CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
J1327

Project Title
Hand Washing: A Thing of the Past?

Abstract

Objectives/Goals
The Center for Disease Control has recently published new guidelines for hand hygiene in health-care settings. The guidelines recommend using alcohol-based products as an alternative to traditional soap and water. Alcohol-based products have been shown to be much more effective in their antimicrobial activity and also much more time-efficient than ordinary hand washing. This project evaluates the effectiveness of several hand cleansers.

Methods/Materials
Seven trials were conducted, each with the same 24 subjects. Unwashed hands were swabbed for the control trial. Then students washed their hands according to the protocol with ordinary liquid soap. Their hands were again swabbed, and the swabs placed in sterile transporters. On another test day, the students' hands were washed according to the hand washing protocol, but this time with anti-bacterial soap. In the next trial, the test students followed the hand cleansing protocol for the alcohol-based gel. Another control test was repeated with 12 students, and then a test of another brand of antibacterial soap. A second control test was repeated, and then again a test of the alcohol based gel. The first antibacterial soap alone was also plated to assess whether or not the soap itself was contaminated.

Results
The unwashed hands(the control) plates had an average colony count of 60. Surprisingly the antibacterial soap plates also produced an average of 60 colonies per plate. The anti-bacterial soap was plated alone, but grew no colonies, and so the soap itself was not contaminated. The ordinary liquid soap plates yielded an average of 48 colonies per plate. The alcohol-based gel plates grew only very few bacterial colonies compared to the others. The alcohol-based gel plates produced an average of only four colonies per plate.

Conclusions/Discussion
According to the results, the antibacterial soap was not effective in removing bacteria from the hands. The ordinary liquid soap was more effective in reducing colony counts. The alcohol gel (with humectants to prevent dry skin) was by far the most effective in eliminating bacteria. Based upon my results, it appears that alcohol-based products should be introduced into daily hand hygiene routines to reduce the spread of transient bacteria. I plan to test the effectiveness of antibacterial soap on those who do not normally use antibacterial soap to evaluate whether or not resistance develops.

Summary Statement
This experiment compares the effectiveness of ordinary liquid soap, antibacterial soap, and the new alcohol-based gels (with humectants) in removing bacteria from the hands.

Help Received
Used lab equipment at Tri-City Medical Center under the supervision of Dr. Paveglio and the Microbiology Director.