



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Samantha M. Guhan	Project Number J0409
Project Title Stevia: Sugar's Ultimate Competitor	
Abstract Objectives/Goals This study focused on sweet glycosides found in the leaves of <i>Stevia rebaudiana</i> . The purpose of the first experiment was to determine the role of surface area of leaves and temperature of water when extracting glycosides. The second experiment addressed glycoside distribution in leaves as a function of age and flowering stage to test the hypothesis that biosynthesis of glycosides may not be growth related. The possibility of developing an assay at 651nm was also explored. Methods/Materials Three transplants of <i>Stevia rebaudiana</i> were grown. In the extraction experiment, fresh whole, fresh shredded, and crushed dried leaves were steeped in cold, room temperature and hot water. Samples were taken at times ranging from 5 minutes to 24 hr. In the distribution experiment, samples of leaves were taken from a young branch, from various levels along a sideways flowering stalk, from two dominant stems before and after flowering and extracted in hot water. All samples were appropriately diluted and their absorbance measured at 210nm and 651nm. Standard solutions were made from commercially available stevia powder. Results The results from the extraction experiment indicate that surface area of leaves is critical in determining final glycoside concentration and speed of extraction. When surface area is limited, the higher the temperature of water, the better the extraction. The distribution experiment results support the hypothesis that glycoside biosynthesis is not growth related. Data verify that glycoside content varies with leaf age, with younger leaves having the least amount. In contrast to literature, middle leaves had the highest glycoside concentration while glycoside content in young leaves increased after flowering. A relevant assay at 651nm could not be developed since absorbance values at 210nm did not correlate with those obtained at 651nm. Conclusions/Discussion This study has raised many questions. Is 210nm the best wavelength? Why does the absorbance at 210nm not correlate with that at 651nm? Some absorbances and stevia yields were higher than expected implying presence of other compounds, whose interference must be accounted for. Since some of the observed trends differ from literature, such as doubling of glycoside concentration in younger leaves after flowering, the experiment needs to be repeated. If correct, this could change harvest time from before to after flowering!	
Summary Statement This project addresses extraction efficiency, leaf age based distribution and a potential assay for glycosides found in the leaves of the plant <i>Stevia rebaudiana</i> .	
Help Received Used UV-vis spectrophotometer and analytical balance at Amgen Inc. under supervision of Dr. Kaltenbrunner; mother gave general guidance.	