A Study on Maximum Power Harvesting Potential from living PKL tree - Future Energy Resource for the Globe

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Abstract

A study has been conducted to extract power from living PKL (Pathor Kuchi Leaf) tree future energy resource across the globe. It has been used Copper and Zinc Plate as a negative and positive electrodes embedded between the two ends of the PKL to harvest voltage, current and power respectively. The voltage, current and power was collected by a calibrated multimeter. It was found the maximum open circuit voltage is 3.12 volt and the minimum open circuit voltage is 3.10 volt, the maximum short circuit current is 0.7A and the minimum short circuit current is 0.6A and the maximum power is 2.18 W and the minimum power is 1.85 W. It has been conducted by the several researchers for power production from other different vegetative and fruits previously. But no one has been done yet for power production from Living PKL tree like us. This research work will be the guideline for future energy resource across the globe.

Keywords: *Energy harvesting, Living PKL electricity, Energy resource, Maximum power*

I. Introduction:

The traditional energy sources like oil, gas and coal are very limited, because it will be finished within 2100 century [1-49]. Then the renewable energy sources like solar, wind, biogas, biomass, geothermal, hydropower, wave, tidal and OTEC energy will face the energy crisis for the globe in near future [50-89]. To keep it in mind, the authors have been conducted this research work **as** a maximum power harvesting potential from living PKL tree - future energy resource for the globe [90-119]. This work is a new and innovative source of biomass energy. This work is very innovative [120-149]. The authors have harvested to extract current, voltage and power from the living PKL tree [150-162]. Most of the results have been tabulated and graphically discussed.

II. Methodology:

Fig.1 (a) Fig.1 (b)

Fig.1 (a,b): Experimental set up of current, voltage and power harvest from the living PKL tree

At first it was considered 5 PKL from 5 trees. Then cu and Zn plate were placed between the ends of the Peach PKL by plastic clips. Then after it was measured the current, voltage and power separately. The 5 leaves were connected in series connection. Then after it was measured the current, voltage and power were measured respectively by a calibrated multimeter. The data were tabulated and graphically represented carefully. It was also measured the thickness of the Cu, Zn and PKL by digital slide calipers.

III. Findings:

Tbale-1 Data for Maximum Power extraction from living PKL tree

Date	No. of Observation	Local time (hrs)	Time duration(min)	Open Circuit Voltage, V_{OC} (V)	Short Circuit Current, I_{SC}(A)	$P_{max} = V_{OC} \times I_{SC}$ (W)
15.11.2019	01	12.42	00	3.12	0.7	2.18
	02	12.44	02	3.12	0.7	2.18
	03	12.46	04	3.12	0.6	1.87
	04	12.48	06	3.11	0.6	1.86
	05	12.50	08	3.10	0.6	1.86
	06	12.52	10	3.09	0.6	1.85
	07	12.54	12	3.11	0.6	1.86
	08	12.56	14	3.11	0.7	2.17
	09	12.58	16	3.12	0.6	1.87
	10	01.00	18	3.11	0.7	2.17

It is shown that open circuit voltage (V_{oc}), short circuit current (I_{sc}) and maximum power (P_{max}) have been tabulated (Table-1) with the variation of Local time and time duration. The observation was for short time. The observation was taken after every 2 minutes.

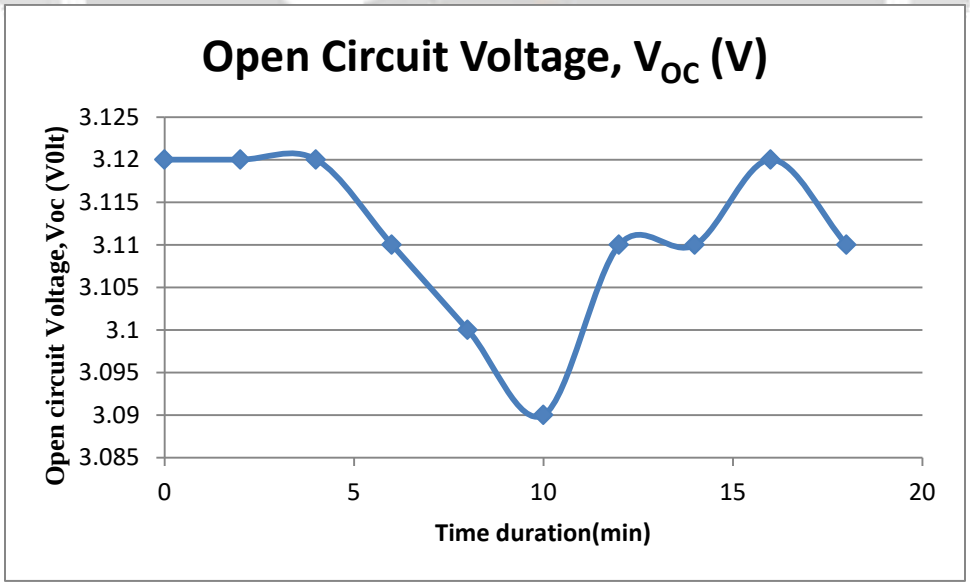

Fig.2 Variation of Open circuit Voltage with the variation of Time duration (min)

It is shown (Fig.2) that the variation of open circuit voltage with the variation of time duration (min). It is found that the maximum open circuit voltage was 3.12 volt and the minimum open circuit voltage was 3.09 volt. The change of the open circuit voltage was 0.03 volt. It can be said that the open circuit voltage was almost constant. The reason for small changing was due to loose connection among the trees.

