



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

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Project Title Effect of Nutrient Additives on Ethanol Production by Saccharomyces cerevisiae	
Objectives/Goals Ethanol is used as a source of alternative fuel for automobiles in different parts of the world. The common baker's yeast, <i>Saccharomyces cerevisiae</i> , was utilized in experiments to determine significance in ethanol production when fermented with differing sugar cane molasses concentrations (12.5%, 25%, 50%, and 100%), differing time intervals (24 hours, 48 hours, and 72 hours), and differing nutrient additives. The specific gravity of each liquid was measured at the designated time intervals and recorded. The closer the specific gravity measurement reached 0.792 (the specific gravity of pure ethanol), the more one can conclude ethanol production. Statistical analysis shows compliance with the proposed hypotheses.	
Abstract Methods/Materials 1. Prepare a .7% yeast stock solution of .7g yeast per 100mL distilled water by thoroughly mixing the yeast in distilled water. 2. Prepare by serial dilution, a series of molasses concentrations from high to low. Flask 1: Pour 100mL of sugar cane molasses into flask 1 Flask 2: Measure 100mL of sugar cane molasses and pour it into flask 2. Measure 100mL of distilled water and pour it into flask 2 as well. Mix. Next, pour 100mL of the final solution into flask 3. Flask 3: Measure 100mL of distilled water and pour it into flask 3. Flask 3 should already contain 100mL of the molasses concentration from flask 2. Next, pour 100mL of the final solution into flask 4. Flask 4: Repeat flask 3 instruction. Pour 100mL of the final solution into an empty beaker or simply dispose. 3. Pour the contents in flask 1 into the PVC tube. Gently place the hydrometer in. Record the reading. Repeat this step 5 for all 4 flasks. 4. Using a 10mL pipette, add 10mL of yeast stock solution to each of the flasks. 5. Add .2g of used nutrient to each flask. 6. Allow fermentation for 24, 48, and 72 hours. Repeat step 5 at each time interval 7. Repeat steps 1 through 8 nine additional times 8. Repeat steps 1 through 9 for each of the yeast nutrients	
Conclusions/Discussion Collected data was analyzed by t Tests. The addition of yeast nutrients to <i>Saccharomyces cerevisiae</i> showed greater ethanol production as opposed to the exclusion of the supplements and t Tests showed successful ethanol yield in higher concentrations of molasses and longer periods of fermentation. This information suggests optimal conditions that could help to produce a substantial ethanol collection, which	
Summary Statement Ethanol has the ability to be used as an alternative fuel source, therefore the fermentation of <i>Saccharomyces cerevisiae</i> under optimal conditions and nutrient additives were researched.	
Help Received Friend helped research for the location of sugar cane molasses and where it was available for purchase	