Bi-Product from Bioelectricity

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Abstract

During the production of bioelectricity from Pathor Kuchi Leaf (Bryophyllum Pinnatum) ,it was found that bi-products biofertilizer, Methane gas and hydrogen gas were produced. Zinc is essential for all living organisms including plants. Being a cofactor in Enzymic reactions, zinc is vital for many biochemical pathways of plants, including: Photosynthesis and sugar formation, Protein synthesis, Fertility and seed production, Growth regulation and Defense against diseases. continuous "mining" of plant nutrients without adequate replenishment - a problem especially in a number of developing countries where the use of fertilizers on staple food crops is generally low. Fertilizers can replenish nutrients the soil lacks and can provide a better growing environment. Introduced in farming more than a century ago, mineral fertilizers have proven to enhance crop quality and yield. They have also contributed largely to the enormous increase in agricultural production which has led to more and better-quality food for humans and animals.PKL is used as a source of Zn based bio fertilizer. Most of the results have been tabulated and graphically discussed. It was found that Solid waste can be produced around 200 gm from 1000 gm PKL. Most of the results have been tabulated and graphically discussed.

Key words: *PKL, Bio-fertilizer, Bi-product, Solid waste*

Introduction

Plants typically require macro and micronutrients which are essential for health, growth and reproduction. Macronutrients including nitrogen, phosphorous and potassium are consumed in larger quantities. Micronutrients, although required in small amounts, are also very important for the plant's health and growth. One of these essential micronutrients is zinc. AAS machine is used to determine the Concentration of Zn and Cu ions by using collected samples after extraction of the electricity using PKL, which is called Miracle Leaf for medicinal value.

Methodology:

Sample collection

Fig.1: Sample collection to determine the metal contents of the PKL sap for fertilizer production before PKL electricity extraction.

Fig.2: Sample collection to determine the metal contents of the residue of the PKL sap after PKL electricity extraction.

It is collected some sample of the residue of the PKL sap after extraction of the electricity. The residue of the PKL sap was collected for different conditions, which are shown in the table 1.

Application of calibration curve

By putting the absorbance of any unknown solution, the corresponding concentration of the sample in the solution can be determined.

Calibration curve of Zn^{2+} and Cu^{2+} for semi solid waste for both mixed and unmixed with secondary salt (after extraction of electricity without filtration):

At very dilution state of the analytical analysis of the graph of Absorbance Vs Concentration gives a straight line going through the origin as follow:

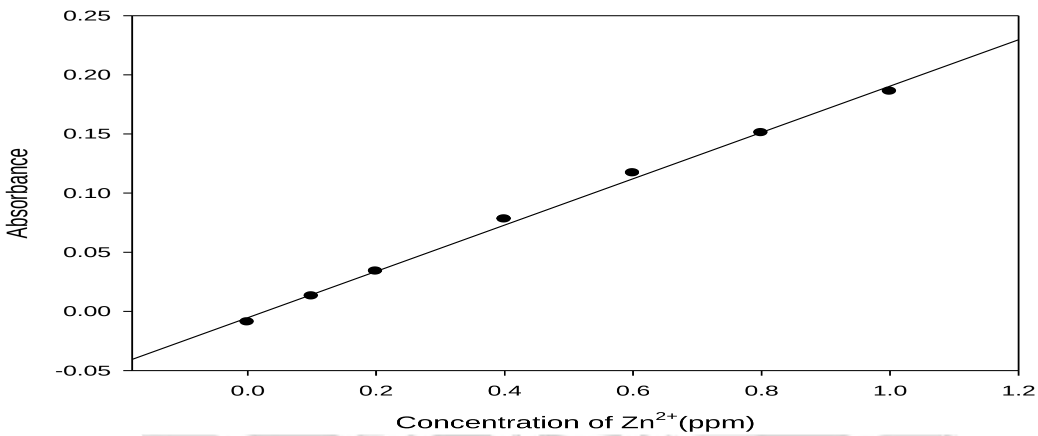

Fig.3: Calibration curve of the Variation of Absorbance with the variation of the concentration of Zn^{2+}(ppm)

