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ELECTROMAGNETIC RADIATION HAZARDS ON ECOLOGY

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Abstract: The energy supplied to a human is food water and air, all these are polluted in today's life, and at most the energy content or the supplements that carry vitamins and proteins are plants and their grains. These plants are affected by Electromagnetic radiation, thus the radiated food grains and leafy vegetables are the food supplements for human. The study of these properties using the electric potential flow through the plants and the protein levels gives the threat level of electromagnetic radiation .In this paper an attempt is made to analyze the hazard effect on plant, the at most food supplement for human.

Keywords: *Microwave radiation, electric potentials, portions.*

1. INTRODUCTION:

Exposure to RF/MW radiations is known to have a biological effect on plants, animals and humans also. Damage to major organs, disruption of some important biological processes, and the potential risk of cancer represent the dangers of microwave radiation to living organisms. Pulsed radiation found to have the greatest impact on biological materials. These things inspired us to take up this project. Our project deals with the effects of microwave radiation on plants.

The earlier studies on the radiation hazards pouring on in the literature indicating adverse health effects of mobile communications and networks which emit electromagnetic radiation, with maximum value of 50% of their energy being deposited when held close to the living system. An attempt is made to analyses the effect of Electromagnetic Radiation in some places of Andhra Pradesh region in India. The main objective of the present work is based on the measurement of electrical potentials in the plants and their behaviour, properties and structure of the plants.

Methodology

In this paper the hazards of microwave radiation on food grains is been observed. The experiment conducted on Mung bean (vigna radiate) seeds, results are very much classified to know the hazard level.

The objective of the project is to carry the effects of microwaves based on various parameters. The methods followed for analyzing the radiation effects are discussed below:

1.1 Analysis based on Physical growth

In this type of analysis we want to analyze the effects of microwave radiations based on physical growth of plants. The growth of the plant is analyzed based on the size of the leaf and length of the stem .Averaging concept is used for more accurate results. The lengths will be measured periodically (for every 7 days) and tabulated. These results are discussed in later sections.

1.2 Analysis of electric potentials:

In physiology, an electrical potential is a short-lasting event in which the electrical membrane potential of a cell rapidly rises and falls, following a consistent trajectory. We want to analyze how the electrical potential of the plant get affected by the radiation. The electrical potential is a very small value. Hence we need a transducer unit to transmit the signal in a better way. The value of the potential is measured using a data logger system.

2. MEASUREMENT OF ELECTRIC POTENTIALS IN THE PLANT

In the previous chapter we have seen the design of the data acquisition system. . Due to very low potential level of electrical signal of plant, the transmission of signal must be without distortion. The arrangement of the setup for electrical potential measurement is as shown.

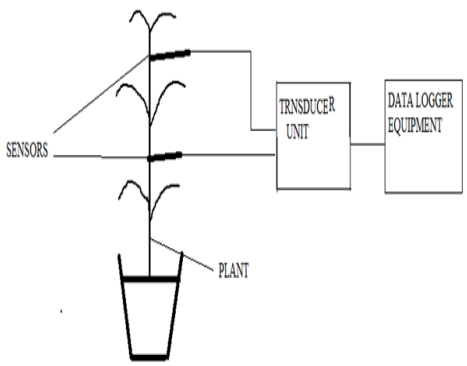

FIG 1: EXPERIMENTAL SETUP FOR ELECTRICAL POTENTIAL MEASUREMENTS

The design transducer unit can be used to acquire bio signals of plants in a more effective way than that of a direct connection of sensors into data acquisition system, since the signal is not affected by the noise of external RF/MW source such as of a typical greenhouse environment, or in an experimental laboratory.

The sensors used here are made of copper. Copper electrodes have high resistance which is compatible with the input impedance of the preamplifier ($>10^6$ Ohm).The sensors are kept in contact with the plant. Due to the potential of plants some potential flows through the sensors. This potential is very small. Hence it is very difficult to measure it directly. To measure the values accurately and without distortions we use the transducer unit. This transducer could be used to improve the efficiency of data acquisition system, in order to avoid the white Gaussian noise and the distortion from other electromagnetic signals.

The electrodes are made in contact with the plant. The signal extracted from that is given to the high sense amplifier. High sense amplifier is for amplifying this voltage. Due to high amplification the noise levels also may raise. To filter the unwanted noise components we need a Butterworth filter. If it is of higher order the results will be more accurate. We are using an 8^{th} order Butterworth low pass filter for filtering. The cutoff frequency of the Butterworth low pass filter is 2 KHz i.e. it passes the signals of frequency less than 2 KHz only. The main reason for selecting Butterworth design is that it offers a flat frequency response.

A voltage to current converter is needed for better transmission of signal. A micro ammeter is used to find the current values obtained. For measuring potentials we use a mille voltmeter which is connected before voltage to current converter.

