

# What type of cleanser/ disinfectant disinfects/cleans your hands the best?

BY: Harnoor.R

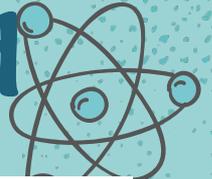


# Introduction

We are going through the global Covid 19 pandemic and here clean hands play an important role to keep infections and viruses away. After considering this importance I have decided to perform this cleansers/ disinfectors comparison experiment. Although some expensive sanitizers and soaps say that it kills 99.9 % of germs but my experiment shows that it leaves behind many of them so our right choice can save money and keep us healthy.



# Types of cleansers/disinfectors used



Liquid Hand Soap



Bar Soap

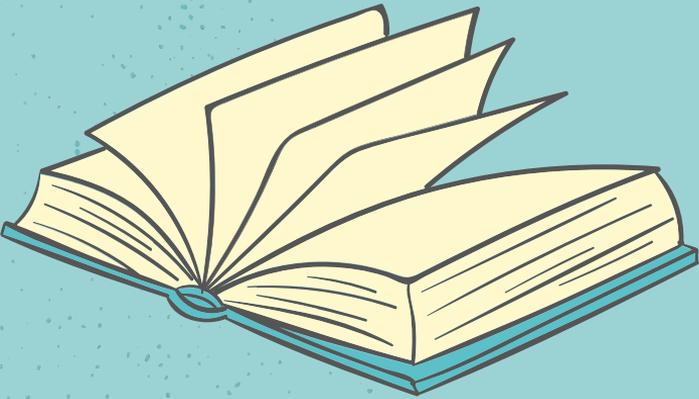


Gel Hand Sanitizer



Liquid Hand Sanitizer

# Hypothesis



I thought liquid hand sanitizer was going to disinfect the best because when you put it on the smell lasts for a long time and after hours when you wash your hands to eat you can sometimes also get the taste of it. Both the smell and the taste is really strong which made me think it would be more effective.

# Variables

**Variables:** Disinfecters, Petri dishes, Amount of lines you make on the petri dish, Amount of colonies.

**Variables to keep the same:** Disinfecters, Amount of lines you make on the petri dish

**Variable to change:** Amount of colonies

# Materials



- Petri dishes
- Nutrient Agar–Agar
- Cotton swabs
- Liquid sanitizer
- Gel sanitizer
- Bar soap
- Liquid soap
- Paper towels
- CFU app
- Mobile phone
- Zipper bag
- Pot for heating agar
- Gas stove



# Procedure

1. Take four petri dishes and label them and their lids.
2. Take a pot and add 8 grams of nutrient agar in 375ml distilled water at room temperature.
3. Stir it well periodically and bring it to a boil.
4. Cool at 50 °C and portion equally into petri dishes
5. Cover immediately and let the agar cool down (for 30 – 40 mins).

## Step 1



Boil Nutrient Agar

## Step 2



Transfer to Petri Dishes

# Procedure (continued)

1. Take the **bar soap** and wash your hands with it and dry with a paper towel (make sure the soap is untouched and so are the paper towels).
2. When hands are properly dried, swab the palm of your hand.
3. Gently roll the swab on the petri dish in a zig-zag pattern.
4. Cover the petri dish with its lid.

Step 1



Wash Hands with Bar Soap

Step 2



Swab the Palm and Roll in Petri Dish

# Procedure (continued)



1. When you are done with the bar soap touch the different surfaces and wash your hands with liquid hand soap.
2. When hands are properly dried, swab the palm of your hand.
3. Gently roll the swab on the petri dish in a zig-zag pattern.
4. Cover the petri dish with its lid.

