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Effect of Organic, Inorganic Fertilizers on Maize Emergence, Growth and Performance

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Abstract: ***Zea mays the third most important cereal crop in India but the Performance of maize is effected by the depth of sowing. A Pot experiment is conducted in Addanki, Prakasam (Dist) Andhra Pradesh with 3 different treatments Organic Inorganic and Absolute control. From overall results we observed that Organic treatment is better than other treatments because it shows better performance in all parameters like germination%, plant height, no of leaves etc and even it was observed that the tassels they emerged first in organic treatment only.***
Keywords : Maize, organic, chemical fertilizers and sustainability

I. INTRODUCTION

Maize (*Zea mays)* is a cereal grain belongs to Poaceae family crop also known as queen of cereal due to diverse uses. In India it is cultivated in most of the states throughout all the season. India ranks 3rd in maize after Rice and Wheat crop, It is staple human food, feed for livestock, for fermentation and many industrial uses. It is having abundant starch (65%). There are two types of milling. Wet milling produces industrial starch like sweeteners, also produces various modified maize starch for paper lamination, textile wrap, sizing and laundry finishing. Dry milled products are animal feed, brewing, breakfast cereals, other food. In India, dry milling is the predominant process for flour and animal feed, fermentation and distilling industries and composite flours. In the new millennium, it is an alternate crop to rice and wheat. About 35% production is consumed by human, 25% poultry and cattle 15% food processing calorically (higher perceived sweetness) other than sugarcane or sugar beet.

The major maize growing states are Karnataka, Maharashtra, Madhya Pradesh, Tamilnadu, Telangana, Bihar and Andhra Pradesh. Karnataka is the largest producer with 1.29million hectares area under cultivation and 3.55 million tons production followed by Maharashtra with 1.16million hectares area under cultivation and 3.54 million tons of production. (Directorate of Economics and statistics, DAC&FW) .Maize is grown in different types of climates but performs well in hot regions with annual rainfall of 60cm. It can grow in all types of soils but loamy sandy to clay loamy soils with abundant organic matter are preferred. The pH of 6.5-7.5 is preferred. In India maize is mostly used for poultry (47%) followed by direct consumption (20%). The average yield of maize is about 3 tonnes per hectare which is far less than that of 5 tonnes per hectare in countries like USA, China.

The average yield of maize in India is less due to many biotic and abiotic factors like weeds, pests, climate and soil conditions out of which proper sowing depth is one and most important for proper germination and yield. Therefore proper depth of sowing is to be determined and maintained to maximize the growth and yield.

II. MATERIALS AND METHODOLOGY

Experiment location:-The pot experiment conducted in the kharif season of year 2020 (during the time of covid-19) at Addanki location to find the result under different climatic conditions. The location of the experiment are:-Addanki, Prakasam(dist) the latitude of Addanki is 15.8107° N, longitude is 79.9724° E Soil : the soils in Addanki (A.P) vary from black to sandy loam soils. Annual rainfall of 906mm and the average temperature is 28.5^{o}c and semi arid region. Before sowing the seeds we have given Basal dosages of urea, NPK and FYM (farm yard manure). while top dressing we have given same Basal dosages of urea, NPK and FYM (farm yard manure) to the soils for better growth. The irrigation is given for every two days and Data were collected on 10 ,20,30,40,50 days after sowing .Growth parameters like Plant height, No. of Leaves, Leaf length, Leaf width were collected.

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Figure 1-Different treatment (organic, inorganic, absolute control) of maize in pot.

III. RESULT AND DISCUSSION

There was significant difference between the treatments in all growth parameters.

In this experiment we have observed that organic treatment is the best one because when it comes to down to richness in nutrients, the organic treatment provides a boost in growth when FYM (farm yard manure) are used, thus the yielding quality nutrients with higher produce along with growth in plant height, number of leaves, length of leaf ,width of leaf.

whereas as chemical treatment it needs a lot of supplement but still not able to maintain a constant growth. whereas as absolute treatment is poor because we are not adding any kind of chemicals or manures that's why absolute treatment maintain low growth. Hence as discussed above organic treatment shows best performance even at lower maintenance when compared to other two treatments.

