



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Van Tran; Katerina Trinh	Project Number S1723
Project Title Quantitative Determination of Pigments in <i>Phaseolus vulgaris</i> and <i>Spinacia oleracea</i>: Chromatography and UV-vis	
Abstract Objectives/Goals The purpose of our experimentation is to find out whether or not the conditions at which green beans and spinach are packaged affect the quantity of their pigments. We want to find this out by using thin-layer chromatography, paper chromatography, column chromatography, and ultra-violet visible spectrophotometry. We hypothesized that canned green beans and spinach will contain the least amount of pigments and that fresh green beans and spinach will contain the most pigments. Methods/Materials By utilizing three different methods of chromatography and a UV-vis, we extracted pigments from fresh, frozen, and canned green beans and spinach, and quantitized the amounts of chlorophyll a, chlorophyll b, beta-carotene, and lutein. Results Our results yielded from analyzing the vegetables with the UV-vis supported part of our hypothesis. As we predicted, canned green beans and canned spinach showed the most degraded pigments because their peaks barely showed up on the spectrophotometer graphs. Fresh and frozen of both types of vegetables showed very similar peaks in chlorophyll a, only differing by less than 1.0 nanometer and 0.2 absorbance. With chromatography, we were not able to receive exact measurements, but we found that fresh and frozen green beans and spinach's pigments showed up more darkly and clearly than canned green bean's pigments. Conclusions/Discussion Canned green beans and canned spinach's pigments degraded the most, and fresh and frozen green beans and spinach retained about the same amount of pigments. Canned green beans and spinach visibly showed the least pigments when we conducted the chromatography experiments. In addition, it showed fewer peaks with the UV-vis than fresh and frozen and shown. On the other hand, when we compared fresh and frozen green beans and spinach's pigments to the absorbance spectrum of chlorophyll a, we found that there were very few differences in quantity between the two conditions. In conclusion, the conditions at which green beans and spinach are packaged do indeed affect the quantity of pigments, and canning these kinds of vegetables reduces the amount of pigment the most while packaging them fresh or frozen allows them to retain the most pigments.	
Summary Statement Our project involves applying ultra-violet visible spectrophotometry and various types of chromatography to compare the amounts of certain photosynthetic pigments in fresh, frozen, and canned phaseolus vulgaris and spinacia olercea.	
Help Received Ms. Dely provided us with TLC silica gel plates; Mrs. Evans provided us with advice throughout the duration of our project; Mr. Allen helped taught us how to operate the UV-vis; Mr. DeSousa helped us with paper chromatography.	