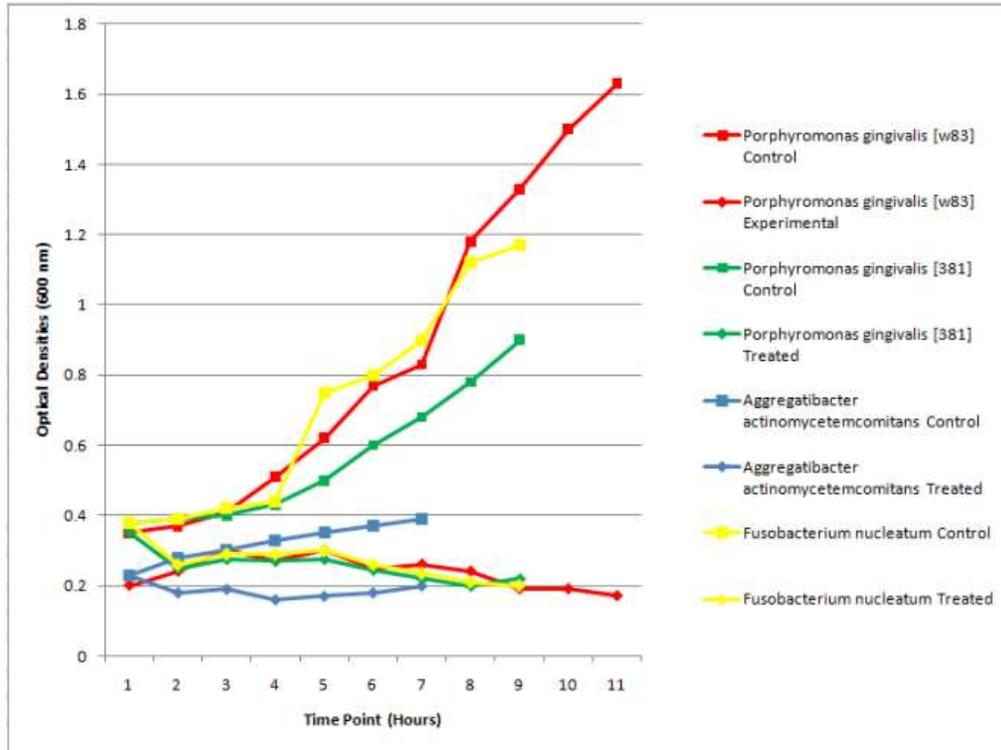
Gram + Panel Bacteria Growth Curves tested vs Control



This chart indicates the growth curves of all Gram + bacteria from the sample panel. The growth measured in increments for 7 hours by 600nm light. Control bacterial cultures were untreated in BHI Media. Treated bacterial samples were tested in the same manner.

Figure 2

Gram – Panel Bacteria Growth Curves Treated vs Control



This chart indicates the growth curves of all Gram - bacteria from the sample panel. The growth measured in increments for 7 hours by 600nm light. Control bacterial cultures were untreated in BHI Media. Treated bacterial samples were tested in the same manner.