Step 1



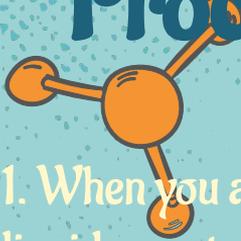
Wash Hands with Liquid Hand Soap

Step 2



Swab the Palm and Roll in Petri Dish

# Procedure (continued)



1. When you are done with the liquid soap touch the different surfaces and squirt the **gel hand sanitizer** on your hands.
2. When hands are properly dried, swab the palm of your hand.
3. Gently roll the swab on the petri dish in a zig-zag pattern.
4. Cover the petri dish with its lid.

Step 1



Clean Hands with Gel Hand Sanitizer

Step 2



Swab the Palm and Roll in Petri Dish

# Procedure (continued)

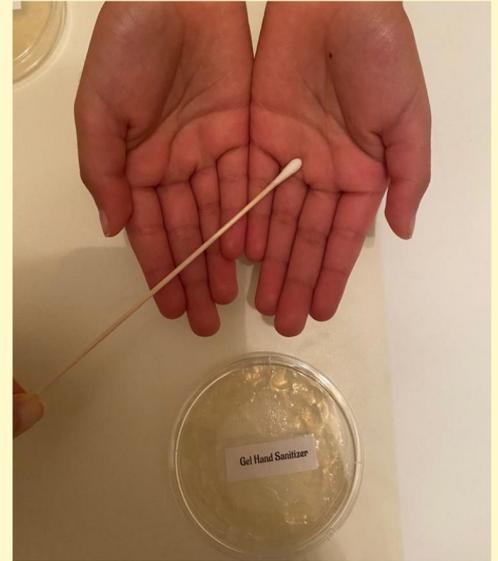
1. When you are done with the gel hand sanitizer touch the different surfaces.
2. Spray the liquid hand sanitizer onto your hands.
3. When hands are properly dried, swab the palm of your hand.
4. Gently roll the swab on the petri dish in a zig-zag pattern.
5. Cover the petri dish with its lid.
6. Keep all the petri dishes in a warm dark place for 5 days.

