



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Ken L.M. Lozano	Project Number J0719
Project Title Electrical Conductivity of Three Types of Fruit Groups	
Objectives/Goals The objective was to determine if there is a difference in the electrical conductivity of sweet fruits, subacid fruits, and acid fruits.	
Abstract Methods/Materials The materials and equipment used are Bananas, Dates, Papayas, Prunes, Apples, Guavas, Nectarines, Peaches, Pears, Kiwis, Lemons, Oranges, Plums, Strawberries, Ascorbic Acid, Citric Acid, Multimeter, pH Checker & buffer solutions, Cell kit with Copper(Cu), Zinc(Zn), Aluminum(Al), Iron(Fe), and Lead(Pb) electrodes, beakers, test tubes, glass plates, graduated cylinder, wash bottle, distilled water, knife, chopping board, & triple beam balance. The steps followed are Calibration of pH Checker, Assembly of the Electrical Cell kit and Multimeter, Preparation of fruit samples and standard organic acid solutions, & Measurement of pH and voltage using varying electrode pairs: Cu&Zn; Cu&Al; Cu&Fe; and Cu&Pb. Three experimental trials were conducted to determine the pH and voltage readings. The pH and conductivity readings were averaged and later used for the correlation and graphical analysis.	
Results The average pH readings showed that the acid fruits had the lowest value and the sweet fruits had the highest one while the average conductivity readings were also relatively higher for the acid fruits compared to the sweet fruits. The average conductivity was highest for the Cu&Zn electrode pair for the three types of fruits and organic acids and lowest for the Cu&Pb electrode pair. The conductivity readings for acid solutions using varying electrode pairs were close to each other for all the different concentrations. The correlation coefficient (r) between the average pH and fruits conductivity showed a weak negative correlation ($r = -0.609$) for the pH and Cu & Zn while it was not significant for the other electrode pairs. The plots of pH vs. fruits conductivity showed a weak and apparently linear relationship only for the pH and Cu & Zn electrode pair.	
Conclusions/Discussion There was some difference between the electrical conductivity of the sweet fruits, subacid fruits, and acid fruits. The conductivity readings were highest among the fruits and acid solutions using the copper and zinc electrode pair. A negative but weak correlation as well a plot of weak and linear relationship was shown between the pH and fruits conductivity using Cu & Zn electrode pair.	
Summary Statement This project deals with the comparison of the electrical conductivity of three types of fruit groups namely sweet fruits, subacid fruits, and acid fruits.	
Help Received Dr. and Mrs. Reynaldo Villareal of CIMMYT for project planning advice; Mr. Bill Harmon of BJU for project planning and experimental advice; my dad for helping me put together the display board and making the wood stands; and my mom for guiding me through all the steps of making a science project.	