Figure 3

Gram- Panel Bacteria Comparison

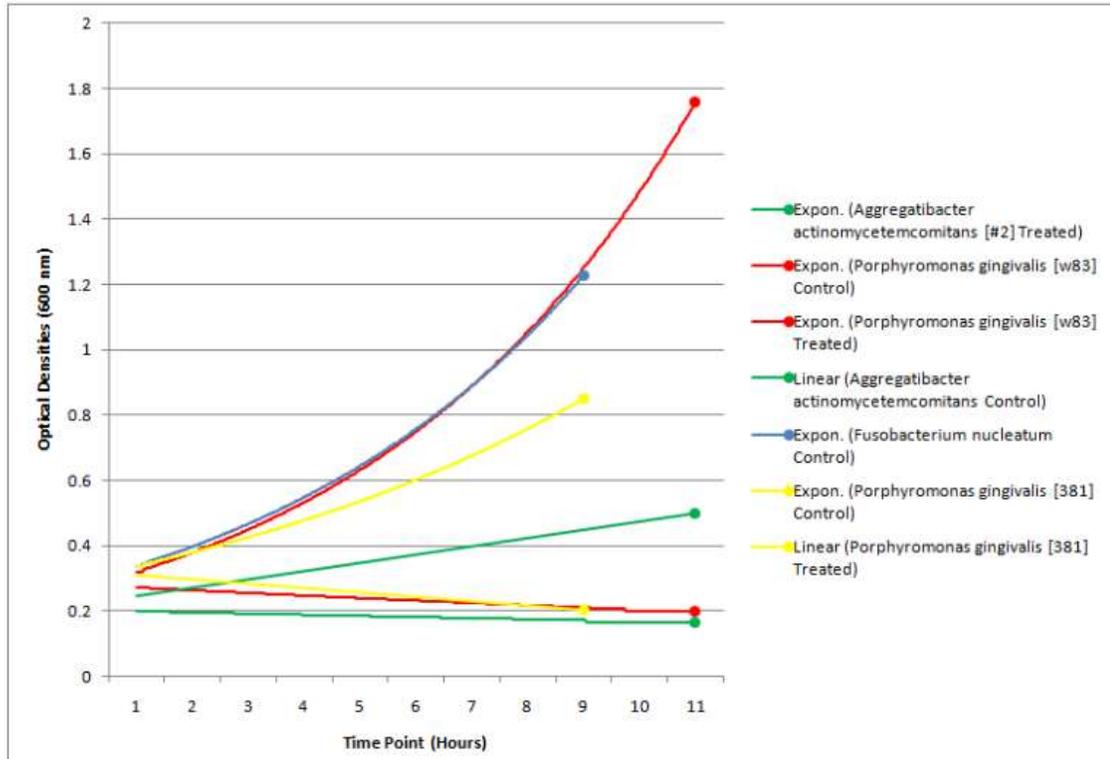


Figure 3 shows a trend line analysis of each treated and untreated Gram- bacteria growth curve. These lines were created using exponential regression analysis for control bacteria and linear regression analysis for treated samples. The figure also indicates the length of time each treatment was run and determine to be effective for treated samples.

