



Colorado Science and Engineering Fair

2024 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: How Different Substances Effect the Zone of Inhibition of Bacteria

Finalist's Name: Espen Plotkin

School and City: Vail Mountain School, Vail

Sponsor's Name: Brett Falk

Category: Micro & Molecular Biology (MCRO)

Division: Junior (6th - 8th grades)

Abstract (250 words or less):

The purpose of this experiment was to find out what creates the largest zone of inhibition between hand sanitizer, Lysol, mouthwash, granite cleaner, and apple cider vinegar.

In setting up this experiment, I placed two flasks of nutrient agar into a microwave until the agar melted. I then placed a sample of bacteria called B. Cereus into a 30 degree Celsius water bath for ten minutes. Then I poured the sample of B. cereus into both flasks of agar and plated the agar into three different petri dishes. Then, I submerged different colored paper disks into each of the substances, and placed the saturated disks into the petri dishes. I incubated the petri dishes at 30°C for two days. After the two days, I measured the diameter of the zone of inhibition around the paper disks. The zone of inhibition is the diameter in which bacteria will not grow around the disk.

The average diameter in millimeters for Lysol was 2 mm, for granite cleaner it was 1.8 mm, for apple cider vinegar it was 1.6 mm, for hand sanitizer it was 0.9 mm, for mouthwash and my control sterile water, it was 0 mm. This was an extremely interesting experiment and the results were unexpected. The hand sanitizer ended up having one of the smallest zones of inhibition, and apple vinegar had one of the largest zones of inhibition. I thought hand sanitizer would have the largest and apple vinegar would have the smallest.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature:

Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.