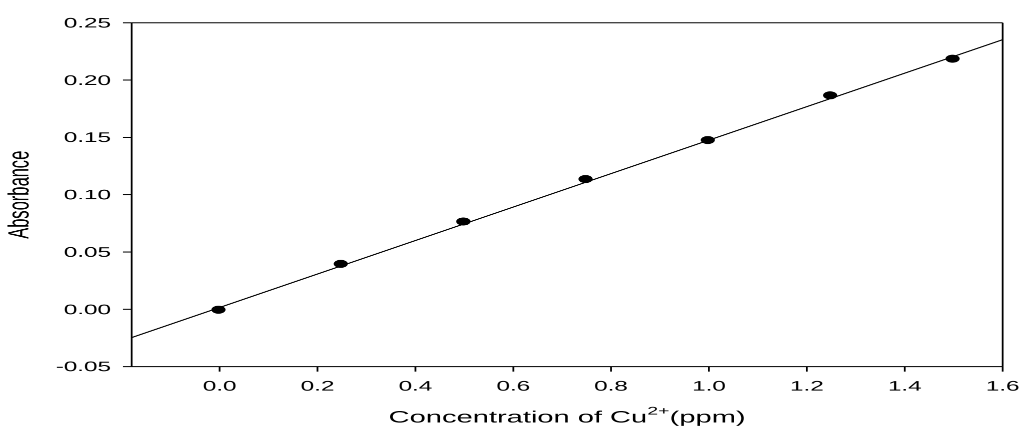

Fig.4: Calibration curve of the Variation of Absorbance with the variation of the concentration of Cu^{2+}(ppm)

Table 1: Determination of the concentration (ppm) of $[Cu^{2+}]$ and $[Zn^{2+}]$ by AAS.

Sample No.	Date of cell preparation	Date of sample collection	% of water	% of secondary salt($CuSO_4$ $5H_2O$)	% of PKL juice/ sap	% of the Copper ion [Cu^{2+}] (ppm)	% of the Zinc ion [Zn^{2+}] (ppm)
01.	01.07.2013	01.07.2013	20	0	80	0.043	17.46
02.	01.07.2013	01.07.2013	50	10	40	0.950	2.20
03.	01.07.2013	01.07.2013	50	10	40	1.841	13.36
04.	01.07.2013	01.07.2013	30	20	50	4.763	22.61
05.	01.07.2013	01.07.2013	30	0	70	0.090	4.96
06.	20.06.2013	01.07.2013	50	10	40	3.885	20.02
07.	05.03.2013	01.07.2013	50	0	50	3.376	37.20
08.	05.01.2013	01.07.2013	50	0	50	2.957	35.37
09.	01.01.2013	01.07.2013	50	10	40	1.860	20.82
10.	01.12.2013	01.07.2013	50	10	40	2.932	19.75
11.	20.10.2013	01.07.2013	50	10	40	18.18	55.58
12.	01.06.2013	01.07.2013	50	10	40	1.546	12.37