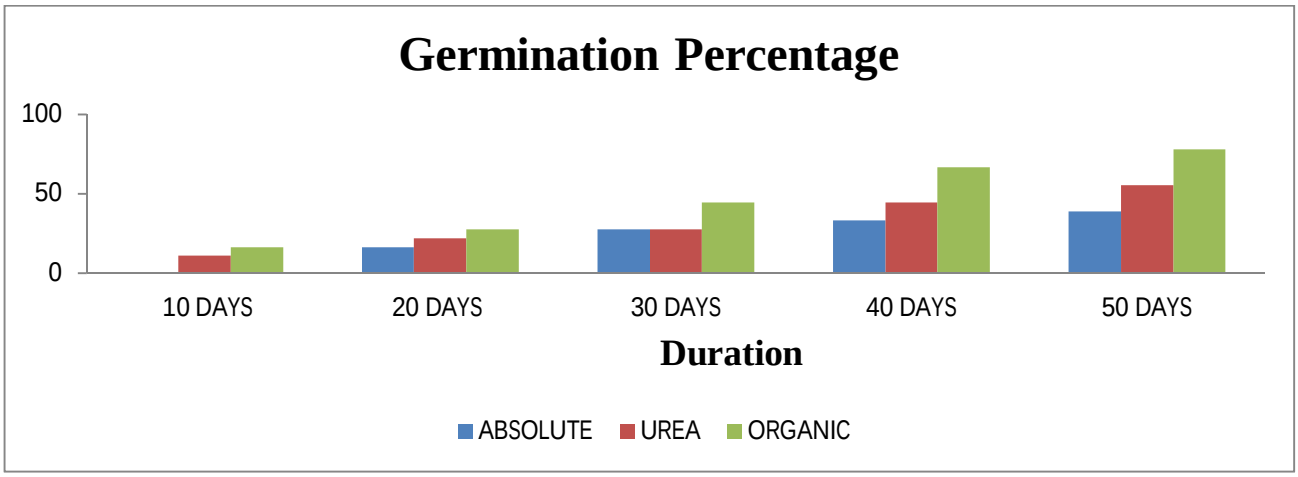
IV. TABLE AND GRAPHS

A. Germination Percentage (GP)

$$GP = \frac{\text{Number of Total Germinated Seeds}}{\text{Total Number Of Seeds Tested}} \times 100$$

Table 1: Effect of organic and chemical fertilizer in Germination Percentage

	10 DAYS	20 DAYS	30 DAYS	40 DAYS	50 DAYS
ABSOLUTE	0	16.6	27.7	33.3	38.8
UREA	11.1	22.2	27.7	44.4	55.5
ORGANIC	16.6	27.7	44.4	66.6	77.7



