



## Colorado Science and Engineering Fair

## 2025 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: Battling Biofilms: Understanding Bacterial Resistance

Finalist's Name: Arriya Haney

School and City: Challenge School, Aurora

Sponsor's Name: John Wiley

Category: Micro & Molecular Biology

Division: Junior (grades 6 - 8)

Abstract (250 words or less):

Biofilms form when waterborne bacteria latch onto a surface, and create an extracellular polymeric substance (EPS), in which antibiotics and cleaning agents typically cannot break through to kill the bacteria. In this experiment, the objective was to determine what cleaning agent could be used to most effectively remove biofilms. To test this, I began by forming these bacterial biofilms, which I then transferred to agar plates. I used assay disks, which I soaked in the cleaning agent I was testing and placed it on the plates. After two days of incubation, I measured the inhibition zone, which is how I measured the effectiveness of different cleaning agents. It was found that tea tree oil solution was the most effective in removal, as it had the largest inhibition zone. Lemon juice and hydrogen peroxide were close followers. I believe these results are logical, as these highest performers had the ability to kill bacteria, as well as disrupt the EPS matrix. This did not support my hypothesis of isopropyl alcohol being the most effective, as it had one of the smallest inhibition zones; in short, it was extremely ineffective.

*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.**