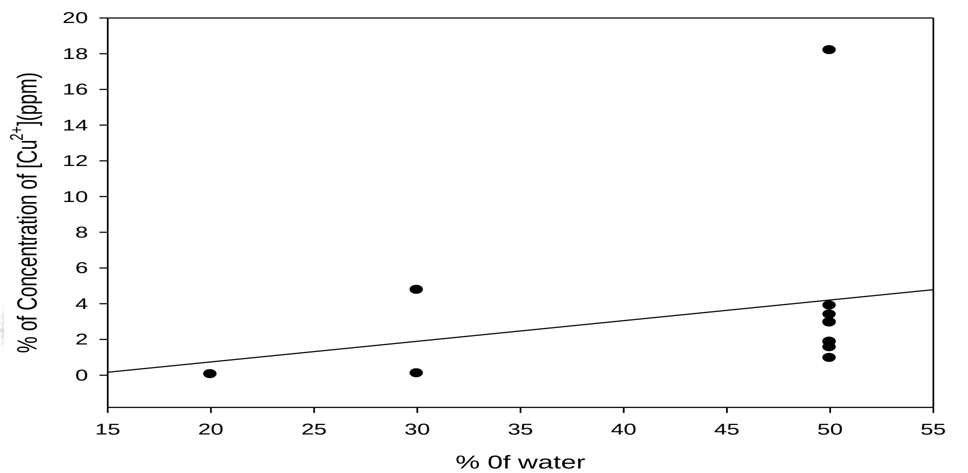

Fig.5: Variation of % of concentration of Cu^{2+}(ppm) with the variation of % of water in the juice.

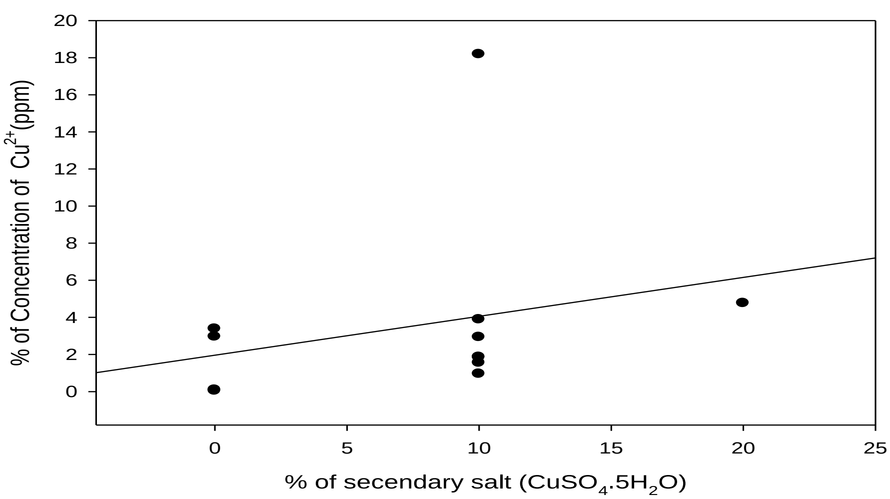

Fig.6: Variation of % of concentration Cu^{2+}(ppm) with the variation of % of secondary salt ($CuSO_4$. $5H_2O$).

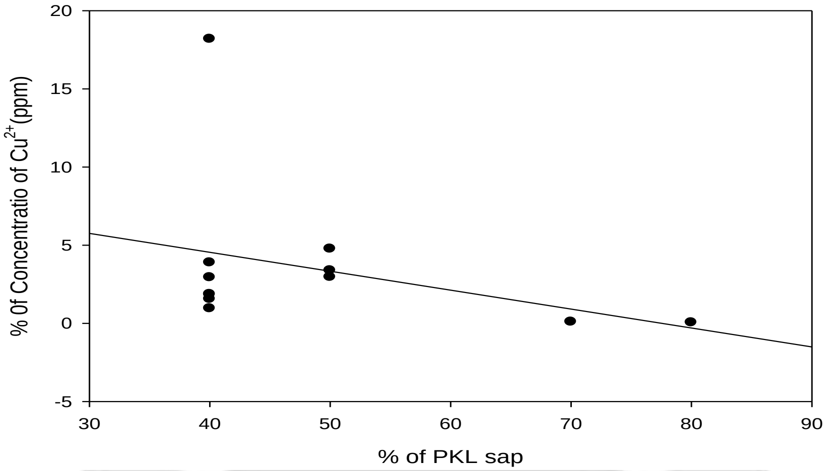

Fig.7: Variation of % of concentration Cu^{2+}(ppm) with the variation of % of PKL sap.

