



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> Noah N. Alderson	<b>Project Number</b> <b>S1501</b>
<b>Project Title</b> <b>Microbial Fuel Cell and the Effects that Different Substrates Have on Electrical Output</b>	
<b>Objectives/Goals</b> This experiment is based upon the premise that, bacteria, if in an anaerobic environment, can create a small electrical charge that is somewhat insignificant. However, if different solutions are used as nutrients for the bacteria to feed on then the electrical charge will either decrease or increase. This experiment intends to prove that a corn-syrup based solution will produce a higher amount of electricity than the controlled sugar-and-paper mix. The economic aspects of this experiment will be a factor, as this experiment is also purposed to prove that a successful microbial fuel cell can be created using obtainable items.	
<b>Abstract</b> This experiment is based upon the premise that, bacteria, if in an anaerobic environment, can create a small electrical charge that is somewhat insignificant. However, if different solutions are used as nutrients for the bacteria to feed on then the electrical charge will either decrease or increase. This experiment intends to prove that a corn-syrup based solution will produce a higher amount of electricity than the controlled sugar-and-paper mix. The economic aspects of this experiment will be a factor, as this experiment is also purposed to prove that a successful microbial fuel cell can be created using obtainable items.	
<b>Methods/Materials</b> Compression fitting, Acrylic storage containers , Adhesive, like acrylic cement, Aluminum foil, Nickel epoxy or other conductive epoxy, Digital multi-meter with leads, Petri dish, Agar, Fruit Juice, Corn Syrup, Table Sugar, Aquarium air pump with tubing, Resistors 220-ohm.	
<b>Results</b> The substrate with the high amount of sugar produced the most electricity. The controlled substrate produced an average amount of electricity, given that it would not produce a large amount. The fruit juice substrate performed, but only generated a miniscule amount of electricity. The corn syrup substrate destroyed its equipment and was unable to be used.	
<b>Conclusions/Discussion</b> The hypothesis aligned with the results, however, only in the results of the high sugar substrate, with the others falling subpar (beneath the control). The results, though disappointing (as in the case with the corn syrup), can be accepted because this experiment tested the feasibility of using such substrates, so these superficially failed substrates still fulfilled their purpose by proving that they cannot work.	
<b>Summary Statement</b> This project tested the plausibility of using different substrates in a microbial fuel cell to increase electrical output to a practical level.	
<b>Help Received</b> Mother helped strip wires.	