Step 1



Clean Hands with Liquid Hand Sanitizer

Step 2



Swab the Palm and Roll in Petri Dish

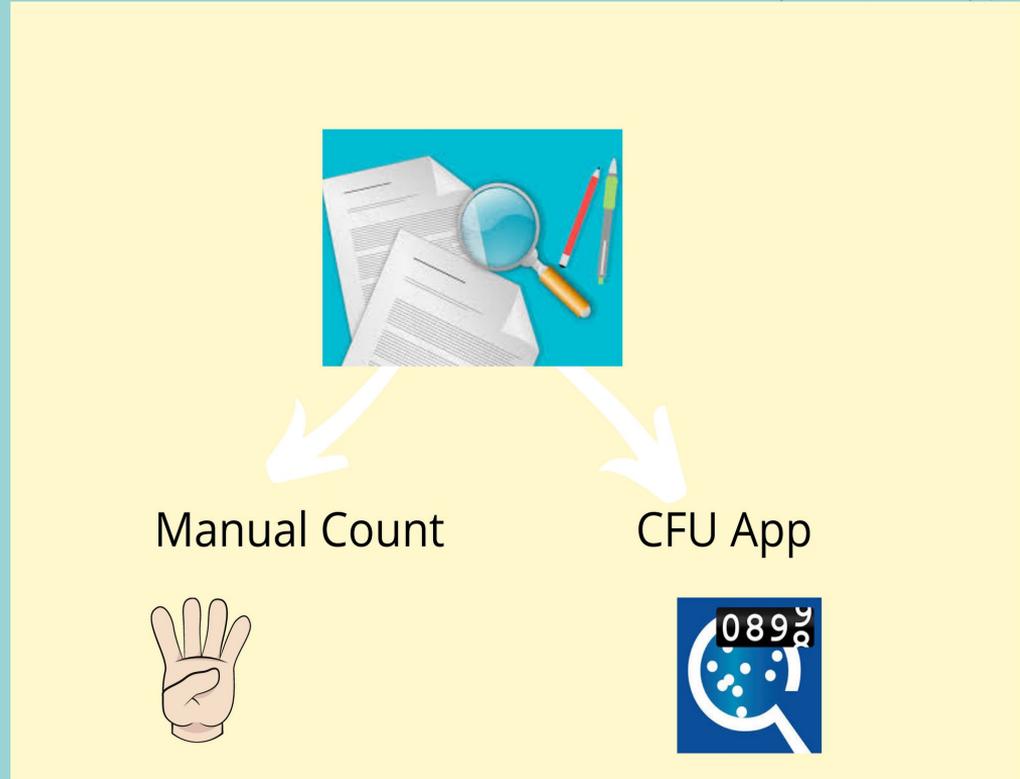
# Observation Methods

## Manual Count

I have counted each dot once as a single colony visible with naked eyes. For merged colonies I have used grid method.

## CFU Count

In CfU App methods I have installed the app on my mobile phone and clicked a picture. Then this app automatically counted the number of bacterial colonies for me but it didn't count the merged and coloured colonies.



# Bar Soap Observation

With manual counting, bar soap has 38 colonies and according to CFU app count it has 5 colonies.

Manual Count



Colonies = 38

CFU App Count



Colonies = 5

# Liquid Hand Sanitizer Observation

With manual count, liquid hand sanitizer has 44 colonies and according to CFU, it has 16 colonies.

## Manual Count



Colonies = 44

## CFU App Count



Colonies = 16

# Gel Hand Sanitizer Observation

With manual count, gel hand sanitizer has 48 colonies and according to CFU, it has 26 colonies.

Manual Count



Colonies = 48

CFU App Count

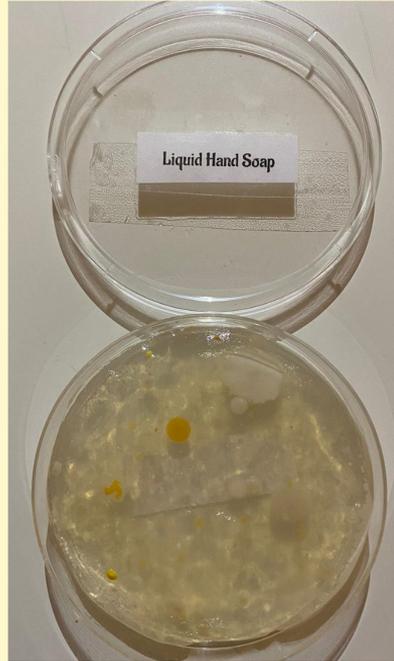


Colonies = 26

# Liquid Hand Soap Observation

With manual count, liquid hand soap has 58 colonies and according to CFU, it has 32 colonies.