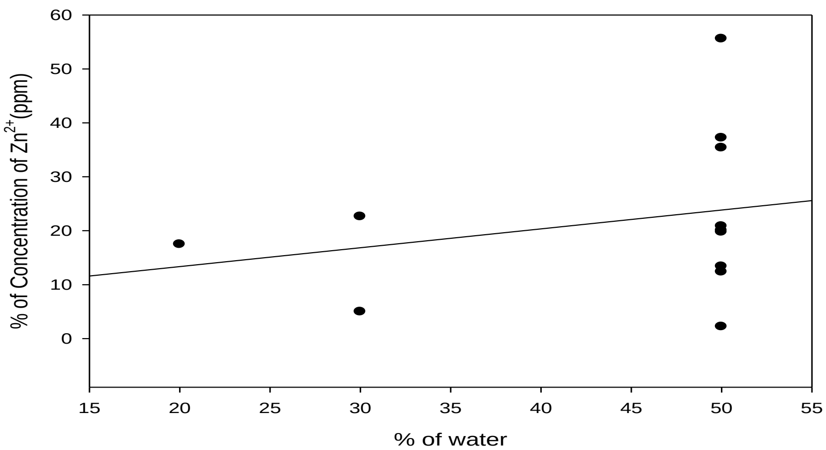

Fig. 8: Variation of % ofconcentration Zn^{2+}(ppm) with the variation of % of water.

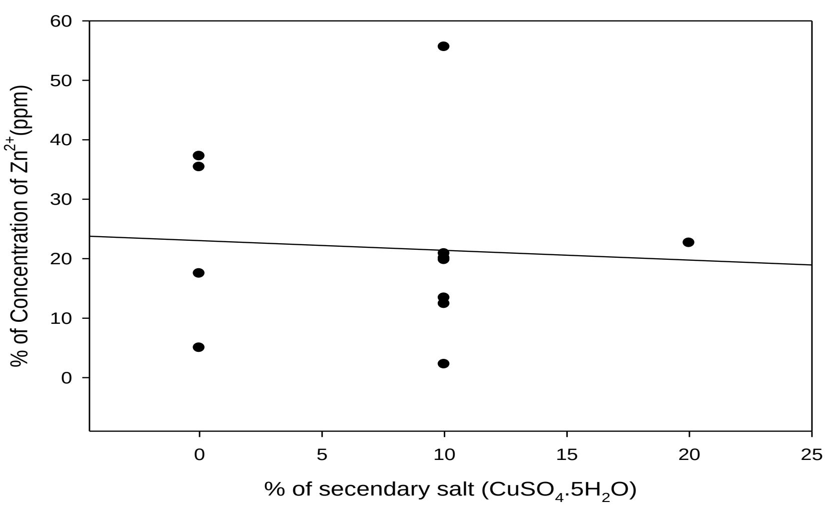

Fig.9: Variation of % concentration Zn^{2+}(ppm) with the variation of % of secondary salt ($CuSO_4$. $5H_2O$).

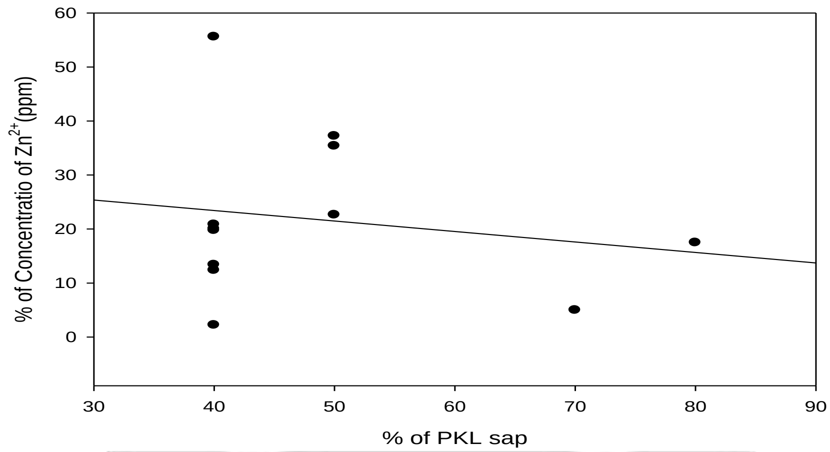

Fig.10: Variation of % concentration Zn^{2+}(ppm) with the variation of % of PKL sap.

