



# CALIFORNIA STATE SCIENCE FAIR 2006 PROJECT SUMMARY

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| <b>Name(s)</b><br><b>Daniel M. Kwon</b>   | <b>Project Number</b><br><b>J1419</b> |
| <b>Project Title</b><br><b>Green Tea: Do More Expensive Green Teas Have a Better Medical Effect?</b>  |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>My objective was to determine whether more expensive green tea types were more effective in reducing heartbeat rates in Daphnia than cheaper varieties of green tea.</p> <p><b>Methods/Materials</b><br/>I tallied the heartbeat rates of Daphnia samples thirty times each in water and in green teas (five different kinds ranging from \$0.15 per 2 grams to \$2.00 per 2 grams). A Daphnia was placed on a microscope with a drop of water and the number of the Daphnia's heartbeats was counted in five seconds. The result was multiplied by twelve to determine the Daphnia's heartbeat rates in one minute in water. Then, the number of Daphnia's heartbeats was counted in the green tea concentrate. This process was repeated 30 times each per green tea (5 different kinds) to collect enough sample data (total of 300 samples). The quality and the cost (unit price per 2 grams of green tea) of the green teas are: Tea #1 (grounded in a tea bag, \$0.15), Tea #2 (bulk and large mature leaves, \$0.20), Tea #3 (better quality mature leaves, \$0.30), Tea #4 (small early leaves in a luxury package, \$1.00), and Tea #5 (very small baby leaves in a luxury package, \$2.00).</p> <p><b>Results</b><br/>In my testing, the average reduction in heartbeats of Daphnia exposed to each green tea sample were: Tea #1 (32.8 beats per minute), Tea #2 (34.0 bpm), Tea #3 (34.0 bpm), Tea #4 (28.0 bpm), and Tea #5 (32.8 bpm). It showed that the larger and more mature green tea leaves (#2 and #3) are more effective in lowering heartbeat rates than the younger and smaller leaves (#4 and #5). It means that the cheaper green teas are more effective in lowering heartbeat rates than the more expensive ones.</p> <p><b>Conclusions/Discussion</b><br/>My hypothesis was not supported because the cheaper green teas showed better heartbeat rate reduction results than the more expensive ones. The Daphnia's heartbeat rate was slower with Green Teas Samples #2 and #3 than with Green Teas Sample #4 and #5. It seems to me that the larger and mature leaves have more chemical ingredients than younger and smaller leaves. However, the taste of the expensive green teas is much better than the cheaper varieties' taste, giving a better, more luxurious, and longer-lasting taste.</p> |                                       |
| <b>Summary Statement</b><br>This project is to determine whether more expensive green teas have better medical effectiveness than cheaper varieties in reducing heartbeat rates on Daphnia (and perhaps even humans).   |                                       |
| <b>Help Received</b><br>Many thanks to my mom and dad for transportation, funds, and making green teas; Mr. Hodges and Ms. Herrington (science teachers) for their advice and mentoring; and my sister Eunice for her help on editing my work and giving me advice.   |                                       |