PROPOLIS ANTIBIOTIC ACTIVITY

MARIANA SUGUIEDA, ASHLEIGH MARIE-LANHAM, ERIC DESROCHES, JENNIFER DIAZ, ANDREW MURPHY, AND VICTORIA WILLIAMS

INTRODUCTION

- With the increase of antibiotic resistence in many pathogens, it is important to research and develop alternative methods of combatting harmful microbes.

- Propolis is a substance made by bees for structural support and protection from pathogens.

- This project will focus on the anti-bacterial properties of propolis available on the market against four bacteria: *E. coli, S. aureus, P. aeruginosa,* and *L. acidophilus.*

- We predict that the three propolis brands available on the market will show activity against these four bacteria but will show stronger activity against the gram-positive bacteria based on previous research.

- The objective is to determine if the propolis that is available to consumers is effective against these microbes.

WHAT IS PROPOLIS?

- Propolis is a resinous substance known as "bee glue" that serves as a protective barrier for bee hives.

- Bees make propolis from the leaves and flowers they land on, making the composition of propolis variable by hive, season, and geographic location.

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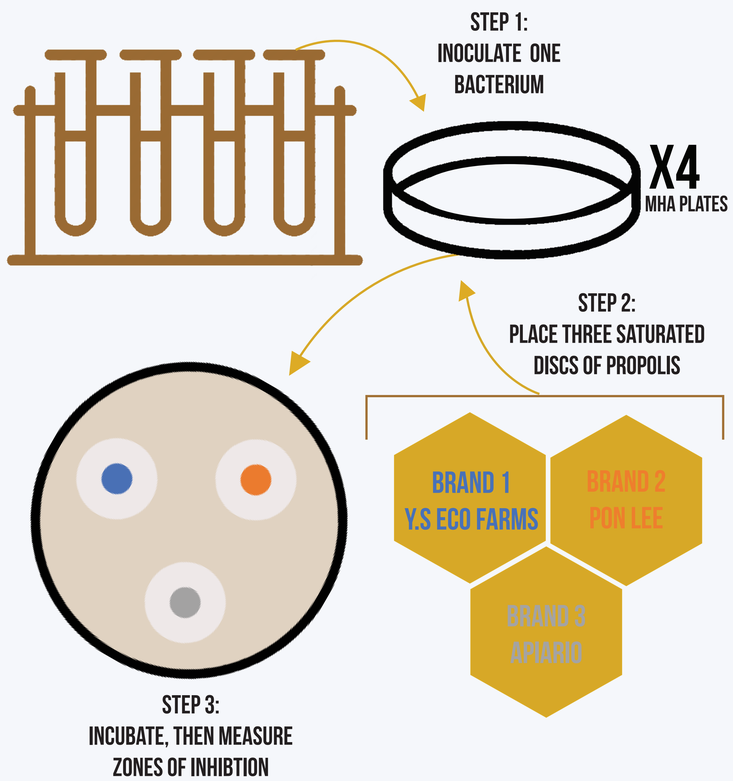
METHODS



- Using the Kirby-Bauer antibiotic susceptibility testing method, Mueller-Hinton plates were divided into three quadrants for each propolis and inoculated with *S. aureus, L. acidophilus, E. coli,* and *P. aeruginosa* individually using aseptic technique.

- One disc was saturated with one brand of propolis and then placed onto the agar in the appropriate quadrant.

- This was done with all three brands across the four plates with different bacteria. These plates were then incubated at 37 degrees Celsius for 48 hours.

- Lastly, the zones of inhibtion were measured. Two trials were conducted.

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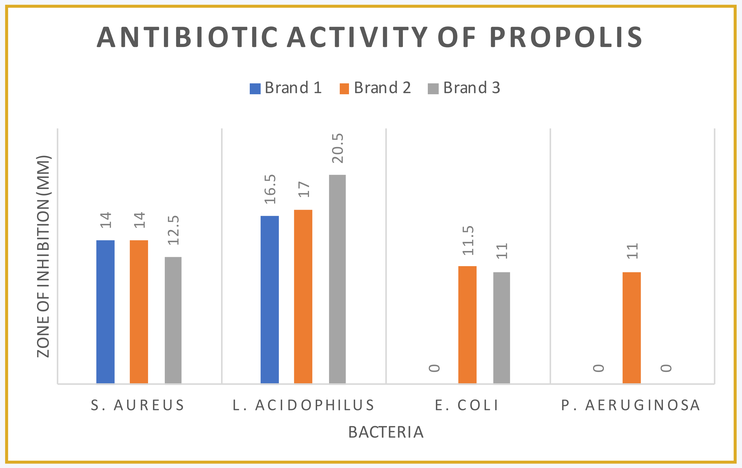
RESULTS



- The table above represents the zones of inhibition measured after 48 hours in the incubator.

- Brand 1 and 2 performed the same against *S. aureus*, while Brand 3 performed slightly worse. Brand 3 performed best against *L. acidophilus*. Brand 2 worked the best against *E. coli* while Brand 1 did not work at all. Brand 2 was the only brand to work against *P. aeruginosa* and thus was the only brand that worked against all four strains.

- All three brands showed more antibiotic activity against Gram-positive bacteria than Gram-negative.

CONCLUSIONS

- All three brands had notable zones of inhibition against of *S. aureus* and *L. acidophilus* rather than *E. coli* and *P. aeruginosa*, suggesting that the propolis is more effective against Gram-positive bacteria than Gram-negative bacteria as our hypothesis stated.

- Brand 2 (Pon Lee) was the only brand that showed antibiotic activity against all four bacteria so we concluded it would be the most effective propolis tested.

- Although not as effective as many modern medicines, propolis can be used as a natural medicine to supplement conventional antibiotics.