



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

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| <b>Name(s)</b><br>Catherine Lo; Marielle Ona  | <b>Project Number</b><br><b>S0809</b> |
| <b>Project Title</b><br><b>Toxic Rocket Fuel in a Healthy Diet: A Field Study of Perchlorate Concentrate in Lettuce Grown in California</b>   |                                       |
| <b>Abstract</b><br><b>Objectives/Goals</b><br>The purpose of this field study is to show that the lettuces grown in California are contaminated with perchlorate since the water that used to cultivate these lettuces is also contaminated by perchlorate. This field study will inform the public of how big the perchlorate contamination problem is.<br><b>Methods/Materials</b><br>Different types of lettuce heads are purchased from different stores. The lettuce heads are put into the freezer to rupture the plant cell wall. The frozen lettuce head is blended in a blender for about two to three minutes with double distilled water. This lettuce solution is put into two separate centrifuge tubes. The centrifuge tubes are put on the shaker over night to dismantle plant cell. Next day, the centrifuge tubes are put into the centrifuge for an hour with 30,000 revolution/ minute and force of gravity of 104739 * g. After an hour, filter the lettuce solution using filter paper with pore size of 22µm. Filter the solution again through SPE Cartridges. The SPE Cartridges are first condition with methanol and double distilled water. Discard the first twenty-two drops of lettuce solution from the cartridges and filter the rest of the solution into plastic tubes. Add standard solution into each plastic tube. Use a pipette to add 1mL of the sample into a glass tube. Run the samples through ICMS (Ion Chromatography Mass Spectrometer).<br><b>Results</b><br>Red leaf and Romaine lettuce heads had the most perchlorate concentration. Lettuce heads that were purchased from Albertsons have the highest concentration of perchlorate. The organic Romain Hearts that were purchased from Trader Joe's have perchlorate concentration too.<br><b>Conclusions/Discussion</b><br>The lettuce heads that were purchased from Albertson#s were grown Salinas, California, which means that the water source that use to water these lettuce heads is contaminated with perchlorate. The organic Romaine hearts are supposed to be chemical free, but since it is water by the perchlorate-contaminated water, it is also contaminated by perchlorate. It is important for human not to consume any perchlorate contaminated food because it may disrupt adult's metabolism, and for pregnant women, perchlorate might cause the child to have behavioral problems, a lower IQ, development, loss of hearing and speech, or defects in motor skills. |                                       |
| <b>Summary Statement</b><br>Many water sources in California are use to cultivate many different lettuce, and these lettuce heads accumulate different amounts of perchlorate since it is water by contaminated water.  |                                       |
| <b>Help Received</b><br>Angie Seyfferth from Dr. Parker's lab at UCR.   |                                       |