



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Divya R. Nair	Project Number 35691
Project Title The Effect of Genetically Modified Crops on Their Sugar Content	
Abstract Objectives/Goals The objective of my project is to find out if genetically modified(GM) crops have a higher sugar content than non-GM crops. I believe that if the crop is genetically modified, then it will have a higher starch and sugar content because of its genetic alteration. When genetic alterations are made, the enzymes in the genetic material change in their quality, influencing the safety of the crop, impacting sugar and starch content. Methods/Materials To test my hypothesis, I used GM and non-GM corn and soybeans. The non-GM crops had a price look-up code beginning with '9', were USDA certified Organic, and verified non-GM by the non-GMO project. I tested their sugar content with a refractometer and glucose test strips using the crop's freshly squeezed juice. To test starch, I used Lugol's Iodine solution. I used both quantitative and qualitative data to analyze my results. For quantitative data, I used the results from the refractometer test, which is measured in degrees Brix. Degrees Brix is a measure of one gram of sugar per 100 grams of solution. For qualitative analysis, I used color variations in the test strips to determine the sugar. The color variation in the iodine tests determined the starch content. Results My experiments demonstrated that the GM corn and soybeans yielded a slightly higher sugar and starch content, as compared to the non-GM corn and soybeans, as predicted by my hypothesis. The sugar content of GM corn was 4.4 degrees Brix higher as compared to non-GM corn. The sugar content of GM soybean was 1.52 degrees Brix higher than non-GM soybean. The glucose test strips for both GM corn and soybeans had a darker color than their non-GM counterparts, indicating a higher sugar content. For the Lugol's Iodine Solution, the dark splotches indicating starch on the GM corn and soybeans were darker and more spread out, indicating more starch. Conclusions/Discussion Based on the results of my experiments, the GM corn and soybeans had a higher sugar and starch content, as compared to the non-GM corn and soybeans, as predicted by my hypothesis. The variation in sugar and starch content of GM versus non-GM crops may differ from crop to crop. Although this is a small variation in the sugar content, this can have a large impact on human health, particularly for type 2 diabetes, given the large direct and indirect consumption of these two crops.	
Summary Statement My project determines the variation in the sugar content between genetically modified and non-genetically modified corn and soybeans.	
Help Received My mother helped me acquire the crops and equipment required for my experiment and my uncle helped me analyze the results.	