Manual Count



Colonies = 58

CFU App Count



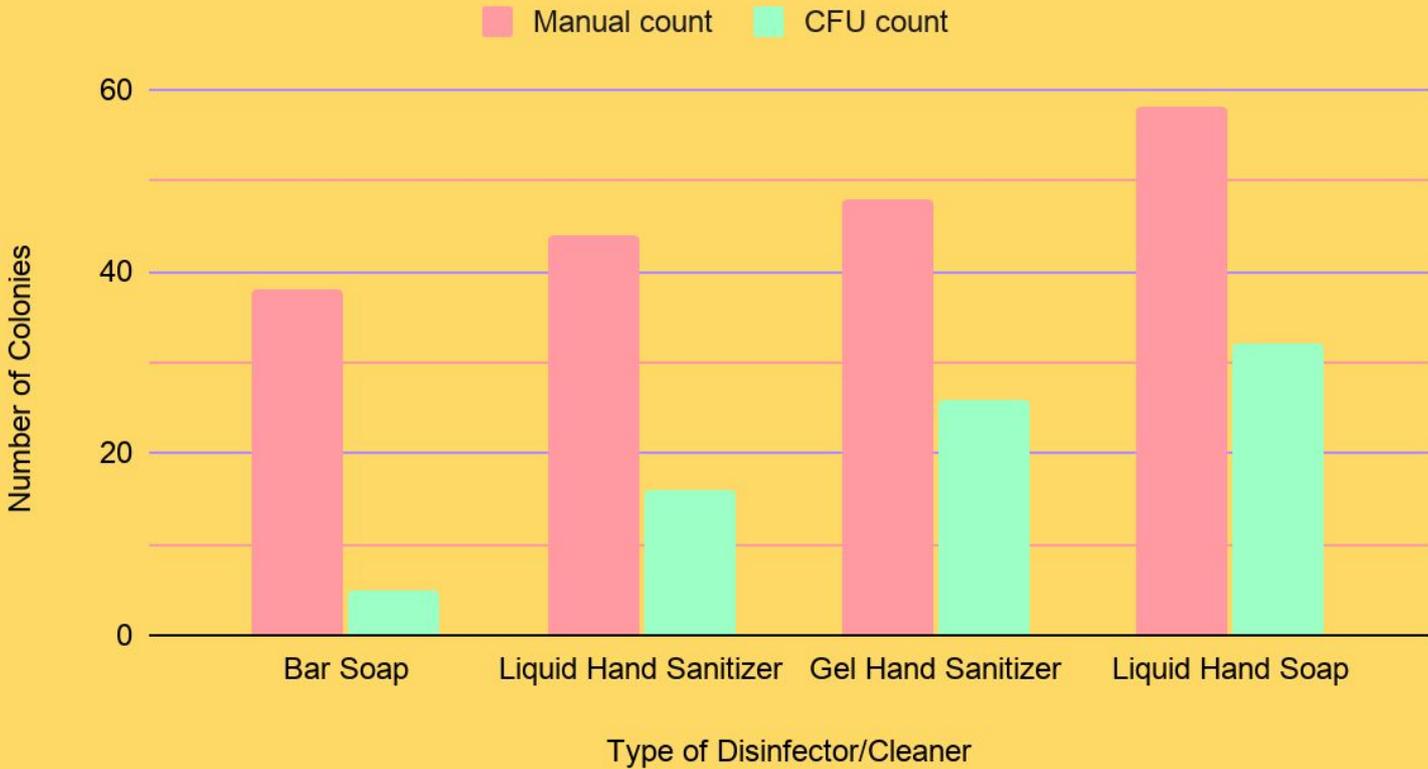
Colonies = 32

# Data

<i>Disinfecters / Cleansers</i>	<i>Manual Count</i>	<i>CFU Count</i>
<b>Bar Soap</b>	<b>38</b>	<b>5</b>
<b>Liquid Hand Sanitizer</b>	<b>44</b>	<b>16</b>
<b>Gel Hand Sanitizer</b>	<b>48</b>	<b>26</b>
<b>Liquid Hand Soap</b>	<b>58</b>	<b>32</b>

# Results

## Comparison of Bacterial Colonies



# Results (continued)

Bar soap is on the first place it has 38 colonies with manual count and with CFU, it has 5 colonies.

In the second place is the liquid hand sanitizer. With manual count, it has 44 colonies and with CFU, it has 16 colonies.

In third place is gel hand sanitizer. With manual count, it has 48 colonies and with CFU, it has 26 colonies.

Last is liquid hand soap. With manual count, it has 58 colonies and with CFU, it has 32 colonies.



# Conclusion

The least bacterial colonies were made in the bar soap petri dish so therefore it is the best disinfectant/cleaner. In conclusion, the bar soap best disinfects your hands.

*Answer to your original question:* The bar soap disinfects/cleans your hands the best.