Graph : 1 Effect of organic and chemical fertilizer in Germination Percentage

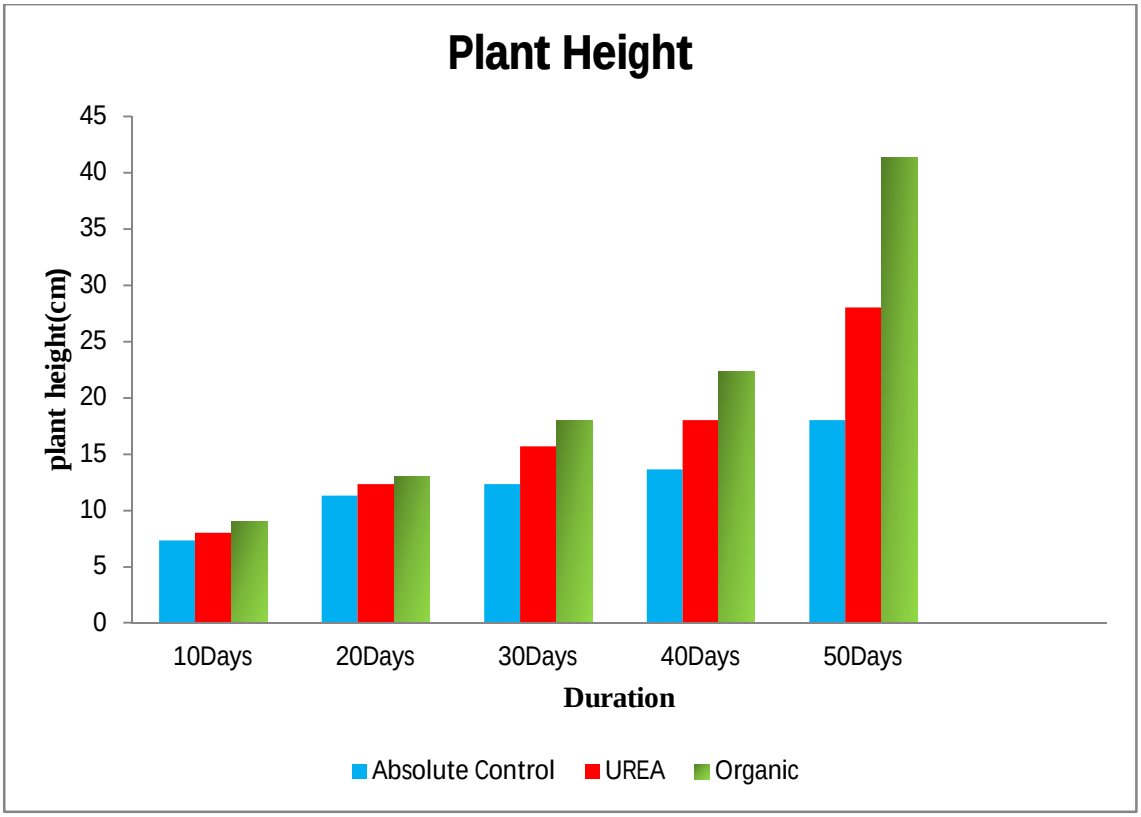
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B. Plant Height

It is the measurement of the total length of a plant from the base to the tip of the highest leaf or flag leaf.

Table 2: Effect of Organic and chemical fertilizers in Plant Height (cm) in maize crop

	10Days	20Days	30Days	40Days	50Days
Absolute Control	7.33	11.33	12.33	13.66	18
UREA	8	12.33	15.66	18	28
Organic	9	13	18	22.33	41.33



Graph : 2 Effect of Organic and chemical fertilizers in Plant Height (cm) in maize crop