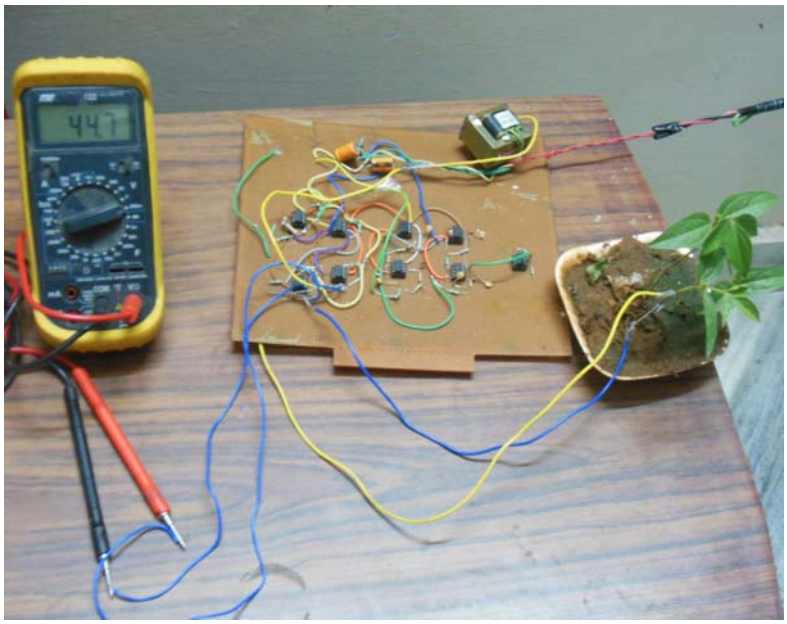

FIG 2: MEASURING ELECTRICAL POTENTIALS

With this setup the measurement of electrical potentials are carried. The electrical potentials are recorded and tabulated

3. ESTIMATION OF PROTEINS

Kjeldhal's method for the determination of organic nitrogen in the world wide standard for purpose of calculating nitrogen and hence the content of protein in organic food, animal feed etc.

Protein calculation:

%Nitrogen=[14.01*{titre(ml)-blank(ml)}*normality of acid*100]/[sample wt*1000]
%Protein=%Nitrogen*6.2

Protein Estimation

The protein estimations in Kjeldhal's method is based on nitrogen content. The table specifies the values of percentage of nitrogen and the protein value per gram of the content are given below:

NAME OF SAMPLE	%NITROGEN	PROTEINS (PER I GRAM)
WITHOUT RADIATION	4.25	0.266g
10 MINS RADIATION	4.19	0.262g
20 MINS RADIATION	4.1	0.256g
30 MINS RADIATION	4	0.24g
45 MINS RADIATION	3.54	0.21g
60 MINS RADIATION	3.02	0.12g

TABLE 1: % of Nitrogen and Protein Estimations

4. RESULTS

The electrical potential values of plants are found using transducer unit, to estimate the radiation intensity falls on plant using electrical concepts. The electrical potentials reveal the electrical characteristics of plants.

The comparison of electrical potential values is as shown below. Graphs for voltmeter and ammeter readings are as shown:

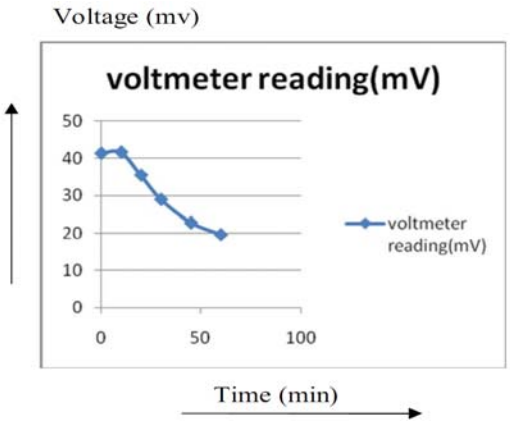

Fig 3: voltmeter readings

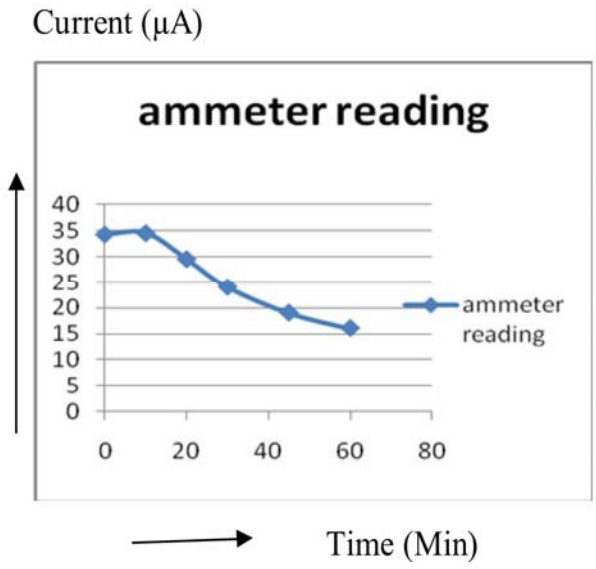

Fig 3: Ammeter Readings

Generally, from the results it is observed that the value of electrical potential of the samples falls down as radiation time increases in most of the cases. In the case of 10 minutes radiated sample the value is recorded very close to no radiated sample and sometimes recorded value is more than that of no radiated sample also. This may be due to activation of zinc component.

CONCLUSIONS

The microwave radiation effect on the plants in all aspects such as physical properties and mutation also is affected by the microwave radiation. The chlorophyll content also decreases. From analogy, due to the less chlorophyll the carbohydrates will also decrease. Through the biochemical estimations it is observed that the carbohydrate and protein contents are decreasing in the sample as radiation time

increases. The electrical potential values of samples also affected by radiation intensity in a negative manner. This is to conclude that the microwaves effect the physical growth, electrical potentials and nutrient values in a negative way. The exposure of microwaves is not good for living beings. Even though the effect is less here, but if the intensity is more it may lead to severe problems.

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