



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Elma Frias; Shanta Hareesh</b>	<b>Project Number</b> <b>S2006</b>
<b>Project Title</b> <b>The Use of Chelated Iron in Growing Spinach as a Solution to Farming in Karst Soils</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> To test chelated iron as a solution to Karst Soils and analyze its overall effectiveness in improving iron absorption.</p> <p><b>Methods/Materials</b> To conduct this experiment, we began germinating spinach seeds in towels, then harvested them when they sprouted to half an inch. They were put into cups containing a mixture of CaCO<sub>3</sub> and compost, then separated into two categories containing five sections each. These sections were: 0g of CaCO<sub>3</sub>, 15g of CaCO<sub>3</sub>, 30g of CaCO<sub>3</sub>, 45g of CaCO<sub>3</sub>, and 60g of CaCO<sub>3</sub>. Both categories were watered daily, but one category receives a tablespoon chelated iron; the chelation process began once the spinach plants began to show signs of chlorosis. Months later, spinach plants were harvested and from each section, 5g was weighted out and finely chopped for further experimentation and analysis on the effect of chelated iron. To test the iron concentrations in all sections from both categories, spinach plants were burned to ashes. To extract the iron concentrations from the spinach plants, ashes were put into a beaker with 2.0M HCl, then placed onto an electromagnetic machine. Each solution was then filtered and five ml of the solution was put into a cuvet. The cuvetts were put into a spectrophotometer to collect the iron concentration. To find out how much iron concentration there was for every five grams of spinach plants, standards were made. When comparing the iron absorptions to the iron absorption in the standards graph, the following data was collected.</p> <p><b>Results</b> Within the 0 g of CaCO<sub>3</sub> with no chelated iron and chelated iron, the absorption of iron were .0447 mg/g Fe<sup>3+</sup> and .0447 mg/g Fe<sup>3+</sup> respectively. Within the 15 g of CaCO<sub>3</sub> with no chelated iron and chelated iron, the absorption of iron were .0224 mg/g Fe<sup>3+</sup> and .0224 mg/g Fe<sup>3+</sup> respectively. The category of 30 g of CaCO<sub>3</sub> with no chelated iron and chelated iron, the iron absorption were .00725 mg/g Fe<sup>3+</sup> and .122 mg/g Fe<sup>3+</sup> respectively. The section of 45 g of CaCO<sub>3</sub> with no chelated iron and chelated iron, the iron absorption were .00647 mg/g Fe<sup>3+</sup> and .0130014 mg/g Fe<sup>3+</sup> respectively. The section of 60 g of CaCO<sub>3</sub> with no chelated iron and chelated iron, the absorptions of iron were .00583668 mg/g Fe<sup>3+</sup> and .00837 mg/g Fe<sup>3+</sup> respectively.</p>	
<b>Summary Statement</b> Testing Chelated Iron as a solution to Karst Soils and analyzing its overall effectiveness in improving iron absorption.	
<b>Help Received</b> Mrs. Hampton helped us in the planting process; Mom helped with the board.	