



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Julia J. Slupska	Project Number J1726
Project Title Cactus Carbs	
Abstract Objectives/Goals The question for this project was 'What are the effects of an area in which a cactus grows on the amount of carbohydrates in the cactus?'. I hypothesized that more carbohydrates would be detected in cacti growing at the locations with temperate conditions. Methods/Materials 10 samples were collected from 5 locations differing in altitude and water abundance. Samples were dried and ground at a laboratory. The cacti powder was subjected to acid and high temperature treatment in order to hydrolyze the complex carbohydrates. The quantities of simple sugars released during the hydrolysis were determined by HPLC. The materials used were: 10 cladodes of Prickly Pear cacti of Opuntia genus, 75% sulfuric acid, calcium carbonate, and de-ionized water. Results The relation of carbohydrates to the environment seemed to be opposite to my hypothesis. The harsher the environment was, the more carbohydrates were detected in the cacti. The lowest amounts of carbohydrates were discovered in the cacti from the farm and the seashore, while higher amounts were found in cacti growing in drier places. Comparing plants from the same altitude more carbohydrates were detected at the locations with lower precipitation. In the two locations with similar average yearly precipitation, more carbohydrates were detected at the higher altitude. Conclusions/Discussion There are some possible explanations for my observation. It is probable that in severe conditions cacti need more storage material, which may influence the carbohydrate levels. It is also possible that the structure has to be stronger under such conditions; for example, at the more severe conditions more fiber (composed of insoluble sugars) is required. Another possible explanation is that cacti store extra sugar so that water will not evaporate due to the low osmotic pressure. In my project book, I discussed ways to verify these theories in future experiments.	
Summary Statement My project investigates the relation of a cactus's location and it's carbohydrate levels.	
Help Received Father drove me to different locations; Mr. Rogelio Oseguera performed HPLC testing; used Verium Corp. lab equipment under the supervision of my mother.	