Figure 4

Gram+ Panel Bacteria Comparison

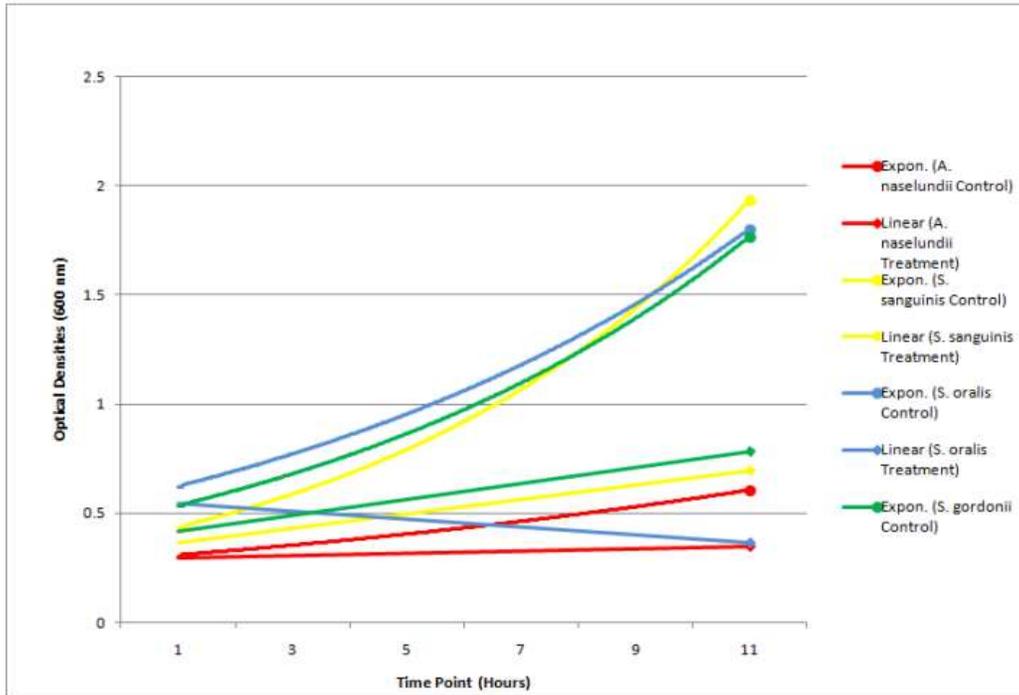
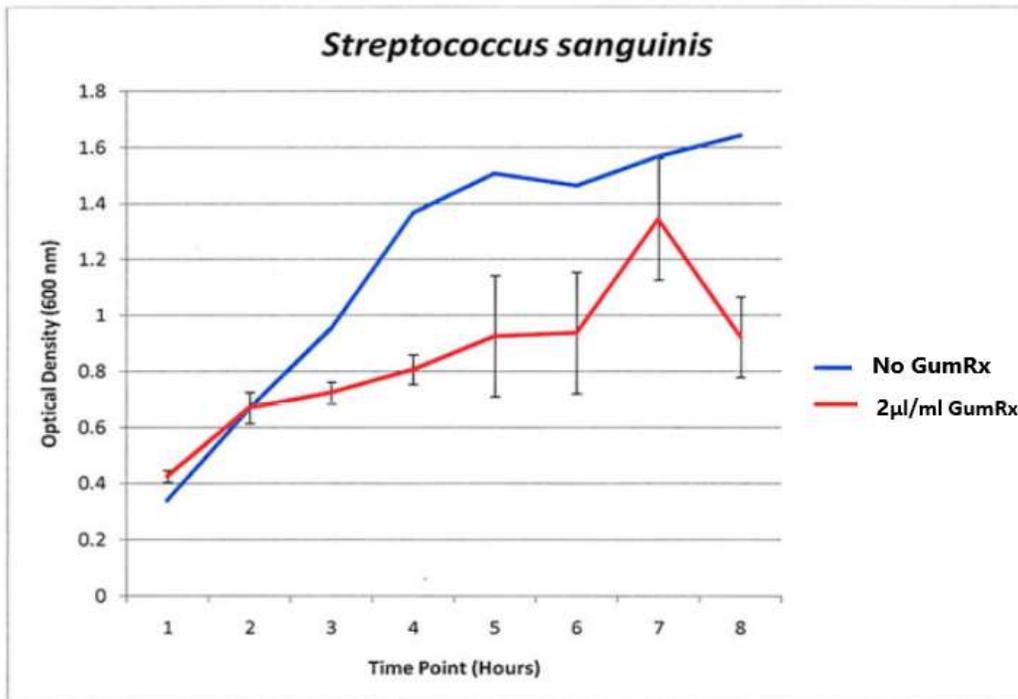
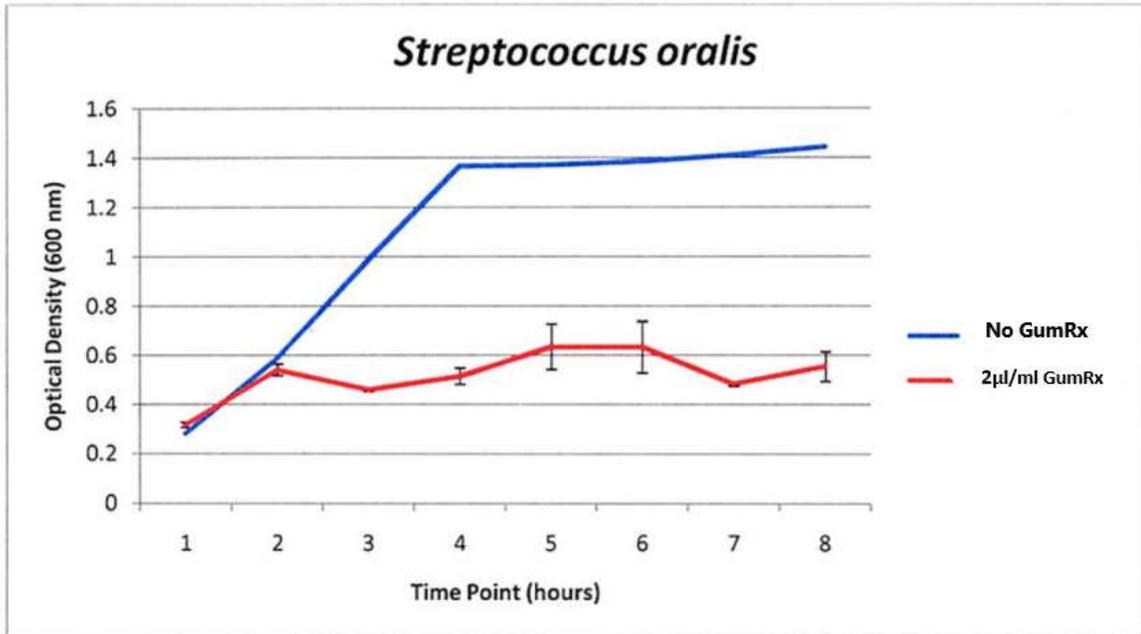


