



STUDY OF VOLTAGE GENERATED BY DIFFERENT FRUIT JUICE

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ABSTRACT

The present paper deals with the study of electricity generation by four different fruit juices of plants like Citrus limetta (Sweet lemon fruit), Carica papaya (Papaya fruit), Ananas comosus (Pineapple fruit) and Punica granatum (Pomegranate fruit). More electricity was generated in pineapple fruit juice as an average of 1.02 volt and less electricity was generated in pomegranate fruit juice as an average of 0.96 volts. For more accuracy four trials were conducted to measure the average voltage generated by each fruit juice.

**KEYWORDS :** Voltage, Electrolyte, cell, Fruit juice etc.

INTRODUCTION:

Voltage can be defined as amount of potential energy between two points on a circuit. It measures the electric current that travels from one end of a wire in a circuit to the other end. One point has more charge than another. This difference in charge between the two points is called voltage. The voltage between two points is equal to the work done per unit of charge against a static electric field to move the test charge between two points and is measured in units of volts. Voltage is basically the push in an electrical current. More current in the circuit, more voltage is produced.

Cell is the basic unit to produce electricity. Battery has two or more cells. Electrical force of a battery is called electromotive force (emf). Each kind of cell has particular emf. Battery or cell contains electrodes and electrolyte. An electrode is the part of a cell through which charges enter or exit. Each cell has a pair of electrodes made up of conducting materials. Electrochemical reaction in electrolyte produces electricity. Austin Chong studied generation of electricity using citric fruits and potato. Electrical conduction depends on ions generated in electrolyte as per the view of Miliani and Kamesh Mazloomi et.al. (2012). There is a chemical change between both the electrodes and the electrolytes. These changes convert the chemical energy to electrical energy. There are two kinds of cells in electricity. These two types of cells are wet cells and dry cells. There are some chemicals in fruits that act as an electrolyte. Citric fruits contain citric acid similar to battery acid. Jerry Goodisman et.al. (2001) worked on lemon cells.

MATERIAL AND METHODS:

The fruit juice was extracted from four different plants such as Citrus limetta (Sweet lemon fruit) belongs to family Rutaceae, Carica papaya (Papaya fruit) belongs to family Caricaceae, Ananas comosus (Pineapple fruit) belongs to family Bromeliaceae and Punica granatum (Pomegranate fruit) belongs to family Punicaceae to measure the voltage generated from fruits juices. For that purpose multimeter, beaker, copper (Cu) and zinc (Zn) electrodes were used. The fruit juice extracted from each fruit was taken into beaker. A copper and zinc electrode were poked in a beaker containing fruit juices. For the measurement of voltage generated from fruit juices the copper and zinc electrodes were connected to multimeter. The method was continued with each fruit juice. The readings were taken for each fruit juice in four trials and calculated average voltage from each fruit juice.

RESULT AND DISCUSSION:

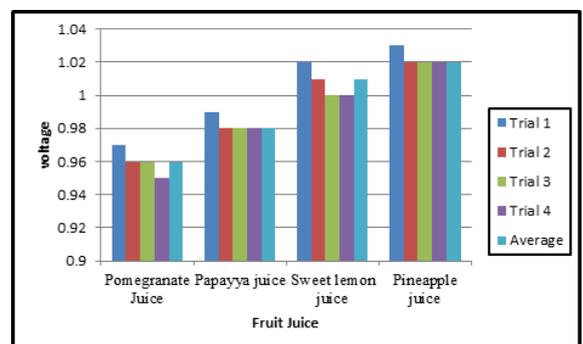
The measured voltage values are presented in the following table. The less voltage generated from the fruit juice of pomegranate is

0.96 volts while more voltage generated from the fruit juice of pineapple is 1.02 volts. The pH is the scale which measures acidity of solution. Pineapple and sweet lemon have more pH than that of pomegranate and papaya. Pineapple and sweet lemon are more acidic (as per the indiacurry .com and pickyourown.org). Probably more acid in fruits will produce more electricity according to Jesse Matthews (2011), Keedy Murphy (2014). There is not much difference in voltage recorded with sweet lemon and pineapple juice. Papaya juice produced 0.98 volt while least voltage produced by pomegranate juice which is 0.96 volt. It was observed that pomegranate juice contains Anthocyanins, Glucose, Ascorbic acid, Ellagic acid, Gallic acid, Caffeic acid, Catechin, EGCG, Quercetin, Rutin, numerous minerals, particularly iron, amino acids according to Julie Jurenka (2008). It was noticed that papaya juice contains N-butyric, n-hexanoic and n-octanoic acids, lipids; Myristic, Palmitic, Stearic, Linoleic, Linoleic and cis-vaccenic and Oleic acids as per opinion of K.L.Krishna et.al. (2008).

Table: Shows Average Fruit Voltage produced by each fruit juice

No. of Trials	Pomegranate Juice	Papaya juice	Sweet lemon juice	Pineapple juice
Trial 1	0.97	0.99	1.02	1.03
Trial 2	0.96	0.98	1.01	1.02
Trial 3	0.96	0.98	1.00	1.02
Trial 4	0.95	0.98	1.00	1.02
Average	0.96	0.98	1.01	1.02

Figure: Shows graphical representation of Voltage produced by each fruit juice



CONCLUSION:

Fruits were tested to see how much voltage it would produce. These results will be useful to the people working in power sector. It would

lead to study of various parameters regarding fruits such as freshness. In future some research work could be done by using other fruit juices.

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