CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Michael D. Quinones

Project Number
J1621

Project Title
Electric Bananas, Are You Ripe Yet? Predicting Banana Ripening Using Electrical Resistance

Abstract

Objectives/Goals
Objective: To predict the ripeness of bananas using electrical properties. I created a banana ripeness tester.

Methods/Materials
Methods: Group similar size bananas by peel color with ten bananas in each group: yellow-green, yellow, and yellow-brown. Label each banana with a permanent marker. Weigh and measure the length and diameter of each banana. Match each banana's peel color with the closest color square in a color standard chart. Check the multimeter against known resistors. Record room temperature and humidity. Insert multimeter probes into the banana. Measure the current in the banana every ten seconds for six readings and calculate the average current and voltage. Calculate the resistance of each banana. Remove and wipe the probes clean. Repeat for the next banana alternating between groups. Materials: Fifty-five Chiquita bananas, Celsius Alcohol Thermometer, Humidity Gauge, Radio Shack Digital Multimeter, Marker, Pen, Ruler, Tape Measure, Camera, Weight Watchers Official Scale, Resistors, Alligator Clips, Color Chart, Mask For Color Chart, Galvanized Nail, Copper Wire, Steel Probes.

Results
For experiment two, I plotted the average resistance for twenty-one bananas over a ten-day period. The resistance dropped over the ten day experiment. For experiment three, with yellow-green, yellow, and yellow-brown bananas, the average resistance decreased as the bananas ripened.

Conclusions/Discussion
During banana ripening, several chemical and physical and chemical changes take place in both the peel and the pulp. While the peel changes from green to yellow and from yellow to brown, the pulp carbohydrates are converted to sugar, the pulp acid is neutralized, the pulp softens, and odors develop. In general, factors such as ethylene, growth regulators, temperature, humidity, and carbon dioxide affect banana ripening. I discovered that the electrical resistance does decrease as bananas ripen. The least ripe yellow-green banana group had an average electrical resistance five percent higher than the yellow control group which had an average resistance six percent higher than the yellow-brown group.

Summary Statement
My project is about predicting banana ripening using electrical resistance.

Help Received
My Mom drove me to the supermarket where I bought bananas on several different days. My dad took me to Radio Shack where I bought a multimeter. My science teacher gave me some suggestions on improving my report.