



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Ken L.M. Lozano	Project Number S0513
Project Title Pigment Separation in <i>Allium cepa</i> (Red Onions) using Circular Paper Chromatography	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project was to determine which of the eluting solutions of petroleum ether, acetone, and water will separate the color pigments in red onions.</p> <p>Methods/Materials The materials and equipment used are red onions, petroleum ether, acetone, distilled water, knife, chopping board, cotton yarn, plastic gloves, plastic bags, #1 filter papers, triple beam balance, watch glass, beakers, glass bottles, graduated cylinders, pipettes, petri dishes, wash bottle, scissors, compass, and ruler. The major steps are Preparation of the chromatography papers; Preparation of the red onion extract; Preparation of the solvents in petri dishes; Spotting of chromatography papers; Observation of pigment movement; and Recording of visual results. Two experimental batches of three trials each were conducted with petroleum ether, acetone, and water as eluting solutions. Four sample spots were done for each paper. The papers were air dried with the movements of the pigments visually noted and measured. The Rf values for the pigments were computed, tabulated, graphed, and analyzed.</p> <p>Results There was pigment movement in the water and acetone dishes, but none in all six petroleum ether dishes. Visual analysis of the all chromatography papers also showed that two colored pigments, yellow and/or purple moved from the sample spots in the water and acetone dishes. The Rf values for the purple pigment ranged from 0.875 to 0.975, with a mean of 0.932, and the yellow pigment had a range of 0.075 to 0.625 with a mean of 0.174 in the water dishes. On the other hand, only the yellow pigment moved in three of the six acetone solvent dishes, with an Rf range of 0.800 to 0.975 and a mean of 0.454.</p> <p>Conclusions/Discussion The pigments in <i>Allium cepa</i> L. were separated into two visible colored components: yellow (quercetin) and purple (anthocyanin). The water eluting solution moved the purple and yellow components in all the six trials indicating that these pigments are polar in nature. The acetone eluting solution moved only the yellow pigment in three of the six trials indicating that perhaps it is weakly polar in nature.</p>	
Summary Statement This project deals with the separation of pigments in red onions using paper chromatography utilizing three kinds of eluting solutions selected based on polarity.	
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