



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> <b>Marlene I. Uriostegui</b>	<b>Project Number</b> <b>S2021</b>
<b>Project Title</b> <b>The Effect of Household Chemicals on Swiss Chard Plants</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My objective was to learn if watering plants by using household chemicals such as windex, pine-sol, and bleach, would affect the development of the plants as well as their chlorophyll levels. <b>Methods/Materials</b> The method that I approached towards doing this experiment was using twelve Swiss Chard plants and I then separated them into groups of four. Each group was watered with a different household chemical and the control group was a group that was watered only with water. Eight trials were taken in total, for a total amount of four weeks. During each trial, the area of the leaves was measured and I used graph paper to do this. During these trials, I also measured the height of each plant. In four of these eight trials, I measured the absorbance level of leaves of each of the plants by using a spectrophotometer. After I found the absorbance level of the leaves I blended, I used the equation of Lichtentaler and Wellburn which helped me find the chlorophyll level in the leaves of the plant that I was testing. After gathering all data, I compared the effects of each plant that was watered with a certain household chemical to all the other plants. <b>Results</b> After the eight trials, there was a significant change not only to the appearance of each of the plants but also to the chlorophyll levels within the plants. Out of all the three groups of plants that were being watered with the household chemical, there was not a significant change to the group of plants that was being watered with Windex because Windex contains ammonia. <b>Conclusions/Discussion</b> The results and all the data gathered, proved that my hypothesis was correct. The group of plants that had a least effect overall were the group of plants that were watered with Windex. These plants suffered the least because Windex contains ammonia and nitrogen is also found in ammonia. This group of plant didn't have a dramatic loss of chlorophyll as opposed to the other group of plants because, nitrogen is a major component of chlorophyll, the compound by which plants use energy from the sun to produce their own sugars which leads to their production of stems, leaves, and fruits of every plant. This information proves that plants that may be polluted with household chemicals due to the owner's carelessness, will suffer and undergo a dramatic change that may even cause the death of any plant.	
<b>Summary Statement</b> My project was about how certain household chemicals can affect the growth, chlorophyll levels, and leaf development of Swiss Chard plants.	
<b>Help Received</b> Parents helped me gather materials; parents also took me to stores and bought the materials I needed to use; my chemistry teacher allowed me to stay in her class after school in order to use the spectrophotometer	