



CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s) Elizabeth A. Thacker	Project Number J2020
Project Title Effectiveness of Hand Drying Products Utilizing Silver Ion Antimicrobial Fabric Technology in Reducing Bacteria	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Not drying hands thoroughly after washing may reduce the benefits of handwashing. According to researchers at the CDC and Mayo Clinic, drying hands is equally as important as washing hands and is often overlooked in disease prevention. When I noticed students at school wiping their hands on their pants when paper towel dispensers were empty, I was inspired to invent the reusable HandyDRYGlove using fabric with antimicrobial silver ion technology. The objective of my project was to test the effectiveness of using this glove for removing more bacteria and moisture from hands compared to commercial hand drying products.</p> <p>Methods/Materials I inoculated and analyzed 73 agar plates to evaluate the effectiveness of hand drying products on bacterial reduction. I washed my hands over 300 times and dried them using three different products: HandyDryGlove, paper towels, electric hand dryer and not drying (the control). After each test, I measured degree of hand wetness with a moisture meter and visually assessed hand condition on a scale from 1 to 5. I inoculated MacConkey and LB agar plates with three fingers and incubated them at 37 degrees C for 72 hours. I photographed and analyzed results. I also sent 10 plates to a lab for DNA gel electrophoresis bacterial strain identification.</p> <p>Results The results showed that bacteria remained on hands after drying for all products. Bacterial colony numbers increased progressively with hand wetness level after drying. The glove reduced the average CFU plate coverage to 5% compared to 22% for paper towels, 29% for hand dryers, and over 50% plate coverage with no drying. Hand moisture meter readings were DRY for the glove compared to MOIST for all other hand drying products. Bacteria was also found on unused paper towels and not on gloves.</p> <p>Conclusions/Discussion The glove was significantly more effective at reducing bacteria, moisture and providing a cleaner drying surface compared to other products. Using the right drying product after washing is an important factor in limiting the spread of disease. I recommend that people finish the job of washing hands by drying hands with a silver ion antimicrobial fabric glove, but any drying method is better than leaving hands wet. Future testing could include towels made from cotton, bamboo, and polyester blends. The practical application of an antimicrobial fabric hand drying product used everyday by consumers may improve public health.</p>	
Summary Statement I created a reusable hand drying glove using silver ion antimicrobial fabric and showed that it was more effective at reducing bacteria and moisture on hands when compared to commercial hand drying products: paper towels and air hand dryers	
Help Received I researched fabric, designed glove, wrote procedures, performed experiments and analyzed results myself. I thank Dr. S. Culler for talking with me about science, providing agar plates, incubator space, and DNA gel electrophoresis results for 10 of the 73 plates. I also thank my science teacher for her guidance	