Problem/Question

Can fruit with citric acid produce enough electricity to power a small LED light bulb?

Hypothesis

I think that a lemon will produce enough electricity to power a small LED light bulb between a lime, lemon,& a orange .

Procedure

1. You will need to stick the galvanized nail(zinc)and copper into the lemon.

2. Connect the wire with the alligator clip on it to the lemon according to the mark on the lemon.

3. Connect wires to the opposite mark on each lemon.

4. Connect the last wires to the light bulb or volt meter.

5. Collect Observations.

Materials

In my experiment i will be using the following materials,

- lemon
- lime
- orange
- alligator clips
- wire
- zinc
- copper
- small LED light
- adult help
- Science note pad
- Pencil
- Volt meter

Results

So far we have used lemons only. We bought alligator clips & attached wire to the alligator clips. We connected the wires per the diagram and used two different types of light bulbs, a small Christmas light bulb and a two prong 12 volt light bulb. We used a Galvanized nail screw and a copper pipe wrap and put them into the lemon. No matter what we used we were unable to power either bulb. Next we are going to experiment with a LED light, using a lime and a orange. We are going to replace the Galvanized screw with a nail, we are also going to test each fruit with a volt meter. I found out that we have to use a LED light. We were unable to get enough electricity to power a 8 volt light or a christmas light. I used eight lemons and I got it to power my light.

	Prediction	Test
Lemon	Yes the light will be the brightest.	Yes it worked.
Lime	yes but the light will be dim.	No it did not work.
Orange	No the light will not turn on.	No it did not work.

Fruit	Voltage
4 Lemons	3 ohm's & 2 Dcv's
1 Lemon	18 ohm's
1 Lime	30 ohm's
1 Orange	100 ohm's

Conclusion

Based on my finding four lemons create 2 volts of electricity.The light bulb we used was a 8 volt light. If 4 lemons produce 2 volts of electricity we will need 16 lemons to power a 8 volt light bulb. i learned that oranges produce the least amount of ohms. Limes only create 30 ohms making the lemon have the most citric acid for producing electricity. according to my prediction i was correct that lemons could produce the brightest light.

Research

Electricity

In this experiment, it deals a lot with electricity. In a lemon battery the electricity comes from the chemical reaction between the copper & zinc. Electricity- is a electric power that is made by atoms and electrons. It is a electrical charge and it is the electrical current. In this paragraph, you learned what electricity is and the lemon is not the electricity.

- *Using electricity by: Angela Royston*
- *Bill Nye the science guy's consider the Followings by: Bill Nye*
- *Dictionary.com*

Electron

Did you know that a electron comes from electricity? A electron is a subatomic particle with a negative electrical charge. In this paragraph, you learned what electron is, now you would have a idea of what a electron is.

- *www.wikipedia.com*

A lemon battery

My experiment is basically making a lemon battery and seeing if it can power a light. A battery consists of one or more electrochemical cells that convert stored chemical energy into electricity. Each contains a positive side (Cathode) and a negative side (Anode). Electrolytes (Acidic lemon juice) allows ions to move between the electrodes and terminals which allows current to flow out of the lemon battery to perform work. In this paragraph, you learned what a lemon battery is. Now you know what a lemon battery is.

- *Www.wikpeidia.com*

Chemical reactions

In my experiment, there is a chemical reaction, which powers the light with electricity. A chemical reaction occurs when 2 matters mix which causes a change. And during such a reaction two or more elements or compounds form a new product. In this paragraph you learned what a chemical reaction is.

- *Atoms and chemical reactions by: Suzanne Slade*

Proton

Did you know that a proton also comes from electricity? A proton is a subatomic particles with a positive electrical charge. In this paragraph, you Learned what a proton is. Now you know that a proton is basically the opposite of a electron.

- *www.wikipedia.com*

Definitions

Anode-the electrode or terminal by which current enters an electrolytic cell, voltaic cell, battery, etc.

Cathode-the electrode or terminal by which current leaves an electrolytic cell, voltaic cell, battery, etc.

Electricity- it is an electrical charge and it is the electrical current.

Variables

*lemon & lime & orange

*room temp. & cold temP.