



Effectiveness of Common Household Cleaning Agents
Senior Project

In partial fulfillment of the requirements for
The Esther G. Maynor Honors College
University of North Carolina at Pembroke

By

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Abstract

This research was conducted in compliance with the Maynor Honors College senior project requirement. The research was conducted to answer the question of how effective various cleaning products are compared to each other, and how long each take to completely disinfect the area provided. The products used were Distilled water, Great Value cleaning vinegar, Great Value bleach solution, and Great Value disinfectant spray. The effectivity was tested by way of petri collection using sterile swabs and an incubator set at 37 degrees Celsius. From least effective to most effective the solutions rank: Distilled water, cleaning vinegar, disinfectant spray, bleach solution. The distilled water area became less disinfected the longer the water sat, but it did remove surface dirt. Cleaning vinegar completely disinfected the area at 30 minutes. Disinfectant spray completely disinfected the area at 15 minutes. Bleach solution completely disinfected the area at 15 minutes. This research shows that bleach is the best solution to use for short complete disinfection based on colonies of bacteria.

Effectiveness of Common Household Cleaning Agents

Introduction:

Common household products are used every day with the hopes of providing a clean disinfected environment. How effective are these products compared to each other, and how long does each take to completely disinfect the area provided? For the sake of simplicity, there were 4 solutions: Distilled water, cleaning vinegar, bleach solution, and disinfectant spray. The solutions were tested by petri dish collections of the areas they had been made to clean.

Hypothesis:

At the beginning of this project, I proposed that longer sit time with more potent cleaning agents will be most effective in eliminating bacteria and germs. In essence, I proposed that the bleach solution would be the most effective and the distilled water solution would be the least effective.

Materials:

- Petri dishes (60x)
- Sterile wood petri swabs (120x)
- Distilled water
- Bleach
- Cleaning vinegar
- Disinfectant spray
- Tape
- Permanent marker
- Paper towels

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Methods:

The solution was allowed to sit for various times: 15 seconds, 30 seconds, 1 minute, 5 minutes, 15 minutes, and then finally 30 minutes. An addition sample was collected prior to application of the solution as an added control. Each area was wiped for 30s after the solution finished sitting. The area was wiped even if there was no solution added (except for control). Then, a sample was collected via petri swap for 15 seconds before the sample was added to the petri dish. The petri dishes were incubated at 37 degrees C for 2 days. There were 30 samples taken per replicate. For the sake of more accurate data, 4 replicates were taken making 120 samples total.

Results:

From least effective to most effective the solutions ranked: Distilled water, cleaning vinegar, disinfectant spray, bleach solution

- The distilled water area became less disinfected the longer it sat, but it did remove surface dirt.
- Cleaning vinegar completely disinfected the area at 30 minutes.
- Disinfectant spray completely disinfected the area at 15 minutes.
- Bleach solution completely disinfected the area at 15 minutes.

Time	Distilled Water	Cleaning Vinegar	Bleach Solution	Disinfectant Spray
Prior	13	lawn	lawn	lawn
15 s	0	4	0.5	0
30 s	1	1	0	0.25
1 min	0	0	0	0
5 min	3	1	0.25	0.5
15 min	lawn	1	0	0
30 min	5	0	0	0

The figure above shows the average number of colonies grown between each replicate.

Conclusion:

The research has confirmed my hypothesis. The strongest solutions (bleach and disinfectant spray) were the most effective in eliminating bacteria and germs and distilled water was the least effective. I did not however anticipate that distilled water would cause extra growth of colonies because I had thought it would do nothing. Distilled water works as a supplement to cleaning but is not effective on its own.

References:

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