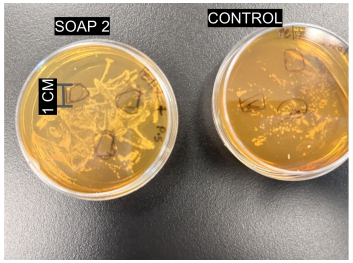
Research question

Does the price and branding of hand soap change its effectiveness?

Figure 2: Hand soaps tested

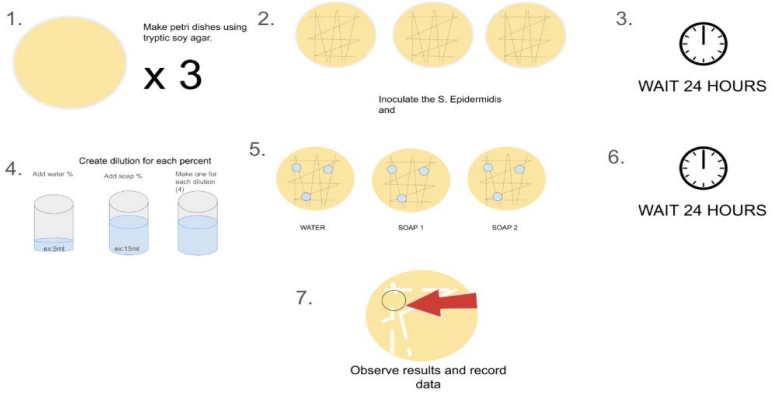
Data analysis and Results

Graph of results showing soap 2 performing better than control and soap 1



Picture of soap 1 in 25% dilution test compared to control

Methodology



Procedure for experimentation

Interpretation and Conclusion

- It is possible to conclude that the less branded liquid hand soap is more effective than heavily branded foaming hand soap, which could be because the liquid hand soap contains less additives.
- This gives valuable information on hand soap improving hygiene and preventing viruses and illnesses.

Introduction

- The market for hand soap is growing to an additional 1.98 billion USD from 2022 to 2027, due to the demand for hand soaps increasing, it's caused discussion about different types of hand soap and their effectiveness. The question posed in this study is if certain soaps were more effective or if there is a standard effectiveness.
- The global impact of this project relates to the safety and well being of people. One study found that interventions (promoting handwashing) reduced lower respiratory infections and upper respiratory infections (Ross, 2023).
- Pipetting was selected as it proved to be the most accurate way to standardize the amounts applied. Four dilutions were also tested to simulate different amounts of hand soap that a person may use.

Figure 1 (Cairns & guide, 2020)

Questions

Does the price and branding of hand soap affect its performance?

Hypothesis: The price and design of hand soap will not affect its performance as hand soap is held to a certain standard and contain similar active ingredients.

