**Which Household Cleaners or Soaps Work Best Against Bacteria?**

**Purpose:**

 This lab activity is to test the effectiveness of various household cleaning products or soaps for their antibacterial ability.

**Procedure:**

1. **Follow the directions for practicing sterile technique.**
2. Divide your plate into four sections with a marker and label them A - D.
3. Obtain a small clean test tube and add about 1cm of dH2O.
4. Flame your inoculator and collect a bacterial colony sample (**NOT** agar).
5. Place the inoculator into the test tube (careful not to touch the sides of the test tube) and mix your bacteria in the water. Flame your inoculator.
6. Carefully swirl the test tube until the bacteria has dissolved. Pour the liquid onto a new clean plate and close the lid.
7. Swirl the liquid until it covers the plate evenly. Use either the plastic inoculator (easier) or the metal one (more challenging) and streak your plate evenly, trying to reach all areas as per the diagram below. Allow the plate to sit a few minutes until water is absorbed.



1. Dispose of your test tube and plastic inoculator as instructed.
2. Collect 4 absorbent paper discs. Each disc will be immersed into a different cleaner or control. Record which cleaner you used in each quadrant in **Table 1**.
3. Pour or squirt a small amount of cleaning product into a clean beaker, then use tongs to immerse the paper disc into the cleaner. You want the disc wet, but not dripping.
4. Place this disc into the center of a quadrant on your dish.
5. Repeat steps 10 - 11 for two more discs in the cleaners of your choice.
6. The last disc will be immersed in distilled water then placed into quadrant D.
7. Tape your plate closed and incubate your plate upside down until next class.
8. Observe your results and measure the diameter of the zone of inhibition (area with no bacterial growth) around each disc.
9. Rank the products in terms of their effectiveness at killing this type of bacteria.

**Results:**

**Figure 1: Labelled Drawing of Bacterial Plate**

|  |  |  |  |
| --- | --- | --- | --- |
| **Quadrant** | **Cleaning Product** | **Zone of Inhibition Diameter (mm)** | **Rank in Antibacterial Effectiveness (1st, 2nd)** |
| **A** |  |  |  |
| **B** |  |  |  |
| **C** |  |  |  |
| **D** |  |  |  |

**Table 1: Effectiveness of Cleaning Products on Bacteria**

**Analysis:**

1. Describe the appearance of your plates after the incubation time. How can you tell if your bacteria were spread evenly or not?
2. What is the purpose of the agar plate?  Could you do this experiment without the agar?  Without the incubator?
3. Which cleaner was most effective against the bacterial growth and how do you know? Does this mean that this cleaning product would work best against all bacteria? Explain.
4. Which cleaning product did the worst job at killing bacteria and how do you know? Did this surprise you? Explain.
5. Which quadrant was your experimental control? Why is it important to the outcome of this experiment?
6. Describe any sources of error in your experiment and how you could improve your results.
7. Some types of bacteria can become resistant to cleaning products and antibiotics. Using what you know about **Natural Selection**, explain how this can happen.