



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> Calvin Wu	<b>Project Number</b> <b>S1433</b>
<b>Project Title</b> <b>Analyzing the Ability of Vinegar to Inhibit Bacterial Growth at Different Acid Levels</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of my experiment is to determine how well vinegar inhibits bacterial growth at different acid levels.</p> <p><b>Methods/Materials</b> The main materials in this experiment are: vinegar solutions, E.Coli,acetic acid,water,sterile filter paper, agar plate. I took all of the vinegar solutions and adjusted the pH to 2.6 and 3.4 by adding more acetic acid or distilled water to the vinegar solution because acetic acid is the main base in vinegar. Then I used an inoculating lupe to streak a bacterial lawn. After that I soaked four hole punched filters into a vinegar solution and placed it on the agar. Then I repeated the process for the other vinegar solution at the other pH. After that I allowed the bacteria to grow for five days. Then in the control ,using the same method, I adjusted acetic acid to pH2.6, and pH3.4. Then I repeated the process of growing bacteria but this time I only put one filter soaked with the solution on the agar. After that I repeat the control test five times each. After that I took the results and statistically analyze them, using the T-Test, to determine whether there was another variable besides the pH that effected the reaction, for the control.</p> <p><b>Results</b> The results of my investigation showed that most of the vinegar solutions inhibit bacterial growth better when it is more acidic. About 71.4% of the vinegar solutions showed that it inhibits bacterial growth better when it is more acidic with significance after the T-test, while only 14.3 % of the vinegar solutions showed significance when it inhibited bacterial growth better when it was less acidic. What happen was that there was one vinegar solution that inhibited bacterial growth better when it was less acidic. However, the T-Test showed that the result was caused by chance which. Then when I compared the vinegar solutions to the control group through the T-Test, 57.14% of the vinegar solutions showed significance. This means that there is another variable besides the pH that caused teh reaction. However, the variable showed up more often in the more acidic solutions.</p> <p><b>Conclusions/Discussion</b> In conclusion, most of the vinegar solutions inhibited bacterial growth better when it is more acidic then when it was less acidic. However there is another variable in the vinegar solution that caused the reaction.</p>	
<b>Summary Statement</b> The purpose of my experiment is to determine how well vinegar inhibits bacterial growth at different acid levels.	
<b>Help Received</b> Used lab equipment at Sanger High School under supervision of Mr. Whittington, Dad help take pictures	