



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Shaady A. Alavi Moghaddam</b>	<b>Project Number</b> <b>J0603</b>
<b>Project Title</b> <b>Go Organic</b>	
<b>Objectives/Goals</b> Are there more antioxidants and Vitamin A in organic spinach versus conventionally grown spinach?	
<b>Abstract</b> <b>Methods/Materials</b> Using thin layer chromatography and column chromatography, I used different solvents such as acetone, hexane, methanol, 70% hexane-30% acetone, and 80% acetone-20% methanol to pull out pigments in the spinach. I also used powders such as anhydrous sodium sulfate and alumina for the same purpose. For exact measuring I used Pasteur pipettes, micropipettes, and test tubes to store the extractions from column chromatography. For the Thin Layer Chromatography I used a TLC plate, which was spotted with pigments and developed in solvent, to show the separation of pigments in spinach.	
<b>Results</b> The organic spinach had more antioxidants and Vitamin A content. The carotene in inorganic spinach was only visible in 2 of the experiments. This was because the amount that the pigments traveled in inorganic spinach were 10cm for the first trial, 9cm for the 5th trial, and the rest of the trails did not show the presence of carotene in inorganic spinach. The average distance traveled by carotene in inorganic spinach was 3.17cm. In the organic form of spinach carotene was present in all the experiments with a high of 10cm and a low of 7cm for the distance traveled by the pigment. The average distance traveled for carotene in organic spinach was 8.29cm. Both chlorophyll a and b were not visible in many of the trials in organic spinach. Chlorophyll a only showed on the TLC plate a total of 3 times with an average traveling distance of .97cm, the high being 2cm and the low 2cm. Chlorophyll b was very much the same and was only present in 2 of the trials for inorganic spinach with a high of 1.6cm, a low of 0cm, and an average of .52cm. The trend that was shown throughout the entire experiment was that the distance traveled by the pigment increased with the polarity of the object.	
<b>Conclusions/Discussion</b> I hypothesized that only the organic form of spinach would show the presence of Vitamin A and antioxidants in its pigmentation. My hypothesis was partially supported. The data shows that there was more presence of antioxidants and Vitamin A in organic spinach than inorganic spinach.	
<b>Summary Statement</b> Antioxidants and Vitamin A content in organic spinach versus conventionally grown spinach	
<b>Help Received</b> Used Lab facility at C.S.U.F. under Dr. Atar Supervision.	