



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Frankie Johnson</b>	<b>Project Number</b> <b>J1717</b>
<b>Project Title</b> <b>The Effects of Ethanol on the Seed Germination Rates of Vegetables at Varying Concentrations</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> I wanted to explore the possible effects that ethanol, at varying concentrations, may have on the germination rates of different vegetables. I believe that as the concentration of ethanol increases the germination rate of the seeds will decrease.</p> <p><b>Methods/Materials</b> Four varieties of vegetables (radish, spinach, arugula, broccoli) were selected due to their relatively short germination time. Vodka(40% ethanol) was utilized as the ethanol source. The alcohol concentration of the vodka was reduced to 1%, 5%, and 10% for the experimental groups, with the control group being water only. Two seeds were planted in each Jiffy Greenhouse disc for a total of 36 plants in each of the 4 groups. Total number of seeds used in the experiment was 576. The seeds were watered with 2.5mL of solution every other day and observed. A positive germination was noted when a plant was visible. Observations were conducted for 22 days.</p> <p><b>Results</b> The greatest rate of germination occurred with the 1% alcohol group. The control group was next greatest. The rate of germination dropped significantly at 5% alcohol and there was no germination at 10% alcohol.</p> <p><b>Conclusions/Discussion</b> It appears that at low concentration (1%) there was an increase in germination rate when compared to the control. This was in contradiction to my hypothesis. My hypothesis was confirmed at 5% and 10% concentrations. This experiment seems to support previous research that states there may be some benefits to ethanol at low concentrations. However, any benefits of ethanol seem to disappear quickly at 5% or above. This implies that even moderate use of ethanol in humans may have negative effects, especially in young who are quickly growing/developing, much like a seed.</p>	
<b>Summary Statement</b> The effects of ethanol, at varying concentrations. on germinating seeds.	
<b>Help Received</b> My father helped in selection of materials and supervised the use of the ethanol.	