



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Nicole Marjes; Nicole Sumait	Project Number J0516
Project Title Trash to Glucose for Ethanol Production	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine which cellulosic waste material contains the most glucose which could be converted into ethanol.</p> <p>Methods/Materials Samples of rice straw, cardboard, newspaper and yard clippings were mixed with sulfuric acid and incubated in a hot water bath. After 5, 15 and 30 minutes of incubation, samples were tested for glucose content using a Chemstrip PbG strip(quantitative strip used by diabetics to detect blood glucose levels). The color change on the strip was compared to the color chart. Corresponding glucose levels were read and recorded. Test trials for all waste materials were done a total of five times to show repeated results.</p> <p>Results Repeated experiments showed all materials tested contained glucose with rice straw samples containing the most glucose at an average of 180 mg/dL. It was also observed that rates of conversion of the cellulose to glucose differed amongst the various waste materials with rice straw conversion occurring sooner than the other materials.</p> <p>Conclusions/Discussion The experiment showed that through acid hydrolysis, cellulose in waste materials can be converted to glucose that could then be used to produce ethanol, a renewable fuel alternative to gasoline. Rice straw samples produced the most glucose. If more time was available, future research could study the optimum conditions under which peak glucose values for the other waste materials could be achieved at a faster rate. Also follow-on research could take the glucose produced and convert it to ethanol. While ethanol is now produced from food products like corn, the ability to use waste materials typically disposed of in landfills or burned to produce renewable fuels would have significant benefits to our environment and society.</p>	
Summary Statement Using acid to break down cellulose to produce glucose, the project determined which waste material contain the most glucose that could be used to produce ethanol.	
Help Received Susan Rizk, Science Teacher, for support and direction. Nicole Sumait's mom for guidance and purchase of materials required. Arkenol, Inc. for use of various literatures for research on acid hydrolysis and ethanol production.	