



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

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Project Title Vinegar Rain: How Do Different Concentrations of Acetic Acid Affect the Development of Radish Plants?	
Abstract Objectives/Goals The goal is to determine if greater concentrations of vinegar lead to declining health in radish plants (<i>Raphanus sativus</i>). Methods/Materials Each of the three group members purchased plastic pots, radish seeds, potting soil, and a supply of vinegar. Simple lab equipment consisted of rulers, beakers, and measuring cups. The more "high-tech" items comprised of a postal scale (to measure the initial mass of soil), and 3 Rapitest soil pH meters. The project consisted of 3 different experiments that each group member performed. There were 75 radishes in total, with 25 plants per experiment. In each experiment, radishes were split into 5 groups of 5. Each radish was watered 20mL daily. The Control Group received only tap water. For Group 2, a solution of 10% vinegar was substituted for water at specific times. For Group 3, the solution was 20% vinegar, Group 4 30%, and Group 5 40%. In the first experiment, the experimental plants were "watered" with the acidic solutions daily; in the second experiment, every three days; in the third, every week. Observations were recorded for each plant daily. Each experiment was terminated at 22 days. Results Despite the different watering schedules, the results were consistent throughout all three experiments: the lower the concentration of vinegar, the longer the plants lived. Plants that received a treatment of vinegar also halted in growth. Symptoms such as constricted stems, discolored leaves, and shriveled leaves appeared. Conclusions/Discussion Higher concentrations of vinegar inversely affected the plant's health. Although the chemical properties of vinegar and acid rain are markedly different, observations from this project gives us insight into the effects of acid rain on crops.	
Summary Statement To learn about how acids affect plants, we recorded the effects of vinegar on radish development.	
Help Received Consulted biology teacher Dr. Jang and chemistry teacher Mr. Cameron; advice from Ralph Salier-Hellendag at AllExperts.com; Fanny's father helped gather supplies; siblings helped observe and record data; Stephanie's mother helped with board layout and design; biology teacher Ms. Traeger	