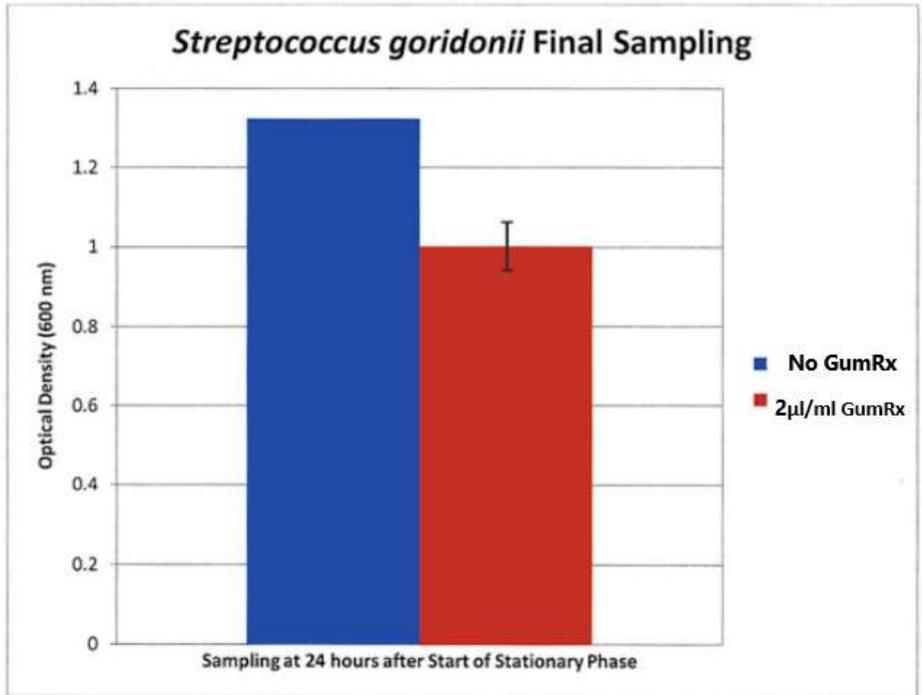
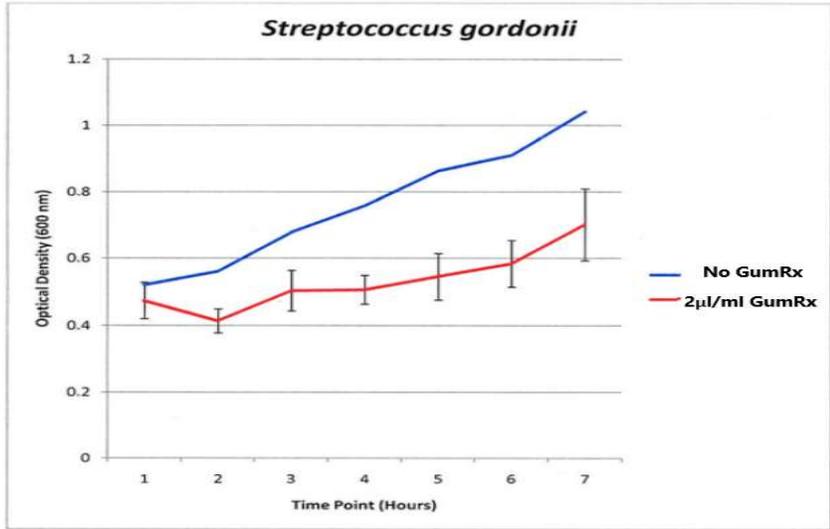
Figure 4 shows a trend line analysis of each treated and untreated Gram+ bacteria growth curve. These lines were created using exponential regression analysis for control bacteria and linear regression analysis for treated samples. The figure also indicates the length of time each treatment was run and determine to be effective for treated samples.

