

BS-008

## **CASSAVA LEAVES BATTERY AS ALTERNATIVE ENERGY BASED ON ENVIRONMENT FRIENDLY TECHNOLOGY**

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### **ABSTRACT**

This study examines the electrolyte cassava battery leaves (*Manihot utilissima*) as an alternative energy based on environment-friendly technologies. Condition that a battery can produce electricity is the presence of an electrolyte. Electrolyte is a substance that is dissolved or decomposed into the form of ions and subsequent solution into electrical conductor, the ions are electrically charged atoms. Electrolytes may be water, acids, bases or other form of chemical compounds. Nature itself has shown electrolyte vegetables and fruits to us. Cassava leaf contains minerals such as potassium, phosphorus, calcium, magnesium, iron, zinc, chlorine, manganese, and sodium is high enough and the salts can produce electrical energy so as environmentally friendly. After testing that cassava leaves are battery voltage of 1.19 volts, closed to within 0.31 volts of commercial battery, while the current is 0.66 amperes strong ampere. Di 0.34 adrift in their cassava leaf battery current flows and voltages that arise, due to a chemical reaction between ions  $K^+$  with  $Cl^-$ .

**Keywords:** *cassava leaves battery, environmentally friendly*

### **INTRODUCTION**

The energy crisis is a very fundamental problems, especially electrical problems. Electrical energy is also an energy that is essential for human life in performing daily activities, the fundamental nature of the requirement as to the needs of the household up to commercial needs, almost all require electrical energy. But this time, the availability of electrical energy sources are not able to meet the increasing demand for electricity in Indonesia [1].

The need for new energy sources is in full swing sought and developed along with the development of biotechnology. Search also focused source of electrical energy derived from organic materials that are environmentally friendly, safe for humans, easy to obtain and can be constantly updated, which is also a source of alternative energy, one of which is an environmentally friendly energy source of vegetables and fruits. The research that has been conducted by scientists of Israel is one potato produce 0.5 volt power supply voltage and of the potato battery cost analysis can be ten to fifty times cheaper than commercial 1.5 volt battery [2].

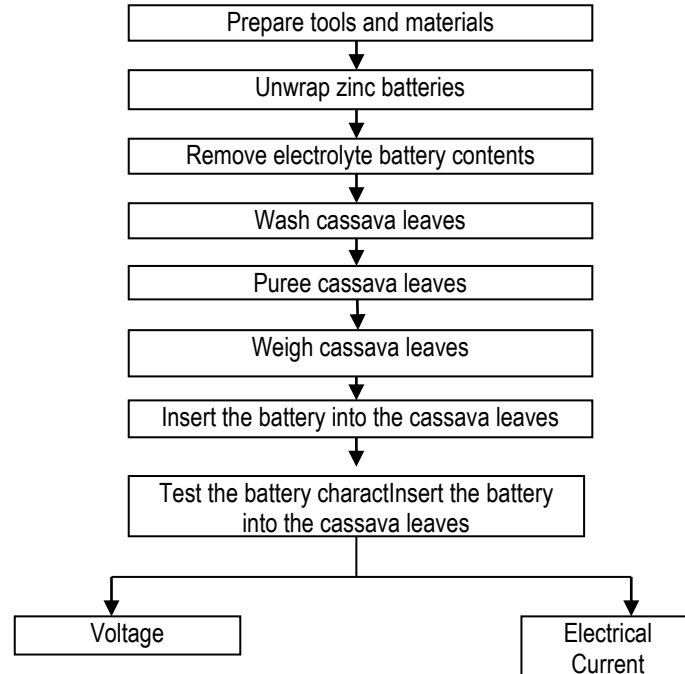
Electrolyte is a substance that is dissolved or decomposed into the form of ions and subsequent solution into electrical conductor, the ions are electrically charged atoms. Electrolyte can be a liquid, acidic, alkaline or other form of chemical compounds. Electrolytes are generally

in the form of acids, bases and salts, It so leafy vegetable cassava (*Manihot utilissima*) can be battery electrolyte. Cassava leaf contains minerals such as potassium, phosphorus, calcium, magnesium, iron, zinc, chlorine, manganese and sodium is high enough and salt. [3].

Batteries are one source of energy that once consumables. The battery consists of three major components, namely the carbon rod as the anode (positive pole), zinc (Zn) as the cathode (negative pole) and pasta as an electrolyte (conductor). One component of renewable battery is a battery paste [4].

Condition that a battery can produce electricity is the presence of an electrolyte. Battery as a source of direct current (DC) can be grouped into two kinds: Batteries dry element and wet elements. Wet batteries can be also called the batteries (accumulators) which means collecting. The battery is an electrochemical cell or cells that can transform Volta chemical energy into electrical energy [5].

The battery also is an equipment that can generate electrical energy through a chemical process. The battery has two electrodes, the positive electrode and the negative electrode. A material when it is connected to the electrodes of the battery, then there will be an electrochemical reaction and the flow of electric current from the positive pole to the negative pole.