Results and discussion

The Table 1 shows the determination of % 0f the concentration (ppm) of Cu^{2+} and Zn^{2+} by AAS. It also shows the secondary salt effect of the PKL sap. Copper Sulphate ($CuSO_4.5H_2O$) was used as a secondary salt. The PKL solution was made by mixing of water, Copper Sulphate and PKL sap for electricity generation. The constituent of the PKL solution(Table 1) is given by PKL sap (20%,40%,50%,70%), water (0%, 20%%, 30%, 50%) and Copper Sulphate (0%, 10%, 20%, 30%).The % of the Copper ion [Cu^{2+}] (ppm) for the above mentioned constituent of the PKL solution has been shown in the Table 1.Again the % of the Zn ion [Zn^{2+}] (ppm) for the above mentioned constituent of the PKL solution has also been shown in the Table 1.Here, it is mentioned that the product ion is [Zn^{2+}] and the reactant ion is [Cu^{2+}].% of The concentration of the product ion [Zn^{2+}] should be greater than the reactant ion [Cu^{2+}].The Table-1 shows that the [Zn^{2+}] is always greater than [Cu^{2+}] for each case. These results show that [Zn^{2+}] is always greater than the [Cu^{2+}], which indicates that for semi solid waste for both mixed and unmixed with secondary salt (after extraction of electricity without filtration) is a wonderful fertilizer.

Fig.5 shows the variation of % of concentration of Cu^{2+}(starts from zero) with the variation of % of water in the juice (PKL sap+ water + secondary salt). It shows that when % of PKL sap + % 0f secondary salt is constant then the % of [Cu^{2+}] varies almost linearly with the variation of % of water in the salt.

Fig.6 shows that % of the [Cu^{2+}] varies with the varies of CuO_4.5H2O is more than variation of % water of the same PKL Solution. The variation of [Cu^{2+}] starts from 1 for $CuO_4.5H_2O$ when for same PKL solution. The variation of % of the concentration[Cu^{2+}] starts from zero for % of H_2O.

Fig.7 shows the variation of % of the concentration of Cu^{2+} with the variation of PKL sap, when other two constituters % of water and & $CuO_4.5H_2O$ is constant. It shows that [Cu^{2+}] slowly decreases with linearly which is very favorable for PKL fertilizer.

Fig.8 shows the variation of % of the concentration of Zn^{2+} (starts from 11) with the variation of % of water in the juice. The [Zn^{2+}] increases almost linearly.

Fig.9 shows the variation of [Zn^{2+}] decreases linearly with the variation of % $CuO_4.5H_2O$. It shows the variation of [Zn^{2+}] with the variation of % $CuO_4.5H_2O$ is very negligible.

Fig.10 shows the variation of % of the concentration of Zn^{2+} with the variation % of PKL Sap. It also shows that the variation of [Zn^{2+}] is almost same as the variation of % of PKL sap in the PKL solution.

Now, comparing Fig. 5 to 10, It is seen that the variation % of the concentration of Cu^{2+} & Zn^{2+} with the variation of % water, of secondary salt and % of PKL sap is opposite in behavior. It shows that [Zn^{2+}] is always greater than the [Cu^{2+}] which is favorable for fertilizer productions. So it can be said PKL can produce bio fertilizer also.

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Nomenclatures

1. PKL = Pathor Kuchi Leaf
2. AAS = Atomic absorption spectrometer
3. ppm = parts per million
4. [Zn^{2+}] = Concentration of Zn ion
5. [Cu^{2+}] = Concentration of Cu ion

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