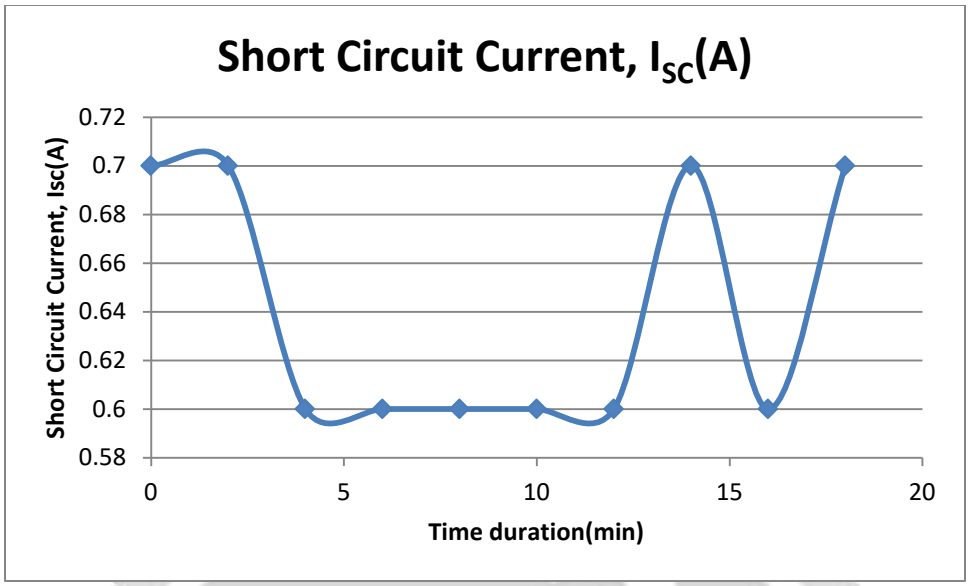

Fig.3 Variation of Short circuit Current with the variation of Time duration(min)

It is shown (Fig.3) that the variation of short circuit current with the variation of time duration (min). It is found that the maximum short circuit current was 0.7A and the minimum open circuit voltage was 0.6A. The change of the short circuit current was 0.01 A. It can be said that the short circuit current was almost constant. The reason for small changing was due to loose connection among the trees.

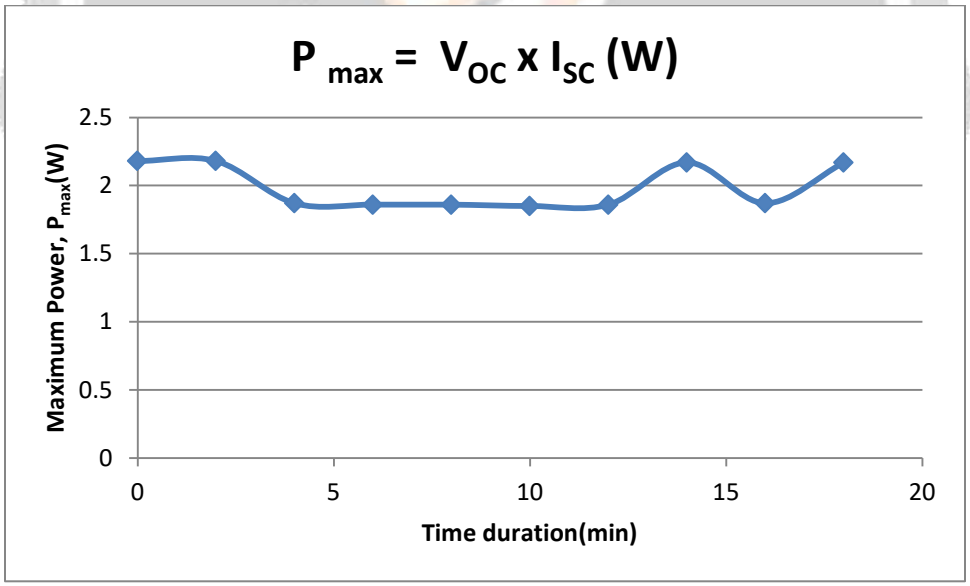

Fig.4 Variation of Maximum Power with the variation of Time duration (min)

It is shown (Fig.4) that the variation of maximum power with the variation of time duration (min). It is found that the maximum P_{max} was 2.18W and the minimum P_{max} was 1.85 W. The change of the P_{max} was 0.33 W. It can be said that the short circuit current was almost constant. The reason for small changing was due to loose connection among the trees.

IV Conclusions:

From the short term experimental analysis it can be said that open circuit voltage, short circuit current and maximum power were almost constant. So now it has to be conducted long term basis research for next time.

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