

Who is the Better Killer?

An Analysis of Which Hand Sanitizer Kills the Most Bacteria.

Samrina Chohan

Introduction

The use of hand sanitizers has become very common nowadays, especially with the global pandemic, COVID-19. According to a study by Stats Canada, hand sanitizer sales have gone up 792% since the pandemic started, therefore, I decided to test which brand of scented hand sanitizer kills the most bacteria. The reason I chose scented hand sanitizers for this project is because according to a survey I created, in which a diverse group of 50 people answered, 64% people used scented hand sanitizers and only 36% people used unscented hand sanitizers. My hypothesis is that the brand to kill the most bacteria would be Medi Care as they not only sell scented but also unscented hand sanitizer as well as other protective gear to fight against Covid-19. Based on marketing strategies, typically companies have a larger number of products if they become popular in the particular field. I also found that many people I know use Medi Care as their hand sanitizer brand, therefore making me believe it has the ability to kill the most bacteria. In the end, my results did not support my hypothesis as the Bath and Body Works hand sanitizer killed the most bacteria, the reason being that it had the most ethyl alcohol out of the 3 hand sanitizers.

Question

Which brand of hand sanitizer kills the most bacteria?

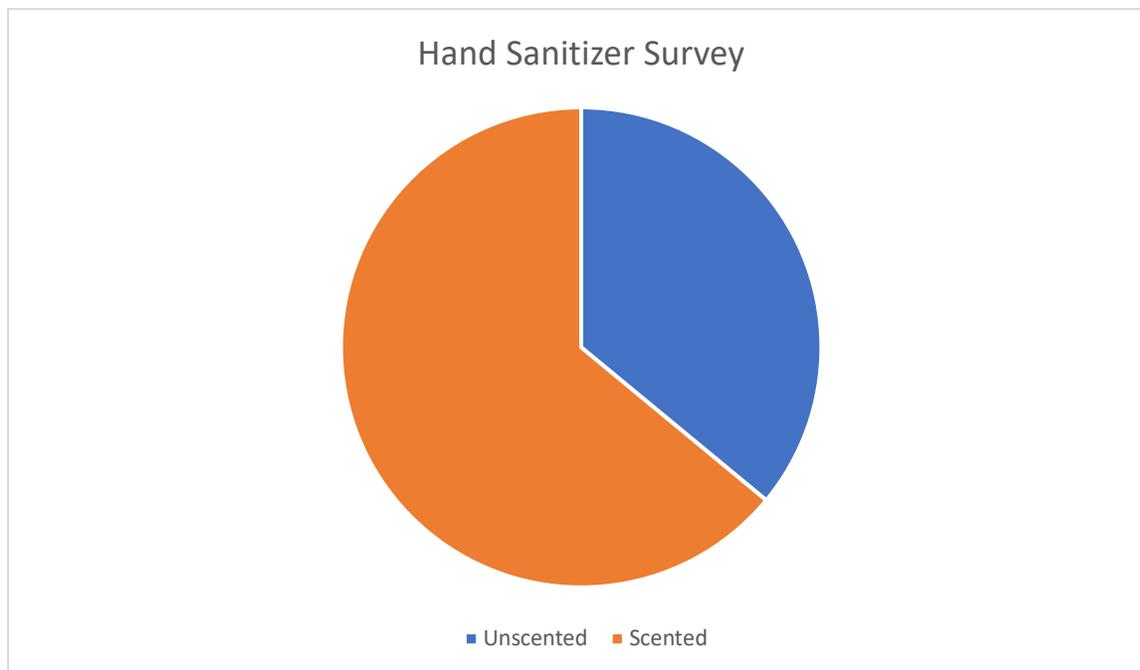
Materials

- Nutrient Agar (8 grams)
- Water (375 ml)
- Pot (1)
- Sterile Swabs (16)
- Petri Dishes (8)
- Nitrile Gloves (4)
- Tape
- Saran Wrap
- Whisk
- Medi Care Hand Sanitizer (lemon scented)
- Life Brand Hand Sanitizer (evergreen scented)
- Bath and Body Works Hand Sanitizer (sweat pea scented)

