



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

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Project Title The Antiseptic Power of Vinegar	
Objectives/Goals My objective is to see if certain three different genera of bacteria will react in a different manner to different types of vinegars. A few of them are Red Wine vinegar, Distilled white vinegar, Garlic wine vinegar, and Apple cider vinegar. My main goal is to find out which vinegar has the strongest antiseptic power.	
Abstract Methods/Materials Materials: -Distilled white vinegar-Apple cider vinegar-Garlic wine vinegar-Red wine vinegar-Bacteria: Escherichia coli, Bacillus cereus, Staphylococcus epidermidis -Other: Nutrient agar, nutrient broth, Petri dishes, blank discs (all completely sterile), forceps, an inoculating loop, a Bunsen burner, a few paper cups, a hot plate, an incubator, a few sterile pipettes, a permanent pen, and a ruler (with centimeters)-as all test are measured in centimeters. Method: First, I subcultured each bacterium separately in nutrient broth. I incubated these for 48 hours at a temperature of 37°C. Next, I pipetted 0.3 ml of each culture of the bacteria onto four Petri dishes and swirled it around with nutrient agar. Then, I soaked twelve blank discs in each type of vinegar and put the soaked discs on two layers of paper towel to absorb the excess liquid. I then put the discs onto each section of the agar and tapped the discs a bit. I incubated all 12 plates in an inverted position for 48 hours at a temperature of 37°C. After 48 hours had elapsed, I measured the diameter of each inhibition zone in centimeters and recorded it. Using the statistical analysis- #The Analysis of Variance# and the #Least Significant Difference# (LSD), I got the results to determine which parameters there were significant differences.	
Results In the course of the experiment, I learned a lot about three types of bacteria and about how they react to different types of vinegars. The different types of bacteria react differently to different types of vinegar. I found that Garlic Wine vinegar works best against most of the bacteria, Apple Cider vinegar works best against B. cereus, and that Red Wine vinegar works best against S. epidermidis.	
Conclusions/Discussion As expected, any type of vinegar inhibits the bacterial growth. In my experiment, I tried to bring out any special advantages of using complex vinegars like Garlic Wine vinegar or Apple Cider vinegar as opposed to using Distilled White vinegar. Using the Analysis of variance, I found that the different bacteria react differently to different types of vinegar.	
Summary Statement This project explores the power of four different types of vinegar (white distilled, apple cider, red wine and garlic wine) against three genera of bacteria (E. coli, B. cereus, and, S. epidermidis).	
Help Received My advisor helped me get materials and execute this experiment in the proper way without going wrong. My parents also helped by encouraging me to do science fair this year.	