

DR. B.R.R. GOVERNMENT DEGREE COLLEGE, JADCHERLA

DEPARTMENT OF PHYSICS


STUDENT STUDY PROJECT

2021-22

Title: Comparative Study on Storing Capacity of Electricity of Vegetables

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CERTIFICATE


This is certify to that, the project work entitled "comparative study on storing capacity of Electricity of Fruits and vegetables" is bonafide work done by

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The result embedded in this work has not been submitted to any other university or institute for the award of any degree.


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Contents:

1. Introduction

2. Objectives

3. Literature survey

4. Materials & Methodology

5. Findings

6. Conclusion

Introduction:

The world is dependent on electricity. It is what powers our lights, radios, TVs and cell phones, but how does it do it? From a scientific point of view, electricity is energy formed by the flow of electrons. Through learning about electricity, circuits, and currents, one can explore how vegetables store energy to create electricity. Objectives:

Objectives:

To find out and compare, which fruit or vegetable has the most stored electricity.

Review of Literature:**Electricity:**

Electricity is essentially a part of everything because everything is made up of atoms. The simplest way to define electricity is the energy formed by the flow of electrons. Therefore, all materials have electrons and potential energy. Potential energy is stored energy. In order for potential energy to move through a conductor, a force is needed. A conductor can be material such as copper which has more number of free electrons.

Luigi Galvani and Alessandro Volta made this discovery in the late 1700s. They discovered conductivity when they did an experiment that tested if an iron hooked attached to a frog touching a copper wire would move the frog. They concluded that the frog's muscles served as a conductor allowing electricity to pass through. A conductive solution can use any electrolyte such as an acid, base or salt solution. Several vegetables and fruits contain juices that are rich in ions and are acidic, and can therefore behave as good conductors. A second type of electricity is known as static electricity.

Static electricity has the ability to be very powerful like lightning and less powerful like amber being rubbed against wool. It has a special force that allows the amber to attract bits of materials. A Greek philosopher, Thales, founded this discovery. Thales is famous for proving his claim that lightning was electrical by doing a well-known key and kite test. Both of these types of electricity have big uses in our world and now lets see how they can be applied.

Methodology:**Working of vegetable battery:**

A fruit or vegetable battery works Just like a normal circuit. A circuit powered by fruits or vegetables needs energy and conductors. To construct a battery using a fruit as a battery we use copper, brass or zinc as active metals. The metals react with the acid in the fruit or vegetable because the juice is rich in positively charged ions. The two nails act as positive and negative poles for the

battery. The electrons travel from the positive pole to the negative pole, generating electricity. Like any other battery, a potato can only last for so long. Eventually, the electrodes undergo chemical reactions that block the flow of electricity, the result being the battery stops working. What typically happens is the production of hydrogen at the copper electrode and the zinc electrode searches for deposits of oxides that act as a blockage between the metal and the electrolyte. This process is known as electrodes being polarized. To get a longer lasting life and higher voltage production, it is important to use electrolytes that are suited for the task. Using two different types of metals is best. The two best types of metals are brass and zinc. The batteries seen and used commercially contain chemicals with a draw towards hydrogen. This combines with the hydrogen before it can polarize the electrodes.

Current (i), Voltage (V), Resistance (R):

When applying electricity, electricity flows in a circuit, or a loop. The electrons that move through the wires cause a movement known as a current. Therefore, circuit is a complete path of electrical energy meaning that the energy or charge is made or stored somewhere which is known as the voltage. Another part of a circuit is a resistance. A resistance prevents or slows and electrical current or charge from moving. When an electrical current flows through a source of resistance, such as a light bulb, it can be changed into light or heat or sound. There are three types of circuits, the most basic being a simple circuit.

Simple circuit

A simple circuit is made up of a light bulb, a switch, and a battery, all connected by wires. The purpose of the switch is to open or close the circuit. When the switch is closed, the circuit is complete. When the switch is open, the circuit is incomplete, breaking the flow of electricity. The next type of circuit is a series circuit. A series circuit is made up of several objects, one after another, such as several light bulbs connected to a battery and a switch. The third and final type of circuit is called a parallel circuit. A parallel circuit is the most complex because it connects several objects in many paths.

The benefit of having a parallel circuit over a series circuit is if a light bulb were to burn out, the remaining would still remain lit. In a series circuit, there are no other paths for electrons to go through and therefore, all of the light bulbs would go out. The circuits listed above are all classified as power circuits, which transfer and control large amounts of electricity. When we think of TVs and computers, the circuits that come to mind are electronic circuits which process and transmit information.

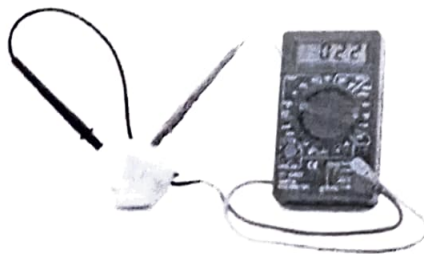
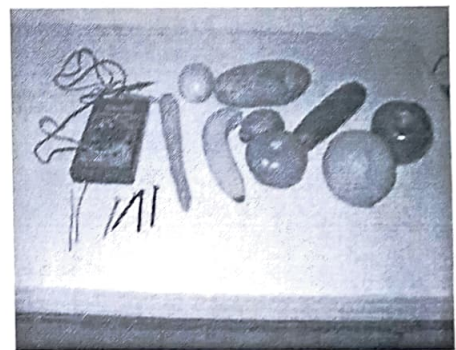
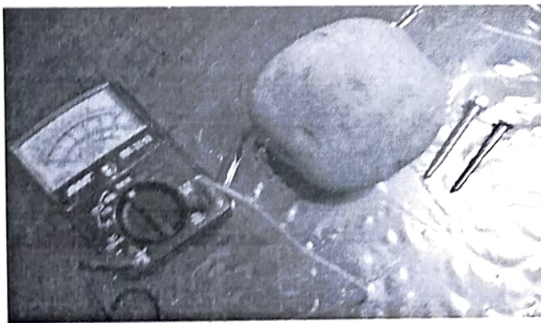
Materials:

- i). Lemon,
- ii). a grapefruit,
- iii). an orange,
- iv). a potato,
- v). a multimeter,
- vi). a penny, a brass nail, a copper nail, and a zinc nail

Procedure:

"Fruits and vegetables conduct electricity in the same way a salt solution will complete an electrical circuit ".It is due to the ions in the salt solution.

Our method is we will stick the zinc, copper, or brass electrode into the different fruit or vegetable and put the multimeter beside it. we will put the multimeter's wires on the electrode and measure how many Volts there are.



Lemon fruit



Pomegranate

Observations:

The electricity produced by vegetables and fruits with zinc-brass and zinc-copper conductors is

Fruits and vegetables	Zinc-Copper Voltage(V)	Zinc-Brass Voltage (V)
Grape Fruit	1.3	4.2
Potato	1.7	5.8
Lemon	1.8	5.9
Orange	1.2	4.8

Findings:


A comparative study has done and checked that which fruit and vegetable has more storing capacity of electricity. Out of four fruits grape fruit showed less voltage and lemon shows high voltage. The lemon did generate the most electricity. The more acidic a fruit is, the more electricity it can generate. The lemon is the most acidic of all the fruits used. Just like in conventional batteries, the acids interact with electrodes to generate small amounts of current that can be tapped and used to power small electronic devices.

Conclusion:

In this project different Fruits and vegetables generated different storing capacity of electricity. Comparison has done on storing capacity of electricity. Our conclusion is that the lemon generated the most electricity.



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