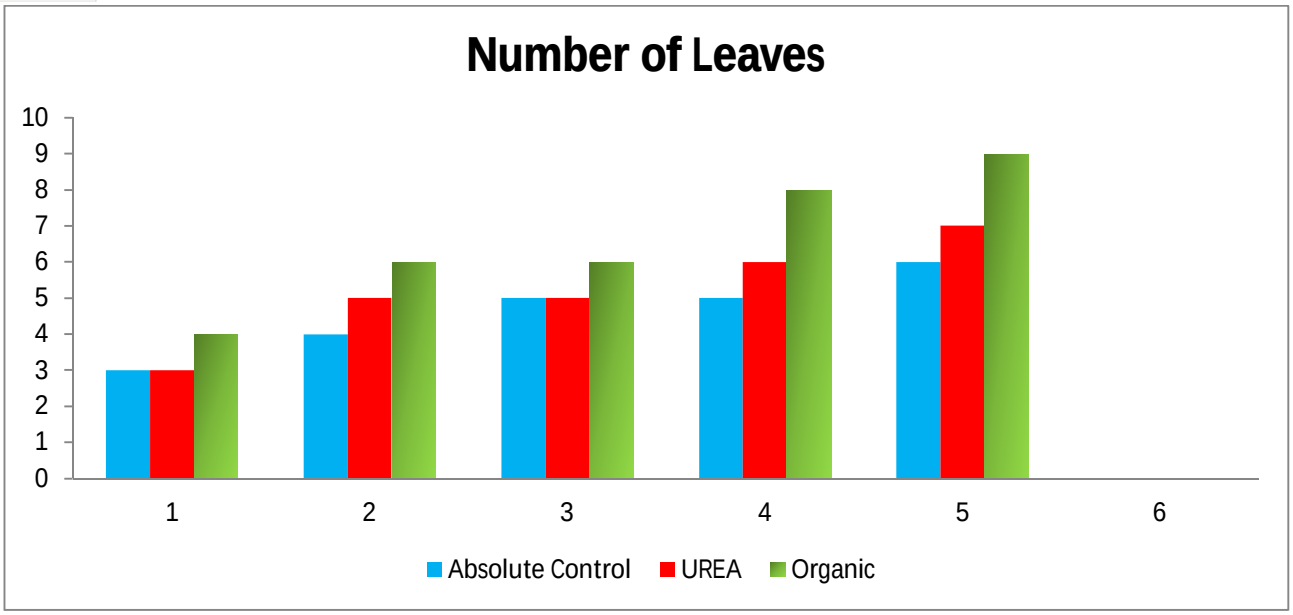
C. Number of Leaves

The total Number of Leaves on a Plant

Table 3: Effect of Organic and chemical fertilizers of number of leaves in maize crop

	10Days	20Days	30Days	40Days	50Days
Absolute Control	3	4	5	5	6
UREA	3	5	5	6	7
Organic	4	6	6	8	9

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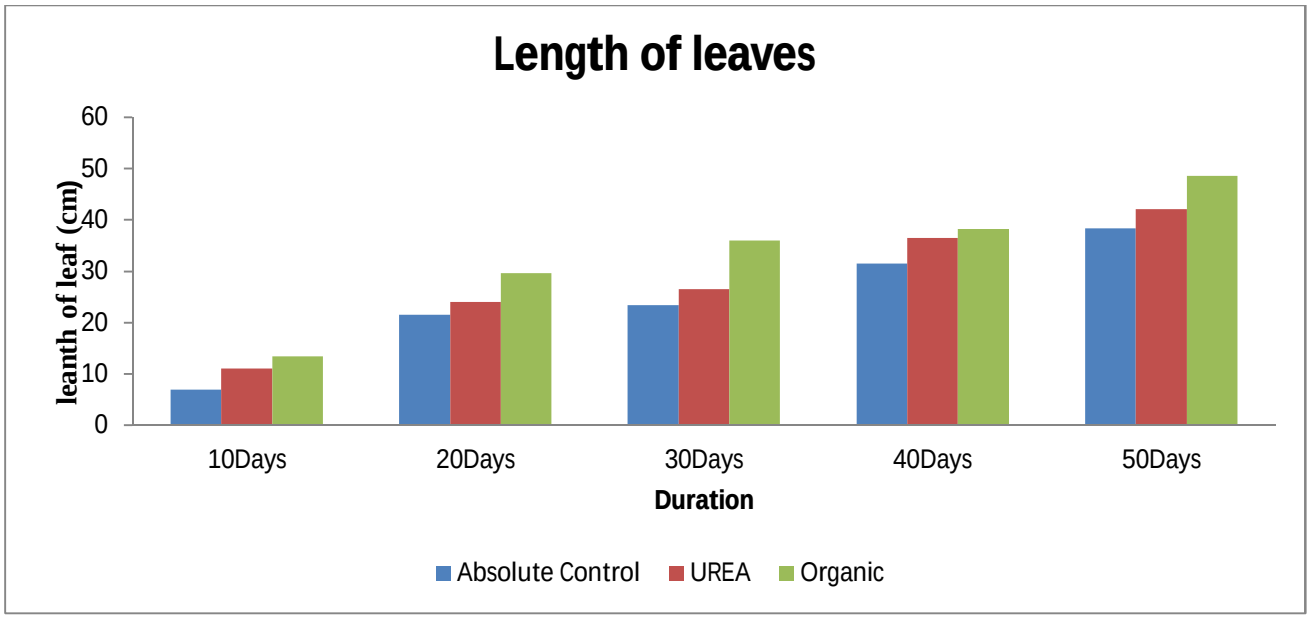
Graph : 3 Effect of Organic and chemical fertilizers of number of leaves in maize crop

