



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Sara K. Davis	Project Number J1011
Project Title Garden Science: Wonders of Plant Juices	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The main purpose of my science project was to see if juices from plants native to Humboldt County, when used as base materials in Graetzel photovoltaic solar cells, could generate electrical power.</p> <p>Methods/Materials I made several Graetzel solar cells using a number of simple items, chemicals, and filtered juices from flowers and berries. Next I conducted a series of experiments using artificial light. After I learned that only two of the four plant juice-based solar cells generated measurable electricity with artificial light, I conducted separate experiments using only dark red flower petal juice-based solar cells exposed to artificial light, and then to sunlight. Then I did experiments using 4-5 solar cells in a series to see if more electricity was generated compared to a single solar cell.</p> <p>Results I discovered that single solar cells based on darker colored plant juices under artificial light generated 10-20 times more electricity than single Graetzel cells using lighter colored plant juices, and 4-5 times more electricity under sunlight. Also, I learned that single solar cells based on dark red petal juice produced slightly more electrical energy than single photovoltaic cells based on blackberry juice. Then with further experimentation using only dark red petal juice-based solar cells, I discovered that 4-5 solar cells connected in series, and under artificial light, generated 2-3 times more electricity than a single solar cell, and 7-29% more power under sunlight.</p> <p>Conclusions/Discussion From my project experiments I found out that berry and /or flower petal juices can be used in simple photovoltaic cells to generate electricity; that more electricity is generated from solar cells using juices of darker pigmented plants than from Graetzel cells using lighter colored ones; that photovoltaic cells using juice from dark-pigmented flower petals generated slightly more electricity than solar cells using juice from dark-colored berries; that sunlight as a light source resulted in more electrical power generation in a Graetzel solar cell than artificial light; and that solar cells operating in a series generated more electricity than individual solar cells. The results of my experiments showed me that electricity can be reliably and cheaply generated by use of simple, inexpensive photovoltaic cells using a combination of relatively cheap materials, including very abundant plant juices.</p>	
Summary Statement Solar generation of electricity from simple photovoltaic (Graetzel) solar cells using plant juices.	
Help Received Father proofread logbook; Mother supervised experiments and helped construct backboard.	