Living PKL Plants - An Innovative Idea for PKL back up LED lamp along the Coastal Belts of Bangladesh

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Abstract

Living PKL (Pathor Kuchi Leaf) plant is an important source of electricity. The scientific name is of PKL is Bryophillum pinnatum Leaf. Firstly, PKL extract is working a good electrolyte after taking from the garden. Secondly, it is working as an electrolyte from a living plant. In this paper, electricity from PKL has been studied. The Zn and Cu plate has been used here. The voltage has been collected for Zn/Cu based electrodes. AgNPs have been synthesized, Characterized and monitoring for PKL electricity from living different vegetative and fruits. Silver Nanoparticles (AgNPs) have been used to improve the performance of electricity from living PKL plant. It is shown that use of AgNPs has been increased the performance. Finally, it can be concluded that AgNPs got better performance for electricity generation from living PKL plant.

Keywords: *PKL, Living plant, Coastal belt, LED lamp, AgNPs, Sand areas, Soil areas*

1. **Introduction**

Bangladesh has a 710 km long coast line. Sometimes people of coastal areas are facing problems of electricity. They are also facing load shedding problem. In this case our PKL electricity can help them. PKL trees can grow everywhere. This PKL is called miracle leaf. There are some places along the coastal belt where the some people are not getting grid electricity properly. PKL electricity can help to provide electricity during night time with Solar PV System. After finishing the traditional sources of energy (oil, gas and coal), renewable energy sources (solar energy, wind energy, geothermal energy, biogas energy, biomass energy, water energy, tidal energy, wave energy and OTEC energy) may be vital source of energy along the coastal belt of Bangladesh. Our PKL electric energy is the one kind of renewable energy sources which is known as biomass energy. Since the traditional sources of energy (oil, gas and coal) are mineral sources, so that it will be finished within 2021 century. That is why we have no time to stay. We have to increase our research work on renewable energy sources like electricity from living PKL along the coastal belt of Bangladesh. It has been studied the electricity from living PKL along the coastal belt of Bangladesh from both sand and soil growing living PKL tree using AgNPs. A comparative study has been done for both with and without NPs.

2. Objectives

(i) To cultivate PKL along the coastal belt of Bangladesh.
(ii) To harness electricity by using the coastal belt of Bangladesh.
(iii) To learn about the use of with and without NPs for PKL electricity production.

3. **Materials and Methods**

Fig. 1 PKL (grows in sand) back up LED lamp

Fig.1 shows the PKL back up LED lamp grows in sand. It has been collected current, voltages, internal resistance, maximum power, load power with the variation of time duration during discharging of the PKL (grows in sand) back up LED lamp. Performance study was done for both with and without NPs. The intensity of light was measured by Lux meter. The voltage was measured by a calibrated multimeter.

Fig.2 PKL (grows in soil) back up LED lamp

Fig.2 shows the PKL back up LED lamp grows in soil. It has been collected current, voltages, internal resistance, maximum power, load power with the variation of time duration during discharging of the PKL (grows in soil) back up LED lamp. Performance study was done for both with and without NPs.

4. Results & Discussion

Table-1 Table for the variation of Intensity of the light (Lux) of PKL backup LED bulb (min) for grows in sand areas

Time duration of the PKL backup LED bulb (min) for grows in sand areas	Intensity of the light (Lux)	Power of the LED lamp (Watt)
00	19990	20

80	18000	20
120	17800	20
160	17700	20
200	16900	20
240	16600	20
300	15500	20
340	15000	20
400	10000	20
440	9500	20
480	9000	20
600	8000	20
700	7500	20
800	6000	20
900	4500	20
1000	2000	20

It is shown from Table-1 Table for the variation of Intensity of the light (Lux) of PKL backup LED bulb (min) for grows in sand areas.