D. Leaf Length

It is recorded by measuring the length of the longest leaf or flag leaf of the plant from the base to the tip

Table 4: Effect of Organic and chemical fertilizers in length of leaves in maize crop

	10Days	20Days	30Days	40Days	50Days
Absolute Control	7	21.5	23.4	31.47	38.34
UREA	11.11	24	26.588	36.45	42.12
Organic	13.4	29.6	36.05	38.26	48.62



Graph : 4 Effect of Organic and chemical fertilizers in length of leaves in maize crop

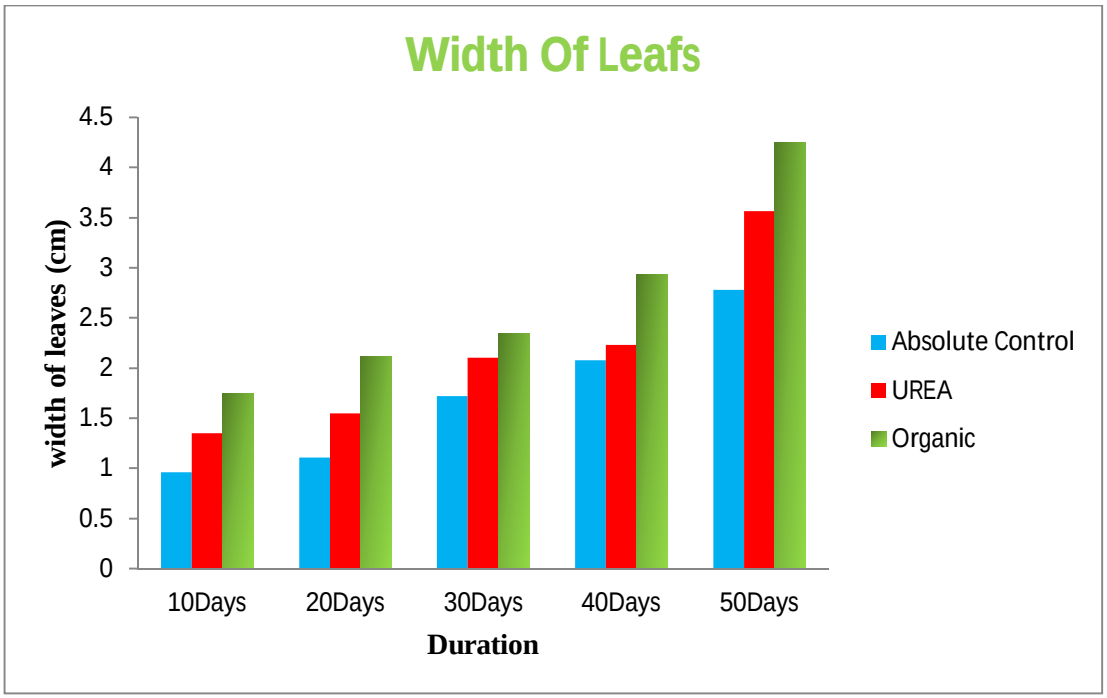
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E. Leaf Width

It is measurement of the width of the leaf at its widest observable part. Number of leaves: The total number of leaves on a plant.

Table 5: Effect of Organic and chemical fertilizers in width of leaves in maize crop

	10Days	20Days	30Days	40Days	50Days
Absolute Control	0.96	1.11	1.72	2.075	2.78
UREA	1.35	1.55	2.1	2.23	3.566
Organic	1.75	2.12	2.35	2.94	4.26



Graph : 5 Effect of Organic and chemical fertilizers in width of leaves in maize crop

