



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Bisma N. Khwaja</b>	<b>Project Number</b> <b>J1916</b>
<b>Project Title</b> <b>Grow For It! Soil vs. Hydroponics and the Effect of Vitamin B1 on the Growth of Cherry Tomato Plants</b>	
<b>Objectives/Goals</b> My main objective is to compare the growth rates of cherry tomato plants in soil and hydroponic media. I will also explore the effect of vitamin B1 on plant growth. I hypothesize that hydroponic methods will result in greater growth rate and B1 will benefit plant growth over time.	
<b>Abstract</b> <b>Methods/Materials</b> I used: 6 cherry tomato plants, 6 containers, coco, rockwool, soil, tray for containers, 40-watt fluorescent lights, Grow Nutrient, B1 Vitamin, and Hydroponics pH Control Kit. I also used stakes, twist ties, beaker, bucket, dropper, measuring tape, timer, notebook, pencil, apron, gloves, goggles, and water. I studied the growth of 6 cherry tomato plants in coco, rockwool, and soil over a period of 64 days. The plants were grown indoors, under controlled fluorescent lighting. My variables were the media used and the addition of vitamin B1. Three plant media received B1 as part of the nutrient solution. The other three plants did not receive B1. Each nutrient solution was maintained at a constant pH. Plants were measured, and data was recorded, graphed and analyzed daily for trends or changes.	
<b>Results</b> The rockwool results support my hypothesis that plants grown in hydroponic media have the greatest growth rate (0.69 in/day). Coco (0.42 in/day) was the only media that had a higher growth rate with vitamin B1 (0.65 in/day). Soil (0.65 in/day) had almost the same growth rate as soil with B1 (0.64 in/day).	
<b>Conclusions/Discussion</b> As I hypothesized, plants grew faster in hydroponic media than soil. Rockwool had the greatest growth rate. The addition of B1 did not initially benefit growth, but began to show results with more data over time. Some sources of error could be stem breakage, genetic variation, and plant shock. I conclude several real world benefits for domestic and industrial use of hydroponics. My indoor plants grew in the absence of weeds and pests, nutrient levels were controlled, plants grew closer together, and samples grew quickly with fluorescent lighting. Also, rockwool absorbed the most water and eventually outperformed soil. As a result, water was conserved over time, indicating that hydroponics has the potential to resolve water shortage concerns. As a next step, I will test how hydroponics affects the flavor of tomatoes. I am curious whether the taste, texture, or color of fruit is depend on the medium used. Since there is no need for pesticides, I believe my crops will be healthier and firmer.	
<b>Summary Statement</b> My project is about soil versus hydroponics and the effect of vitamin B1 on the growth rate of cherry tomato plants.	
<b>Help Received</b> I interviewed an employee from Orange County Hydroponics, who donated materials for my project. My father lowered the artificial lighting for my plants and allowed me space in his garage. My mother drove me to the library, hydroponics store, and hardware stores so I could gather information.	