Figure 2: Hand soaps tested

Investigative Methods/Procedures

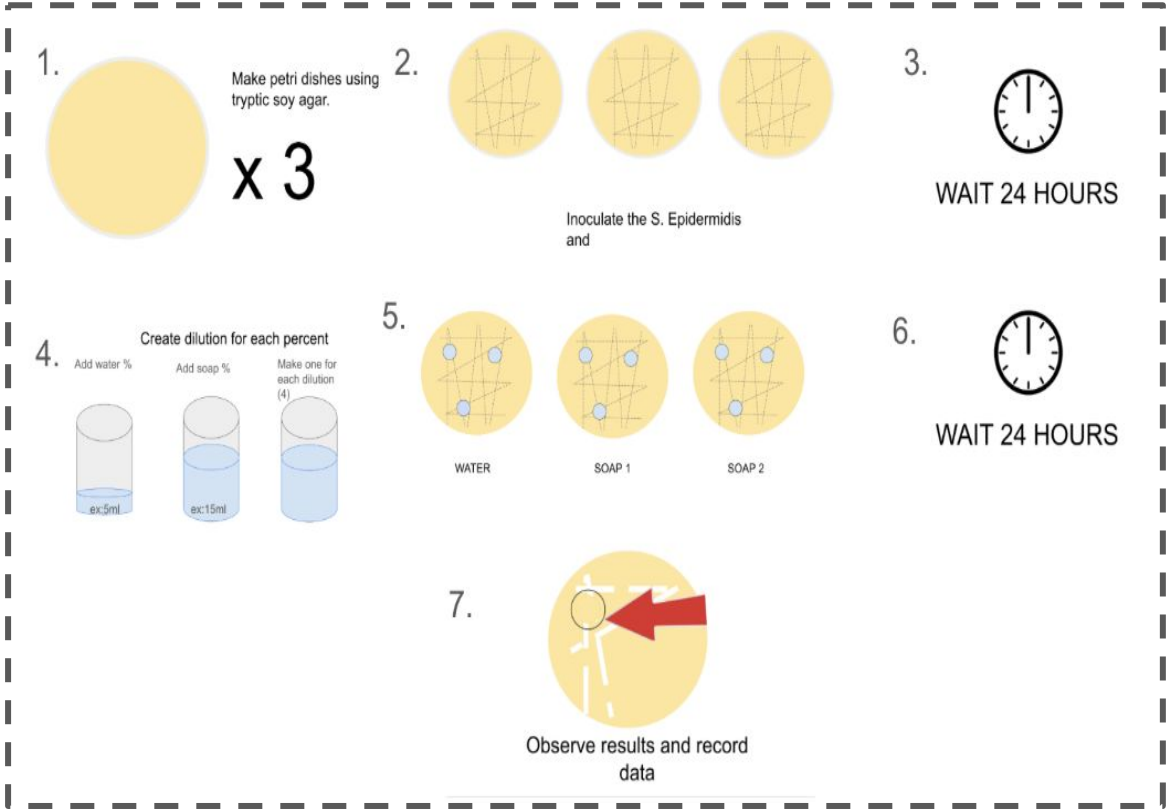


Figure 3: Procedure for experimentation

1. Independent Variables
   - Amount of soap in each dilution
   - Brand of soap
2. Dependant Variable
   - Area of inhibition in cm.
   - Effectiveness of each hand soap
3. Control
   - Same Bacteria in each test.
   - 20 ml of soap/water solution in each dilution.
   - Water in each test

Results

	5 ml of soap diluted	10 ml of soap diluted	15 ml of soap diluted	20 ml of soap diluted
	25%	50%	75%	100%
soap 1 inhibition in cm	0.4	0.5	0.1	0.5
soap 2 inhibition in cm	1.0	1.5	0.5	1.7
control 3 (all water) inhibition	0.5	0	0.01	0.3

Figure 4: Data depicting the relationship between the concentration of soap and zone of inhibition

- Numerical results for each soap/water dilution are shown in figure 4.
- The table presents the findings that soap 2 yields a higher inhibition of bacteria.

Results

Figure 5: Data depicting the results comparing relationship between the concentration of soap and zone of inhibition

- This chart visualises the data
- The middle bar (red) represents soap 2 and is significantly higher than the rest of the bars.
- This shows how soap 2 performs better at inhibition of bacteria than the control and soap 1.

Results

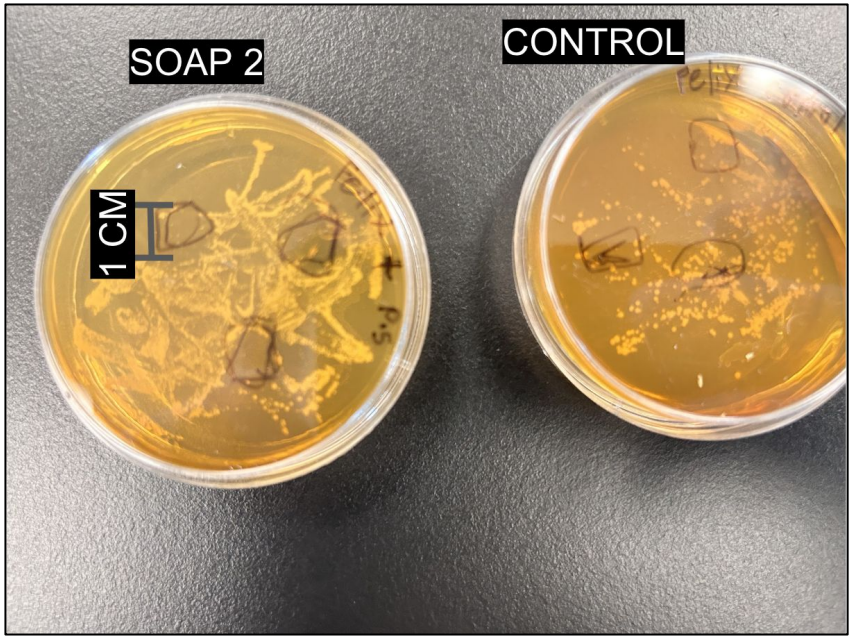


Figure 6: 25% Soap dilution results comparing soap 1 against the control.

- This shows soap 2 compared to the control (water) in the test.
- As seen in figure 6 soap two creates an inhibition of 1cm, whereas the control creates a smaller inhibition of 0.5cm in a 25% dilution.

Interpretation

- This project led to the conclusion that the less branded liquid hand soap is more effective than the heavily branded foaming hand soap. This contradicts the hypothesis that all hand soaps are equal, as the less branded proved to be more effective.
- A variable that may have caused the result of the less branded soap being more effective is the liquid hand soap contained less additives for scent and foaming abilities.
- It is also possible that the liquid hand soap did not dry as quickly staying on the dish in the incubator for longer which could be an influencing variable on the overall results.
- During the 75% test the results were significantly lower than the other test possibly from a malfunction in the incubator running hotter than normal drying the soaps up before they had a chance to kill the bacteria.

Implications and ideas for future research

- This shows how scent, branding, and price could be a factor in the effectiveness of hand soap. Information about this is important to understand when choosing a product to fight against viruses and other illnesses.
- If this project was continued, testing with human born viruses would provide valuable insight into the true effectiveness of hand soap during pandemics giving people more knowledge about personal protection against illnesses.
- Other future experiments could be testing different soaps by the same brand, this would also show if there's a difference in individual soaps or if it is a matter of the brand.

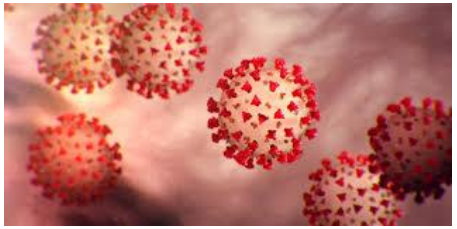


Figure 7: (*Coronaviruses (COVID-19) – NFID*, 2025)

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Photo Credits

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