*Hypothesis correct or incorrect?*

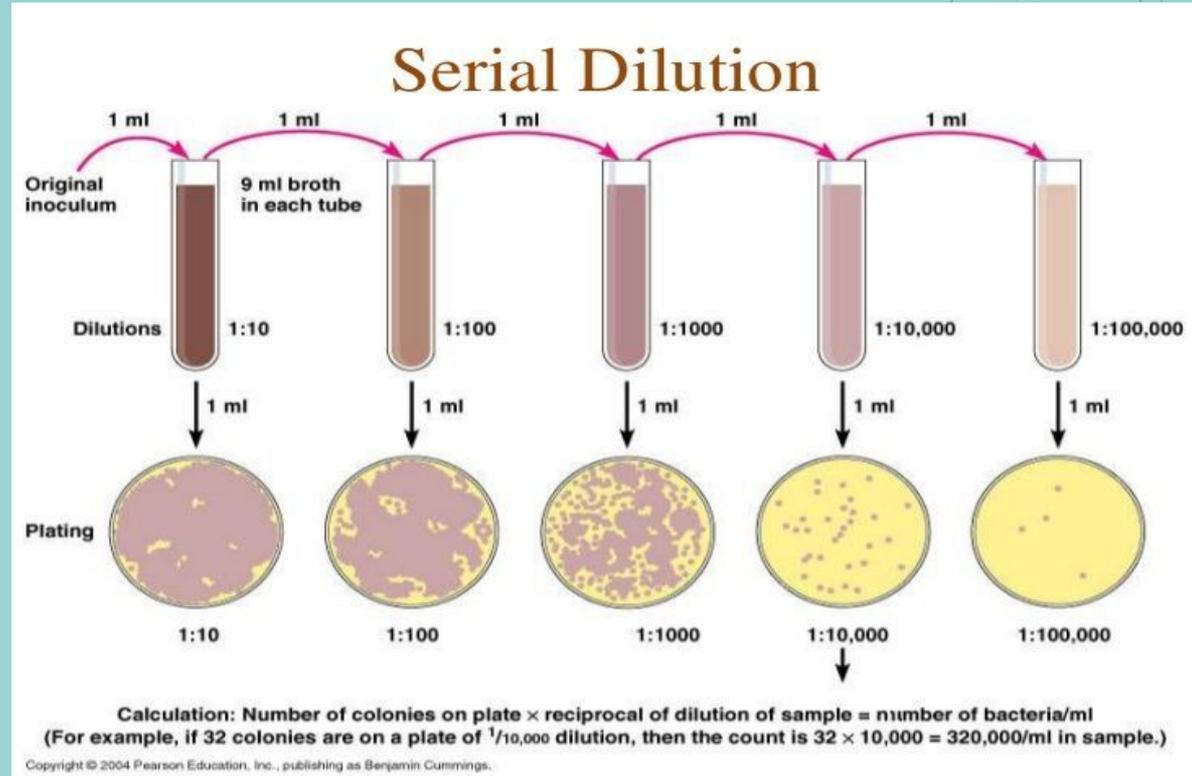
My hypothesis was incorrect because the bar soap petri dish had the least colonies instead of liquid hand sanitizer.

# Sources of Error

Although this experiment went great I did have a little problem counting the merged colonies (unseparated big colonies). That could be the source of error in my experiment.

# Future Experiment

If I get another chance to complete the same experiment then I will use the serial dilution method to count the number of bacteria colonies with more accuracy rather than the manual and CFU method.



# Citations

1. Bacteria growing experiments in petri plates. (n.d.). Retrieved March 14, 2021, from <https://www.sciencecompany.com/Bacteria-Growing-Experiments-in-Petri-Plates.aspx>
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5. Serial dilution. (2014, September 09). [Image]. <https://i.ytimg.com/vi/loyeVv1D-3o/hqdefault.jpg>
6. TheFunsuman. (2014, September 09). Serial dilution. Retrieved March 14, 2021, from <https://www.youtube.com/watch?v=loyeVv1D-3o>

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7. Serial dilution. (2014, September 09). [Image]. <https://i.ytimg.com/vi/loyeVy1D-3o/hqdefault.jpg>

8. TheFunsuman. (2014, September 09). Serial dilution. Retrieved March 14, 2021, from  
<https://www.youtube.com/watch?v=loyeVy1D-3o>