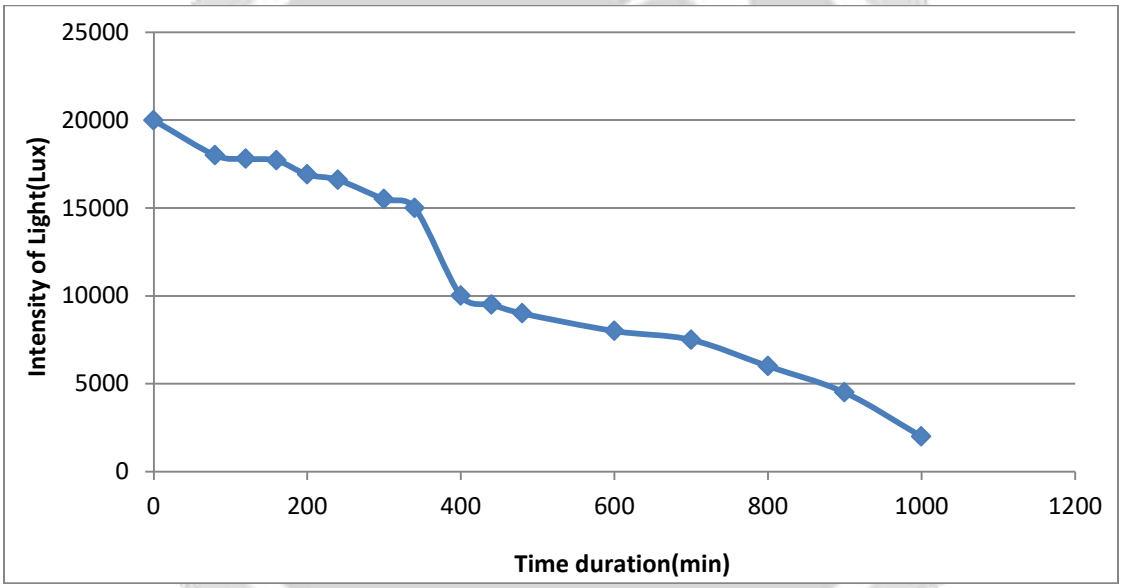

Fig.3 Variation of Intensity of the light (Lux) of PKL backup LED bulb (min) for grows in sand areas.

It is shown that form Fig.3 that the variation of intensity of the light (Lux) of PKL backup LED bulb (min) for grows in sand areas. It is found that the discharge rate was slowly up to 300 minutes then it decreases rapidly up to 400 minutes. Then after, it decreases almost exponentially up to 1000 minutes.

Table-1 Table for the variation of Intensity of the light (Lux) of PKL backup LED bulb (min) for grows in soil areas

Time duration of the PKL backup LED bulb (min) for grows in soil areas	Intensity of the light (Lux)	Power of the LED lamp (Watt)
00	20010	20
80	19000	20
120	18800	20
160	18700	20
200	17900	20
240	17600	20
300	16500	20

340	16000	20
400	11000	20
440	10500	20
480	10000	20
600	9000	20
700	8500	20
800	7000	20
900	5500	20
1000	4000	20

It is shown that the variation of Intensity of the light (Lux) of PKL backup LED bulb (min) for grows in soil areas.

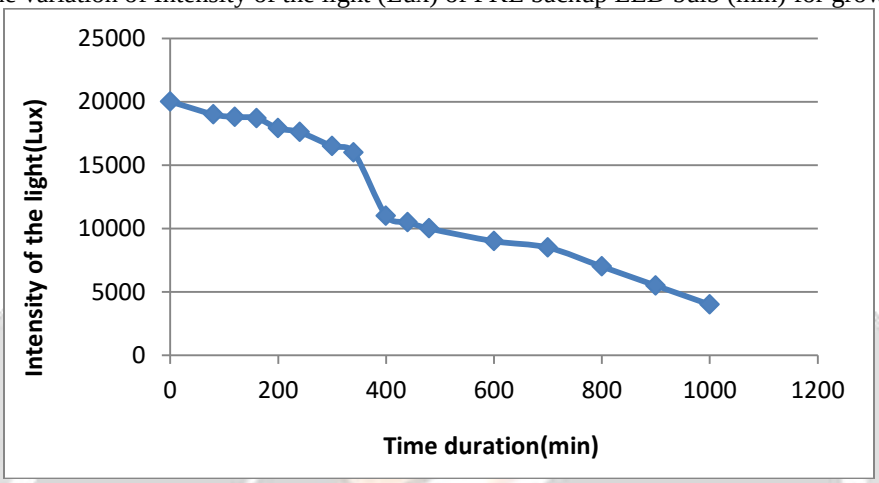

Fig.4 Variation of Intensity of the light (Lux) of PKL backup LED bulb (min) for grows in soil areas.

It is shown from Fig.4 that the variation of Intensity of the light (Lux) of PKL backup LED bulb (min) for grows in soil areas. It is found that the discharge rate was linearly up to 300 minutes then it decreases rapidly up to 400 minutes. Then after, it decreases almost linearly up to 1000 minutes.

Table-3 Data of voltage collection for both with and without AgNPs in sand areas for a single living PKL cell.

Time duration(min)	Open circuit Voltage, V_{oc}(V) without AgNPs in sand areas	Open circuit Voltage, V_{oc}(V) with AgNPs in sand areas
00	0.98	1.05
30	0.98	1.05
60	0.98	1.05
90	0.98	1.05
120	0.98	1.05
150	0.98	1.05
180	0.98	1.05
210	0.98	1.05
240	0.98	1.05
310	0.98	1.05
340	0.98	1.05

It is shown from Table-3 that the voltage collection for both with and without AgNPs in sand areas for a single living PKL cell.

