



EFFECT OF DIFFERENT VOLTAGES OF ELECTRIC CURRENT ON GROWTH OF BROWN CHICKPEA (*CICER ARIETINUM*)

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ABSTRACT: The effect of different voltages (5V, 9V, 12V) of electric current on the growth is observed in these studies. The current were induced for one hour after every 24 hours for 20 days. Plant height, root length, number of leaves, leaflets, distance between two nodes, stem diameter significantly increased under the influence of appropriate electric field. The remarkable variation in color is observed. There was increase in chlorophyll or green pigment in plants.

Key words: - Electroculture, Growth parameters, plant growth, chickpea.

INTRODUCTION :

Chickpeas (*Cicer arietinum* or garbanzo beans) are large roundish legumes, that look rather like a large round pea with an interesting bumpy surface. A staple of Middle Eastern, African and Indian cuisines the chickpea is the world's second most widely grown after the soybean and one of the eight founder crops of the origins of agriculture on our planet. Chickpeas store really well and are high in nutritive value, although they are not very disease resistant, compared to other legumes. Recent days the mass production for human population is the key need and concern. However, electric fields can be used as non-chemical method in agriculture. The electroculture is one of the boosts for plant growth. Aksyonov et al. (2000) noted the increase the rate of seed germination as well as stimulated the plant growth. The effect of electric field on seed germination and growth parameters of chickpea *Cicer arietinum* L. was studied by A. Afrasiyab, J. Zafar, H. Muhmmad (2020). W. Ross (1840) & Holdenfliess (1844) reported possible results favoured in an increase of potato plant yield upto 25%. Dr. Maimbary (1746) found an increase in growth of myrtle plants with electrical source. Kerdofag et al. (2002) mentioned

the yield of electrified seeds was possibly 5-10% increase in yield, but did not affect seed germination. Pietruszewki (1999) told cotton seeds have shown an increase in the seed germination in the electric field. Podlesny et al. (2003) reported in *Pisum sativum* rate of seedling depended on the intensities and exposure duration. Singh (1932); Moliterisz (1965) noticed the citrus tree connected with the negative end of the source can be helpful in fruit ripening. Wang and Wang (2004) analyzed the electric field can also be a fertilizer in soils.

This article aims to analyze the aspect of electric field and its exposure time using chickpea seeds as an experimental system. The effects of electric current were studied under favourable conditions in this paper.

MATERIALS & METHODS:

The vigour seeds of *Cicer arietinum* (Brown Chickpea) were collected. Four pots were labelled with Control, 5V (A), 9V (B), and 12V (C) prepared with garden soil rich in humus. The height of the pots was 6 inches. The DC power voltage supplier with 5V, 9V, and 12V were used. The copper electrodes attached with DC Voltage supplier dipped into pots filled with soil. The seeds of *Cicer arietinum* were soaked in

normal water for 12 hours. The pots were prepared with soil and water gaining fertility for sowing the seeds. The seeds were sown with 2-3 inch depth in the pots filled with soil. Each pots contain 5-6 seeds and allowed to grow under controlled condition with open sun light. The process of gently watering to the pots with scheduled timing till the sprouts come out in the soil was going. On the very 5th day after sowing the seeds the electric field was developed. The electric contact was made to pot A, B, and C with 5V, 9V, 12V respectively through stainless copper electrodes placed in the pots at both ends. The data was analyzed with respect to formal parameters.

RESULTS & DISCUSSIONS:

The rate of plant growth was enhanced as compare to the control groups. The crucial review made (Table 1 & Figure 3) that inducing the electric current of different voltages shows difference in plant growth parameters. Results obtained by this growth parameters lead us to conclude that electric field has rapid development in plants.

CONCLUSION:

Experimentally it was proven that, electricity boosted the growth of plants. The experimental study proved that, using appropriate intensities of the electric field plant cellular metabolism increase resulting positive growth in plants. In the study, we noticed the positive growth effect of 5V, 9V, & 12 intensities of the electric field in parameters like leaflet number, leaf number, distance between two nodes, stem diameter, height of shoot etc. Electro culture thus plays significant role in mass production for farmers in India. Not only crop plant but the angiospermic (flower) plants production can be increased due to appropriate electric current supply. Also in order to reduce underground pollution, excessive use of insecticides it is an optimum method. Further study could reveal

more good & remarkable output as per concern with respect to farmers benefits.

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Table 1: Detailed analysis till day 20

Sr. No:	Units	Average number of leaves	Average number of leaflets	Average shoot height (cm)	Average stem diameter (cm)	Distance Between 2 nodes (cm)
1	Control	5	13	16.5	0.8	2.1
2	A(5V)	7	12	15.5	0.6	2
3	B(9V)	9	12	19.5	0.8	2.2
4	C(12V)	10	14	21	0.8	2.5

Figure 1: DC power voltage supplier

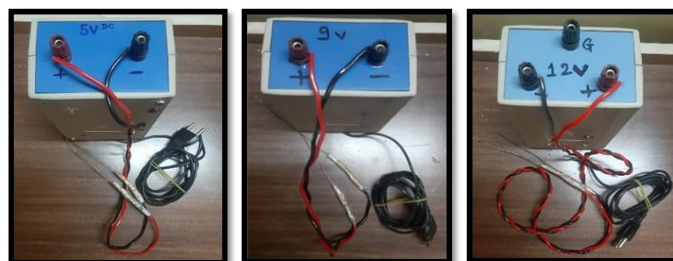


Figure 2: Electric current given to the plants



Figure 3: Observation noted periodically

