



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Deborah I. Wildey	Project Number J0809
Project Title Can You Create an "Antifreeze" out of Frost Hardy Plants?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The object of this experiment is to determine if an #antifreeze# can be created out of frost hardy plants by grinding them and extracting juice.</p> <p>Methods/Materials A container of two tablespoons of plain water was put in the freezer. It was observed every five minutes for the formation of ice crystals. Results were recorded. Then juices were extracted from bok choy, spinach, broccoli and kale. Each sample mixture was prepared by adding one tablespoon of water to an equal amount of plant extract. Mixtures were placed in the freezer and checked every five minutes for the formation of ice crystals. Results were recorded and compared.</p> <p>Results Some of the plants that resisted freezing for a longer amount of time included: kale, bok choy and spinach. While water took ten minutes to show signs of ice crystals, kale took twice as long. Spinach and bok choy both added five minutes to the freezing time of water.</p> <p>Conclusions/Discussion My conclusion is that some non-toxic plants can increase the freezing time of water. Plant extracts may provide an environmentally friendly alternative to modern antifreeze.</p>	
Summary Statement This project tests the ability of various plant extracts to increase the freezing time of water.	
Help Received Mother helped cut out lettering for title.	