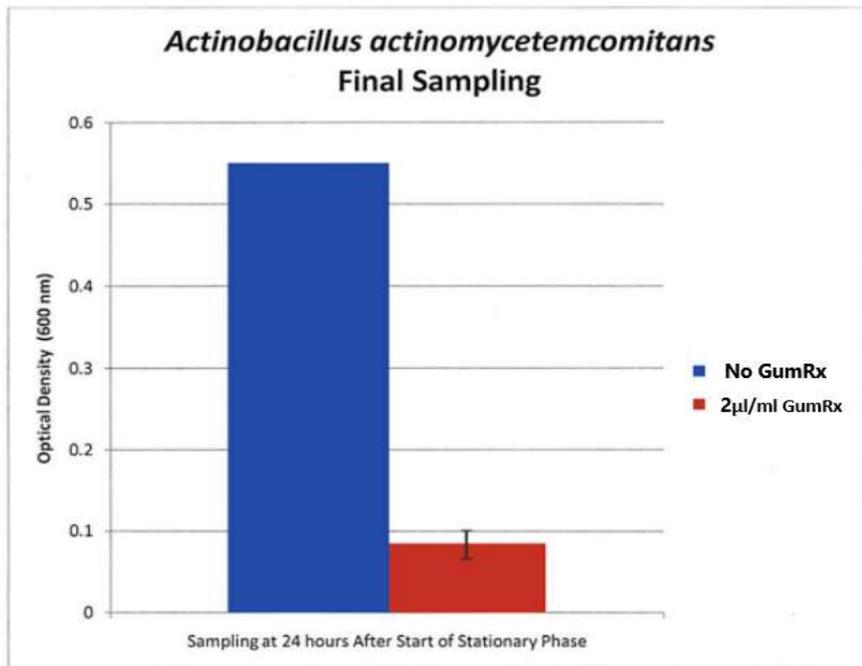
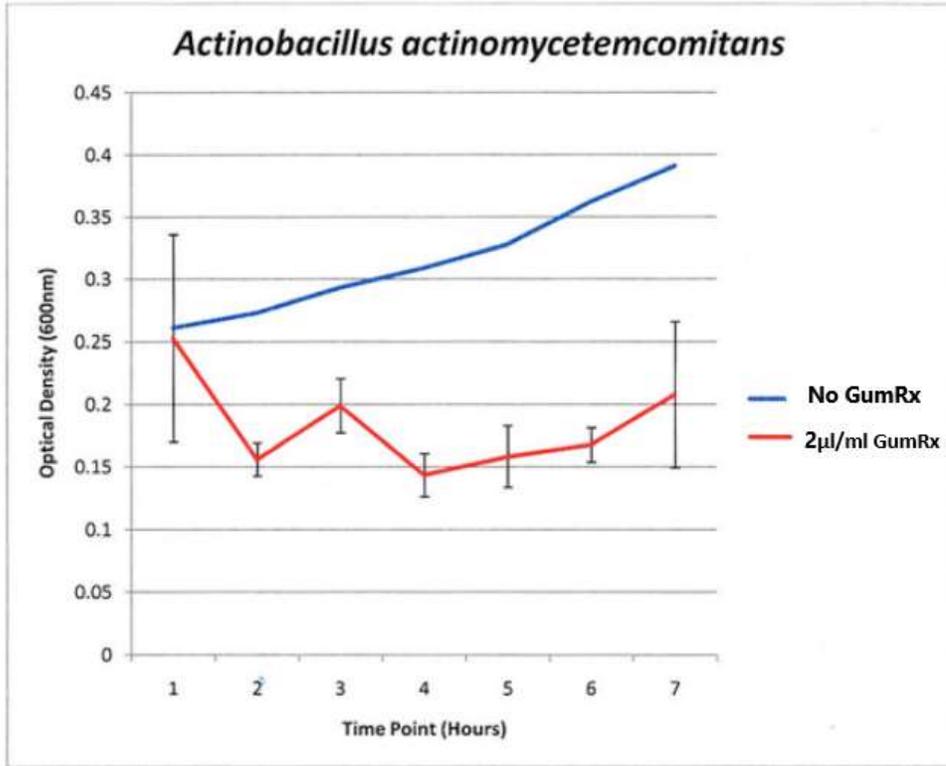
Conclusions