**Figure 1.** Flowchart of Research

## METHODOLOGY

The study was conducted on the several stages of the preparation of tools and materials, the manufacture of batteries and analysis of data. The tool used was a knife, screwdriver,

scissors, gloves, multimeter, paper labels, sheet, wall clock and glass beaker. While the material is a former primary batteries, cassava leaves, and distilled water. Flow diagram of battery manufacture is shown in Figure 1. The data analysis is testing the battery voltage and electrical current of cassava leaves battery.

## RESULTS AND DISCUSSION

**Results** Measurement of battery voltage and electrical current of cassava leaves (*Manihot utilissima*) are shown in Table 1.

**Table 1. Voltage, Strong Flow Batteries cassava leaves (*Manihot utilissima*)**

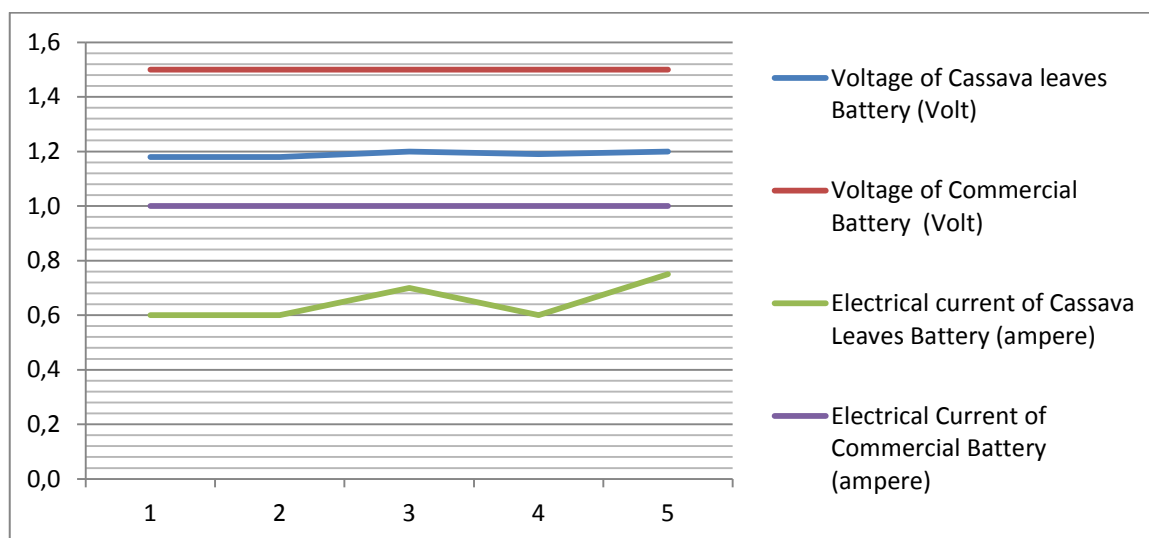
Battery numb	Volume of Aqua (ml)	Mass of Cassava Leaves (gram)	Voltage (volt)	Current (ampere)
1	25,00	15,00	1,18	0,60
2	25,00	15,00	1,18	0,60
3	25,00	15,00	1,20	0,70
4	25,00	15,00	1,19	0,65
5	25,00	15,00	1,20	0,75
Average	25,00	15,00	1,19	0,66

The results of comparative characteristics of cassava leaves battery with commercial batteries are shown in Table 2 and Figure 2.

**Table 2. Comparison of Cassava Leaf Battery characteristics with commercial batteries**

Voltage and electrical current	Baterai number				
	1	2	3	4	5
1. Voltage of Cassava leaves Battery (Volt)	1.18	1.18	1.20	1.19	1.20
2. Voltage of Commercial Battery (Volt)	1.50	1.50	1.50	1.50	1.50
3. Electrical current of Cassava Leaves Battery (ampere)	0.60	0.60	0.70	0.60	0.75
4. Electrical Current of Commercial Battery (ampere)	1.00	1.00	1.00	1.00	1.00

After testing as in the table above that the battery cassava leaves are still a long way to approach the voltage, strong current commercial batteries, battery voltage of 1.19 volts cassava leaves adrift 0.31 volts of battery ABC, while powerful battery current cassava leaves are also adrift 0,34 amperes. In 100 grams of leaves of cassava (*Manihot utilissima*) contains minerals such as potassium, phosphorus, calcium, magnesium, iron, zinc, heat, manganese, and high enough seta sodium salt [3]. It turns out that the existence of a battery voltage arising from cassava leaves of 1.19 volts and a current of 0.66 amperes flowing.



**Figure 2.** Comparison of Characteristics Line Graph Cassava Leaves Battery with Battery Commercial

## CONCLUSIONS

Cassava leaves (*Manihot utilissima*) batteries their current flows and voltages that arise due to the reaction between ions  $K^+$  with  $Cl^-$

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