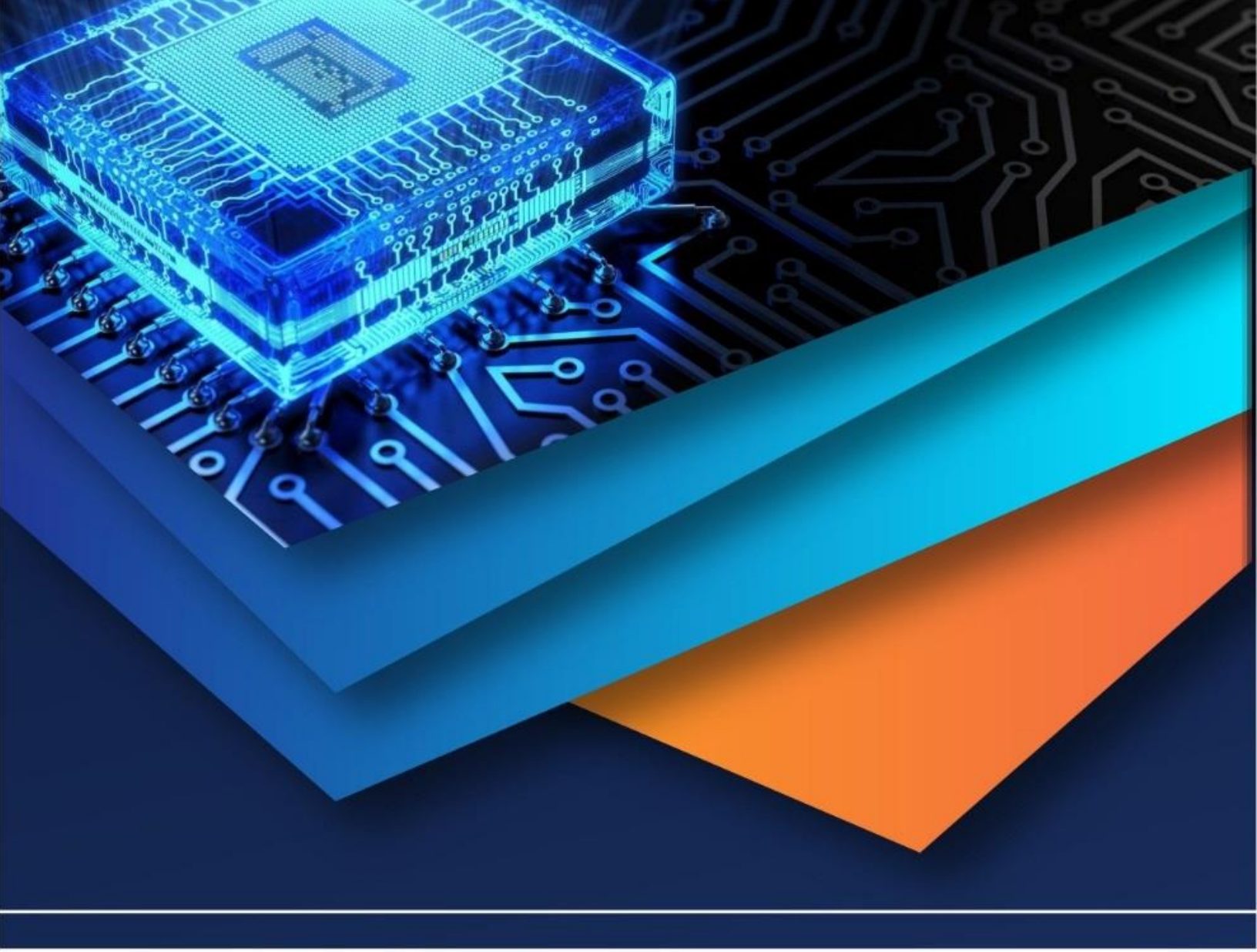
V. SUMMARY AND CONCLUSION

It is concluded by the research conducted was that Organic treatment is better than other treatments because it shows better performance in all parameters like germination%, plant height, no of leaves etc and even it was observed that the tassels they emerged first in organic treatment only. This could be due to the reason that the organic manures get mineralized slowly so they provide nutrients to the plants till later stages of the crop life cycle.

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