

# on the germination and cation uptake of capsicum annuum

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The chilli seeds were germinated under different colour lights. The percentage of germination was in the order red  $\geq$  yellow  $\geq$  green  $>$  control  $>$  blue. Energy ratios of red, yellow, green and blue lights against control were 1.13  $>$  1.03  $>$  0.92 and  $>$  0.76. The chlorophyll ratio against the control was in the reverse order. Under pot conditions, upto 0.33% NaCl solution enhanced seed germination compared with ordinary tap water. However, the percentage of survival decreased as the concentration of salt increased.

**Key words:** Photoeffect, germination, capsicum annuum

## INTRODUCTION

The objective of this study is to find out the influence of various colour lights and saline water irrigation on the seed germination of chillies (*capsicum annuum*).

## MATERIALS AND METHODS

Known amount of sieved ( $<$  2mm) soil has been kept in mud pots and glass beakers. A known number (10 or 30) of seeds in each were sown. To study the effect of colour lights, they were covered with bell jars, which were enveloped with respective transparent cellophane colour papers. To study the effect of salinity, they were irrigated with tap water and solutions as shown in Table II. Experiments were carried in triplicates. All mud pots and glass beakers were kept under shade, where the maximum intensity of light was  $\sim$  2500 lux. The percentage of germination and survival pattern were observed. The seedlings were removed and air dried to find out the ratio of wet/dry weight. Chlorophyll content of the leaves and transmission curves for the coloured cellophane were determined using spectrophotometer. Different parts of the seedlings were dried, acid digested (perchloric-nitric acids), and the cations, Na, K, Ca, Mg, Zn, Fe and Mn were estimated by Atomic Absorption Spectra (AAS).

## RESULTS AND DISCUSSION

### Influence of colour lights

Calculated wavelengths of lights used, their energy levels and other plant physiological parameters are given in Table I. Even though the percentage of germination

observed is in the order, red  $\geq$  yellow  $\geq$  green  $>$  control  $>$  blue, the rate of germination is faster in red and yellow than in green. The energy ratio of the colour light with that of control is in the order blue  $>$  green  $>$  yellow  $>$  red. But chlorophyll ratio (colour/control light) is in the reverse order, which indicates that low energy level enhances chlorophyll formation in this plant. The dry/wet weight ratio is maximum under normal light, viz. control. On both sides of this mean energy value, it tends to decrease. The water potentials of the leaves were almost the same. The total cationic contents are higher in plants grown under coloured lights than under control.

### Influence of salinity

The percentage of seed germination and the surviving ability of seedlings under various degrees of salinity are given in Table II. Even 0.33% NaCl solution appears to enhance seed germination. But, beyond this, the germination is hampered.

## CONCLUSION

This variety of chilli has been found to be photo-blastic.

## REFERENCES

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TABLE—I: Wave lengths and plant physiological parameters

Details	Red	Yellow	Control	Green	Blue
Wave length, nm	620	565	550	508	410
Energy, k Cal mole <sup>-1</sup>	46.4	50.9	52.3	55.6	70.2
Germination percent	80	80	74	80	48
Total chlorophyll content (mg/g) on the 25th day	2.09	1.82	1.61	1.66	1.45
Chl.a (mg/g)	1.50	1.38	1.17	1.22	1.07
Chl.b (mg/g)	0.59	0.55	0.45	0.44	0.38
Chl.a/b ratio	2.56	2.51	2.59	2.75	2.82
Energy ratio of colour/control light	0.89	0.97	1.00	1.08	1.34
Total chlorophyll ratio under colour/control light	1.30	1.13	1.00	1.03	0.90
Ratio of dry wt/wet wt.	0.09	0.09	0.13	0.11	0.08
Leaf water potentials on the 40th day (bars)	-9.9	-9.2	-9.3	-9.3	-10.6
<i>Total cationic content on the 40th day (mg/g):</i>					
In the root	155	45	77	62	74
In the leaves	80	76	48	54	407
In the stems	82	197	31	49	199
Average	106	106	52	55	226

TABLE—II: Percentage of seed germination, survival of seedlings under various salinity conditions

Medium	Sp. cond. (m.mho.cm)	pH	Seed germination on 16th day (%)	Survival on 38th day (%)	Survival on 60th day (%)
Tap water	0.57	7.48	41	82	82
0.16% NaCl	3.64	7.96	41	80	65
0.33% NaCl	7.06	7.55	37	81	63
0.66% NaCl	11.70	7.50	26	35	21
1.00% NaCl	16.82	7.46	13	8	8
1.30% NaCl	27.75	7.72	—	—	—