



CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

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Project Title Radical Terminators! Comparing Antioxidant Acitivity of Different Polyphenol Rich Food Using BR Reaction & Raspberry Pi	
Objectives/Goals Abstract The purpose of our science fair project was to compare antioxidant content of different polyphenol rich food samples and to use a Raspberry Pi to automate data capture. We used the Briggs Rauscher(BR) reaction as a method to generate free radicals. The BR reaction is an oscillating chemical reaction in which a mixture of chemicals go through a sequence of color changes, which repeats periodically. Adding antioxidants to BR reaction mixture increases the interval between blue cycles of the reaction. Our hypothesis for this project was, if different food samples are added to the BR reaction mixture, then the time interval between second and third blue phases will increase, depending on the food's antioxidant content. We hypothesized Gooseberry to have most antioxidants and ivy gourd the least. Methods/Materials Food samples were prepared by adding 5 gram of food to 95mL of distilled water. Mixture was centrifuged at 3000rpm. BR reaction mixture contain distilled water, sodium iodate, sulfamic acid, hydrogen peroxide, malonic acid, manganese sulfate and starch. BR reagents were mixed well with an overhead stirrer. 5ml of food sample was added to BR mixture at onset of second blue phase with overhead stirrer still active. Used light sensor connected to Raspberry Pi to record intensity of light passing through BR mixture. Data captured was analyzed to compute delay between second and third blue phases of the reaction. Three trials were conducted for each food item. The control was delay between second and third blue phases of BR reaction without adding any antioxidants. Results The delay between second and third blue phases was 15 seconds for the control. Bilberry produced the highest difference (498 seconds) from the control, indicating that it has the most antioxidant content among the food tested. Ivy gourd produced lowest difference with 8 seconds. Conclusions/Discussion Our hypothesis was partially correct. Different food samples produced varying delays between second and third blue phases of BR reaction. Bilberry had the most antioxidants, and ivy gourd had the least antioxidants. Consuming food rich in antioxidants is essential for maintaining proper health. Antioxidants help neutralize free radicals. Excess free radicals can cause illness such as cancer, autoimmune disorders, rheumatoid arthritis, cardiovascular, and neuro-degenerative diseases.	
Summary Statement We used the Briggs-Rauscher reaction to compare the antioxidant content of different food samples and used a light sensor attached to a Raspberry Pi to capture intensity of light passing through the BR mixture.	
Help Received Our parents supervised us while we conducted the experiment, took photographs and helped with layout of the board. Our science teacher, Mr. Lee, provided guidance throughout the project.	