



**CALIFORNIA STATE SCIENCE FAIR  
2008 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jason Lin; Daniel Nguyen</b>	<b>Project Number</b> <b>S0910</b>
<b>Project Title</b> <b>An Ethanol World Economy? A Comparison of the Financial Viability of Ethanol Production from Grass vs. Woodchips</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this experiment was to produce ethanol from green garbage, in this case, grass and wood and calculate the amount of ethanol yield from each substrate, otherwise known as biomass. After the amount of ethanol yield was calculated, prices were estimated to compare with present day gasoline cost to see if using ethanol would be more inexpensive and environmentally efficient. If ethanol can be produced from garbage containing cellulose, then the U.S. can stop importing fuel, stop using petroleum and fossil fuels as a main source of fuel, and start using biofuels such as ethanol as a new source of recyclable fuel.</p> <p><b>Methods/Materials</b> In this experiment, grass and wood were the variables as their sugar content (glucan and xylose are main sugars) is unknown. Wheat straw and sugar bagasse were the constants as they were used as the standard reference materials (SRS) and their sugar content is known. The standard reference materials were developed by the National Institute of Standards and Technology. After the completion of the hydrolysis, drying, filtering, gathering weight data, and neutralization of each substrate, the samples were analyzed by a HPLC system, which analyzes the sugar content in each sample. Grass and wood could be compared against wheat straw and sugar bagasse.</p> <p><b>Results</b> Carbohydrates such as glucan, xylan, arabinose, and cellulose are the main sugars in grass and wood. Grass and wood can be produced into ethanol through many steps. The hypothesis for this experiment was both correct and incorrect. Because garbage with carbohydrates, especially sugars, can be produced into ethanol, the U.S. has the choice of stopping importing fuels from foreign countries and become independent on terms of fuel however, although ethanol can be used as a new source of fuel, there must also be ways to advertise and to convince the community to use ethanol fuel instead of gasoline.</p> <p><b>Conclusions/Discussion</b> If this experiment were to be done again in the future, the start of the experiment would be sooner in the year because of the lengthy time it takes for each step in producing ethanol; also, have more of each sample to have a better average when collecting data in case some are inadequate; in addition, other substrates such as cardboard, paper, and other waste materials could be used.</p>	
<b>Summary Statement</b> We compared the pros and cons between ethanol and petroleum fuels and the amounts of sugars yielded by grass and wood.	
<b>Help Received</b> Used Lab Equipment At UCR Bournes College of Engineering under supervision of graduate Vu Nguyen working for Bin Yang.	