Procedure

- i. A survey (Google Forms) was conducted in which 50 residents of Saint John, New Brunswick who were diverse in terms of age, religion and occupations, were asked to answer whether they used scented hand sanitizer more or unscented hand sanitizer. After the results were obtained, 64% people said they used scented hand sanitizer more often.
- ii. I then gathered all of my materials.
- iii. After that, I placed my pot on the stove (medium heat)
- iv. Next, I added 375ml of water into the pot, ensuring there were no spills.
- v. Then, I added my 8 grams of nutrient agar into the water, making sure nothing went out of the pot.
- vi. After that, I took my whisk and mixed the contents, dissolving my solute in my solvent. This was done for approximately 5 minutes.

- vii. Next, I let the solution cool down for approximately 20 minutes, ensuring it was not hot, but warm.
- viii. Then, I put on my nitrile gloves to ensure no bacteria from my hand was spread onto the petri dishes.
- ix. After that, I took my pre-sterilized petri dishes and layed them out on my kitchen counter.
- x. Then, I labelled each dish, keeping 2 for only bacteria, 2 for bacteria and Medi Care hand sanitizer, 2 for Life Brand hand sanitizer, and 2 for Bath and Body Works hand sanitizer.
- xi. Next, I removed the covers of the petri dishes in order to pour the agar, making sure to fill only the base of each dish. I had to make sure that this process was done fairly quickly in in order to ensure no airborne bacteria entered my petri dish.
- xii. Then, I let the petri dishes sit for about 1 hour, letting the agar harden in the dishes. I made sure that the dishes were kept upside down, to prevent any condensation from disrupting the surface.
- xiii. After that, I took my sterile swabs and swiped across the corner of my windowsill, making sure to take from around the same spot to keep the experiment controlled.
- xiv. Next, I placed the bacteria from the windowsill on my petri dish, by swiping a zigzag across each dish.
- xv. Then, I swiped a drop the size of a raindrop of hand sanitizer on each petri dish, according to the labels.
- xvi. After that, I taped the petri dishes shut, later adding a layer of saran wrap for extra protection.
- xvii. Next, I let the petri dishes sit in my room, undisturbed for 7 days, making sure it was warm and dark.
- xviii. Finally, I observed each petri dish to see which dish had the least amount of bacteria grown.



Variables

Independent Variable: Brand of hand sanitizer

Dependent Variable: Amount of bacteria grown

Controlled Variables: Room Temperature, Room Brightness, Petri Dish Type, Amount of Hand Sanitizer Poured, Amount of Bacteria Used

Results

According to my experiment, the Bath and Body Works hand sanitizer killed approximately 20% more bacteria than the Medi Care and Life Brand hand sanitizer. The reason for this is because the ethyl alcohol (which is an effective virus-killer) is 6% more than the Life Brand and 1% more than the Medi Care brand. Bath and Body Works had 71% ethyl alcohol, Medi Care had 70% ethyl alcohol and Life Brand had 65% ethyl alcohol, thus the reason that Bath and Body Works hand sanitizer killed the most bacteria, Medi Care hand sanitizer killed the second most bacteria, and Life Brand hand sanitizer killed the least bacteria.

Conclusion

My hypothesis was that the Medi Care brand would have killed the most bacteria. My results do not support my hypothesis. An interesting future study would be to measure the amount of bacteria killed in the non-scented hand sanitizers of the same brands and then to compare the results between the scented and non-scented.

References

- "How to Grow Bacteria: 5 Experiments to Grow & Test Bacteria." Home Science Tools, Frank Schaner, learning-center.homesciencetools.com/article/bacteria-experiment-guide/.
- "Bacteria Growing Kit." Home Science Tools, Frank Schaner, www.homesciencetools.com/product/bacteria-growing-kit/.