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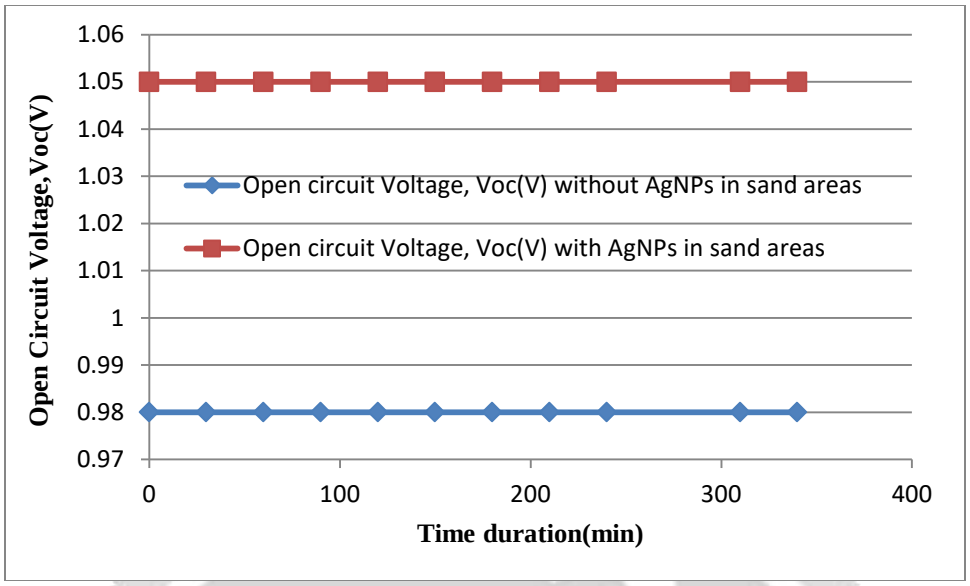

Fig. 5 Variation of voltage (V) with time duration (min) for both with and without AgNPs in sand areas for a single living PKL cell.

It is shown from Fig.5 that the variation of voltage (V) with time duration (min) for both with and without AgNPs in sand areas for a single PKL cell. It is also found that the voltage was almost constant for both with and without AgNPs in sand areas for a single PKL cell. But it is also found that there is an impact after applying the AgNPs to the single living PKL electrochemical cell. The voltage has been increased for AgNPs. The voltage difference was 1.05-0.98= 0.07 volt for sand areas.

Table-4 Data of voltage collection for both with and without AgNPs in soil areas for a single living PKL cell.

Time duration(min)	Open circuit Voltage, V_{oc}(V) without AgNPs in soil areas	Open circuit Voltage, V_{oc}(V) with AgNPs in soil areas
00	1.01	1.10
30	1.01	1.10
60	1.01	1.10
90	1.01	1.10
120	1.01	1.10
150	1.01	1.10
180	1.01	1.10
210	1.01	1.10
240	1.01	1.10
310	1.01	1.10
340	1.01	1.10

It is shown from Table-3 that the voltage collection for both with and without AgNPs in soil areas for a single living PKL cell.

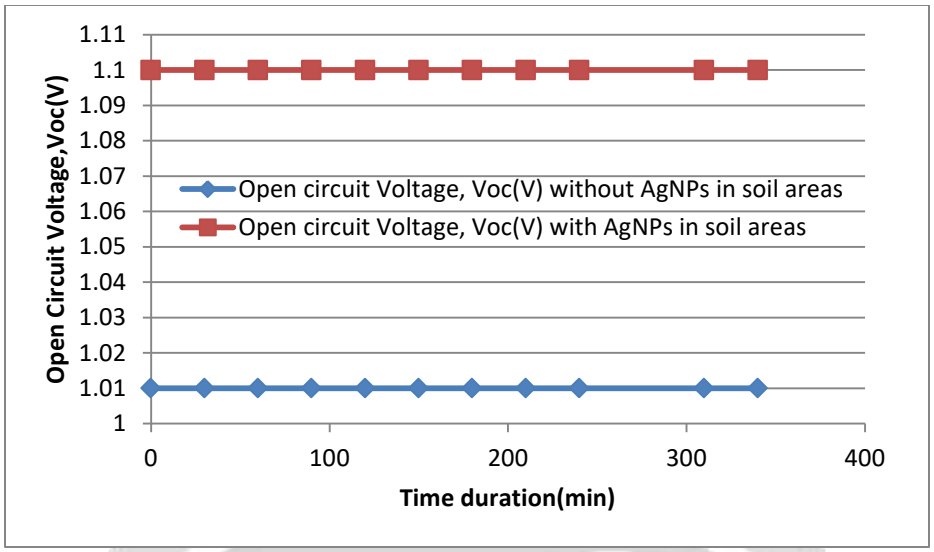

Fig. 6 Variation of voltage (V) with time duration (min) for both with and without AgNPs in sand areas for a single living PKL cell.

It is shown from Fig.6 that the variation of voltage (V) with time duration (min) for both with and without AgNPs in soil areas for a single PKL cell. It is also found that the voltage was almost constant for both with and without AgNPs in sand areas for a single PKL cell. But it is also found that there is an impact after applying the AgNPs to the single living PKL electrochemical cell. The voltage has been increased for AgNPs. The voltage difference was 1.10-1.01= 0.09 volt for sand areas.

5. Conclusions

i. The performance of PKL electricity is almost equal compare to the cultivation of PKL is soil and sand for a single living PKL cell.
ii. The voltage difference for a single living PKL cell in sand was 0.07 volt for with and without AgNPs.
iii. The voltage difference for a single living PKL cell in a soil was 0.09 volt for with and without AgNPs.
iv. The voltage difference between Soil and Sand is 0.09-0.07= 0.02 Volt.

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