

[Project ID]

Fruits to Power

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[Title]

Abstract

The purpose for doing this experiment is to make using electricity cheaper. People should care because this could be a new way to imagine large corporations, what if they did not have to pay as much money for their electricity bills and anything else that could cost them money, so if they even just replace half their electric wires with lemons or limes or oranges or anything then they would save so much money in the long run.

Stick a penny and a nail into a fruit and then wrap the wires around the lightbulbs and then you have power for a dollar seventy five. So many companies go bankrupt from electric bills for using electric wires all day everyday. I connected the wires to the multimeter and tested different batteries.

I then connected the electrodes to the fruit, wired up the multimeter, and tested to see if there was a voltage measured.

I placed the fruit on the counter for two hours, so they would all reach the same temperature before testing.

I punched in the nail and penny, measuring the distance of 2 inches apart. I connected each electrode to the multimeter and read off the voltage.

I hypothesized that the more acidic the fruit was the more volts it would produce so I hypothesized that the lemon would generate the most volts. I ran four trials changing the type of fruit and Measured the voltage generated using a multimeter. And it turned out to be the lime that won and the lemon was.01 volt behind it. We had so many extra fruits afterwards that we powered three light bulbs for three different rooms in our house for maybe two dollars and fifty five cents

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Discuss your Research Question

- Discuss your Problem Statement
- State the Variables
- State your Hypothesis

Fruits can produce enough energy to light a lightbulb but which produces the most light for the least amount of money? If you're in an emergency and you can't find batteries you can find an orange or a lemon and make enough light to "We had so many extra fruits afterwards that we powered three light bulbs for three different rooms in our house for maybe two dollars and fifty five cents". My project compared 4 different fruits, an orange, a lemon, a lime and a grapefruit. This study compares light produced to acidity. An oranges acidity is only about 1%, a lemons acidity is about 8%, a grapefruits acidity is about 4%, and a limes acidity is about 6-7%.

Does acidity cause a fruit to produce more volts? I am measuring the acidity of each fruit that I will be testing. I used an orange that had minimal amounts of acid and it came in last place proving that acidity does effect the amount of volts produced. An oranges acidity is only about 1%, a lemons acidity is about 8%, a grapefruits acidity is about 4%, and a limes acidity is about 6-7%.

Relevant Literature

Mark Fraire, turn on a light with lemon power, 2016, Barnes and Noble.

A lemon battery can't create a lot of electricity, so you need to connect the battery to something that needs very little power to see the effect. Most light bulbs need more power than you'll generate in this project.

Guinness World Records, Fruit batteries, 2014

Did you know that your fruit bowl is brimming with electrical potential? When life gives you lemons (and a few other household odds and ends), forget about making lemonade- generate homemade electricity instead Mwahahaha!

Aurora Lipper, Fruit Batteries Science Fair Project guidebook, 2009 | add to references

Batteries are comprised of two different metals suspended in an acidic solution. With the fruit power battery, the two metals are zinc and copper. With a zinc and copper setup the electron flow is out of the penny (copper) and into the nail (zinc) through the acidic juice inside the fruit.

Hypothesis

My hypothesis is that the lemon will produce the most volts, It has the acidity of all the fruits so I believe that it will produce the most volts.

Materials

1. Lemon, grapefruit, lime, and orange.
2. Digital multimeter.
3. Alligator clip wires.
4. galvanized nails.
5. And a clean copper penny.

Methods / Procedures

I connected the wires to the multimeter and tested different batteries:-

I then connected the electrodes to the fruit.

I placed the fruit on the counter for two hours, so they would all reach the same temperature before testing.

punched in the nail and penny, measuring the distance of 2 inches apart. Working quickly, connected each electrode to the multimeter and recorded the time I continued this process, changing the fruit for each trial.



(photo taken by researcher)

To set this up me and my dad went and bought fruits and vegetables, after that we got the multi meter and plugged in the wires we then connected the alligator clips to the wires and stuck a penny and a galvanized nail into the fruit/vegetable, the red wire had to go to the penny because it was positive and the black wire had to go to the nail because it was negative.

Results (aka, dependent variables)

Results

Which fruit gives the most voltage?

Name: Ian Gladden

Type of electrode: Copper

Date: Jan 2nd 2021

Type of electrode: Zink

Time: 2:10 PM

Fruit temperature: 63.5° F

Table 1: Old 1956 Penny			
Fruit	Acidicness	Voltage Generated (V)	
		Trial 1	Trial 2
Lemon	8%	1.01	.98
Lime	6-7%	1.02	.97
Grapefruit	4%	1.00	.95
Orange	1%	.98	.91
Old potato	5-6%	.93	.89
New potato	5-6%	.93	.90

RESULTS

The results of the experiment show that the lime produced the most voltage with the old penny but with the newer penny the lemon beat the lime. One of the weird things that happened was that the orange at first read it at 0.31 with the penny from 2020 but when we used a penny from 1956 it ended up getting .98 volts. Another odd thing that happened was when we used an indian penny it did not work very well we ended up only getting about .20 volts with each fruit that we used it on.

Conclusion

I hypothesized that the lemon would produce the most volts. My hypothesis was incorrect because the lime had .01 more volts than the lemon and the lemon was only 0.1 volts ahead of the grapefruit. I had no limitations for this experiment. Another variable that could be tested could be how many limes does it take to power a lightbulb.

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References (bibliography)

Mark Fraire, turn on a light with lemon power, 2016, Barnes and Noble.

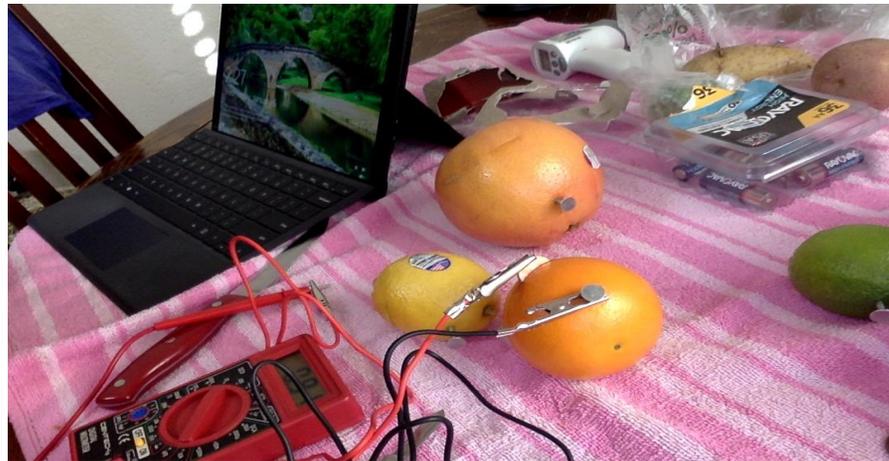
Guinness World Records, Fruit batteries, 2014

Aurora Lipper, Fruit Batteries Science Fair Project guidebook, 2009

Project Photos



(photo taken by researcher)



(photo taken by researcher)