



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

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Project Title Plant Protein: Blue Light vs. Sunlight	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals We observe the effects of different color lighting, specifically blue light, on the protein levels in vegetables. After extracting proteins from the dried, ground leaf samples, I purified the proteins using a column chromatography technique. To determine the concentrations of proteins in each of the fractions, I used a spectrophotometer to measure the optical absorbance at 280nm. The tomato plant exposed to blue light contained more protein in it than the tomato plant exposed to sunlight.</p> <p>Methods/Materials I purchased tomato plants and separated them into two different containers. Both groups received equal amounts of water. I left each of these groups in their appropriate light source for about 30 days because I assumed it was enough time for the plants to fully absorb their light's energy and give accurate results. After 30 days, I picked the leaves from both tomato plant groups. We dried the leaves so that I could grind them down to powder. Then I took out two mortars and pestles to turn the leaves into powder. Then I put the individual samples into their own microcentrifuge tube. The next step was to add extraction buffer. Then I prepared my vertical gel. With the remaining samples from the tubes I used to collect from the columns, I used the spectrometer to note the absorbance levels of the proteins. I measured the absorbance for all 24 tubes and recorded the results and created a graph.</p> <p>Results My results show that the plants exposed to blue light did in fact produce higher levels of protein. I made a vertical gel but there was a significant error. Fortunately the spectrometer was able to verify that there were proteins in those tubes. The first thing I noticed was the color difference; the leaves under blue light had a darker green pigment than the leaves under sunlight. The leaves exposed to blue light had a darker pigment than the leaves that were in sunlight.</p> <p>Conclusions/Discussion Overall, this experiment was successful and gave me the results I was looking for. Now that I have learned color alters the natural state of plants, I have become more curious as to what effect blue light will have on red roses for example. I learned that the color of light increases pigment production and that it can help plants to produce higher levels of protein. I conclude that if one wants more protein in their vegetables, they should grow them under blue light.</p>	
Summary Statement The effects of blue light and natural sunlight on plants to see which develops more proteins,	
Help Received	