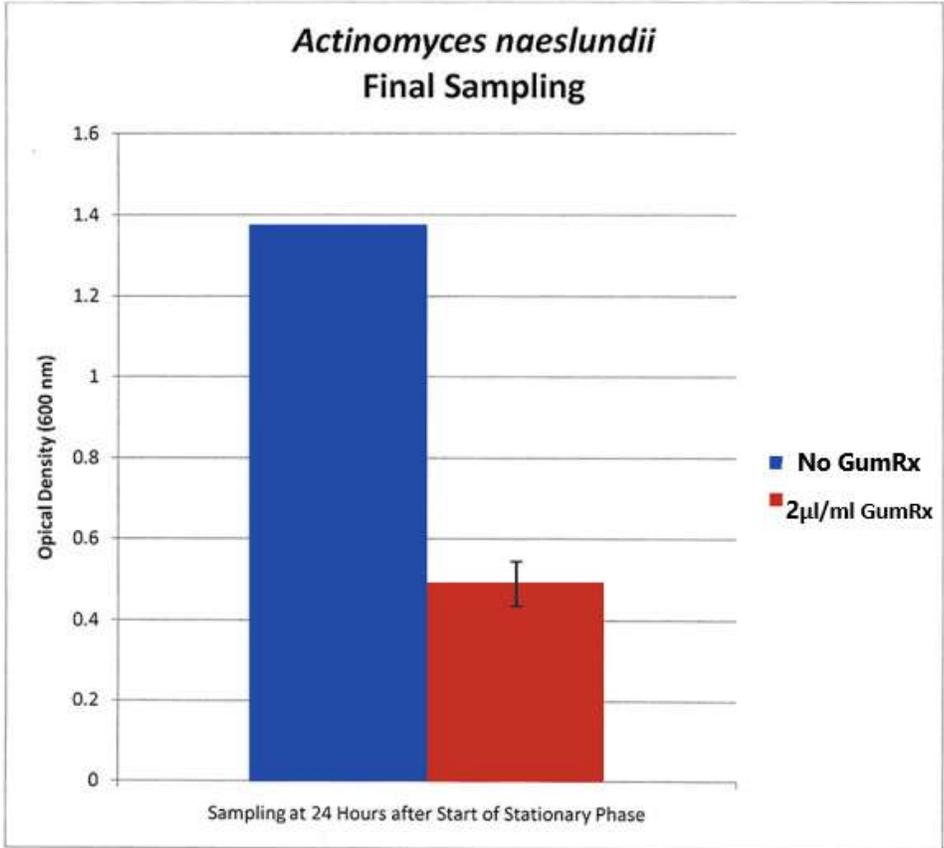
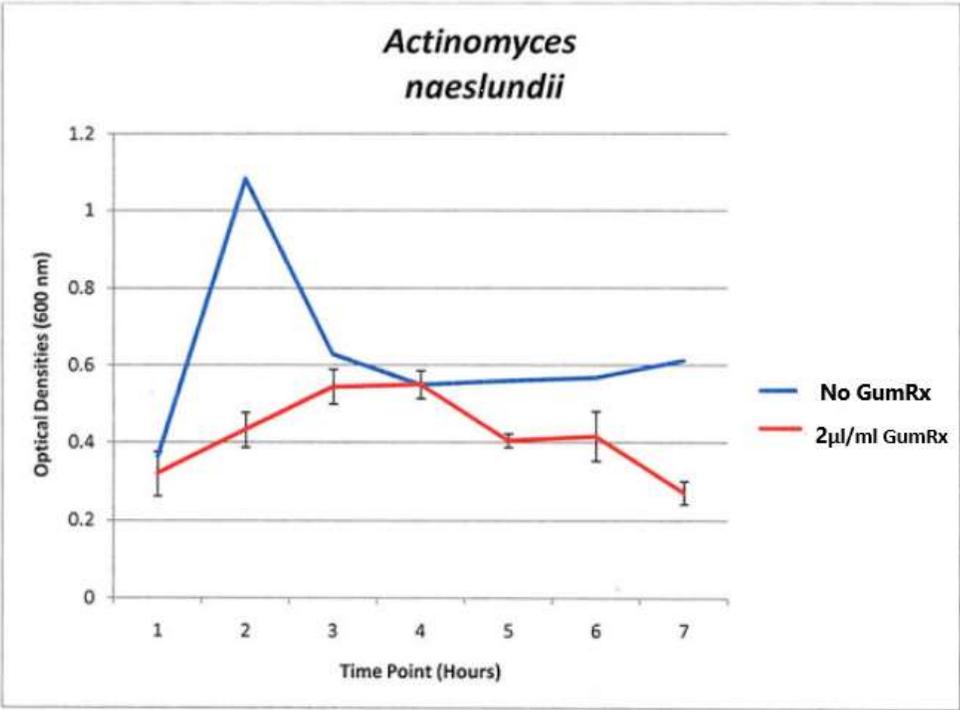
The formula of the essential oils; peppermint, spearmint and almond oils has effective antibacterial activity against Gram+ and Gram- oral bacterial. This study suggests the beneficial effects of the combination of these three essential oils as used in GumRx formulation in reducing periodontal inflammation due to the antibacterial effects of the oils. Further studies need to be conducted to determine the relative antibacterial activities of each individual oil alone.

Other Analysis Figures









## **Conclusion**

Based on 2µl/ml of GumRx in bacterial suspension it has been determine that GumRx has provided results as a antibacterial or inhibitor towards all the bacteria tested. This concludes that GumRx is product that helps periodontal disease by killing bacteria.

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