The Effectiveness of Herb Infused Oils vs. Chemical Cleaning Products on Bacteria Reduction

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Review of Literature

- **Problem**: Hospitals are being cleaned, yet there is an increase in nosocomial infections due to MDR microorganisms (Advani 2019)
- Bacteria forms biofilms, which allows bacteria to survive (Wu, 2014)
- Biofilms grow on both biotic and abiotic surfaces causing harm to patients' who have weakened immune systems (Longo, 2014)
- Traditional drugs used for bacterial infections were proven effective, until bacteria started to show resistance causing a need for new solutions (Martin, 2003)
- Lysol All Purpose Cleaner showed reduction of bacteria, but not the 99% as most cleaning commercials state (Rubino, 2002)
- 409 Multi-Surface showed very little effect towards bacteria (Audrey, 2015)
- Windex Glass Cleaner showed the same amount of bacteria reduction as products not chemically equal, such as water (Ruhman, 2010)
- Aloe vera contains ingredients that have a inhibitory effect on both gram negative and positive bacteria (Gharibi, 2016)
- Rosemary contains phytochemicals and antioxidants that allow for the inhibition of bacteria (Jawad, 2018)

Objective/ Hypothesis

- Testing herbal oils vs. commercial cleaning products to see which would reduce the amount of bacteria more
- Herbal oils will reduce 5% more of the bacteria compared to the commercial cleaning agents

Methodology

leaning Products:

- Lysol All Purpose Cleaner Spray
- 409 Muti Surface Cleaner Spray
- Windex Glass Cleaner Spray

Cont. Methodology

Herbs:

- Aloe Vera
- Rosemary

Surfaces:

- Door knob
- Thumb swab
- Air
- Sink
- Phone

Control/ Experimental Procedure:

Day 1

- Plating
  - Gathered bacteria
    - Used Q-Tip when needed
  - Labeled plates with surface type
    - Made Rosemary and Aloe vera dilutions
      - 25.5mL of water
      - 5.5mL of ethyl alcohol
      - Ethyl alcohol was not added to the Aloe vera oil, due to it already being diffused when brought

Day 2

- Herbal Oils/ Commercial Cleaners
  - Created four wells (holes) in the agar
  - Applied 0.1mL of the cleaners

Day 5

- Taking down the zone of inhibition
- Identifying the microorganism that formed; yeast, mold, bacteria

Results 1

SURFACES / PRODUCTS	PHONE	SINK	THUMB	DOORKNOB	AIR
WINDEX			0	?	
409	½ inch		½ inch		
LYSOL	¾ inch		0	?	?
CONTROL			0		0
ROSEMARY 25%		0	0		?
ROSEMARY 50%	0		0	?	?
ROSEMARY 100%	0		0		?
ALOE VERA 12.5%	0		0	0	0
ALOE VERA 25%	0	0	0		

Discussion 1

- ~~hypothesis.~~Natural based cleaners are more effective by 5% compared to synthetic cleaners in reducing bacteria
- **HYPOTHESIS WAS REJECTED**
- Herbal cleaners had zero effect on the bacteria, regardless of different concentrations based off the first analysis
- Factors could have led to inconclusive data

Results 2

Discussion 2

- **Hypothesis:**Natural based cleaners are more effective by 5% compared to synthetic cleaners in reducing bacteria
- **HYPOTHESIS WAS INCONCLUSIVE**
- Analyzing cleaners vs control
- Not only do the cleaners not eliminate bacteria but allow it to grow?

Conclusion

- The hypothesis was not supported or rejected
- For future experiments, it would be best to eliminate variables and to have a limit of factors
  - Repeat procedures just with an initial growth and less surfaces and cleaners