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EFFECT OF CYCOCEL ON GROWTH AND YIELD OF TOMATO UNDER DIFFERENT SALINITY LEVELS

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Abstract: The pot experiment was undertaken during *Rabi* season of 2004-05 and 2005-06 on tomato variety "GT-2". With a view to determine the effect of cycocel levels viz., C_0 (root dip in distilled water), C_1 (root dip in cycocel@250 ppm) and C_2 (root dip in cycocel@500 ppm) on growth attributes of tomato under different salinity levels *viz.*, S_1 (control: 0.2 dS/, ECe), S_2 (2.0 dS/m ECe), S_3 (4.0 dS/m ECe), S_4 (6.0 dS/m ECe) and S_5 (8.0 dS/m ECe) on growth, yield and quality of tomato. The pots were filled with artificially salinized soil by adding NaCl, Na_2So_4, $CaCl_2$ and $MgCl_2$ in ratio of 1:1:1:1. A significant difference was found in growth attributes under different cycocel levels except root to shoot ratio in pooled analysis. The yield and yield attributes significantly differed due to different cycocel levels except pulp to juice ratio. The total soluble solids and ascorbic acid were found to be significant, whereas acidity was found no significant under different cycocel levels in pooled analysis. The cycocel level C_1 (250 ppm as root dip) treated plant recorded the highest plant height, number of branches per plant, dry weight of shoot, fruit weight, total number of fruits per plant and fruit yield per plant and minimum days to flower initiation in artificially saline soil. It means, cycocel (250 ppm as root dip) increases the salt tolerance in tomato plant.
Keywords: Cycocel, Salinity, Conductivity of saturation extract, Sodium Chloride, Sodium Sulphate, Calcium Sulphate And Magnesium Chloride, Growth Suppression, Flowering Stage, Days to flower initiation, Soluble Essential Nutrients.

Introduction

Tomato (*Lycopersicon esculentum* Mill.) belongs to family solanaceae with diploid chromosome number (2n=2x= 24). It is one of the most important fruit vegetable crops among vegetables grown in world and India.. Tomato is one of the most important "protective foods" because of its high nutritive value with its widespread production. It is a major source of vitamins and minerals. In arid and semi arid regions, the problems of soil salinity and sodicity in ground water and irrigated soil are very common. When such soils have excessive accumulation of natural electrolyses (mainly chloride and sulphate of sodium, magnesium, calcium and potassium excluding gypsum) enough to interfere with the normal growth of several crop plants are called saline. When salt concentration reaches at a level of

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harmful to plant growth, a salinity condition is said to have developed. A salinity affect plant at all stages of growth and development but sensitivity sometimes varies from one growth stage to the next. The degree to which growth and normal metabolism of plant can be maintained in such soils is described as salt tolerance. Salt tolerance of plants not only varies considerably among the species but also depends upon the cultural conditions under which the crop is grown. Effect of salinity in tomato is, to some extent, known by the farmers from their long experience of cultivation but very little information is available about Salt tolerance of tomato and techniques of growing tomato crops under salt affected soils. Therefore, efforts have been made in this research to study and discuss the "Effects of cycocel levels on growth and yield of tomato under different salinity levels".

Material & Methods

A mixture of sodium chloride, sodium sulphate, calcium sulphate and Magnesium chloride in ratio of 1:1:1:1 were used for to develop salinity levels of 2, 4, 6 and 8 dS/m. The artificially saline soil was placed in pots (12 cm x 12 cm x 9 cm) at the rate of 10 kg per pot. The roots of five weeks old seedling were dipped in distilled water (as a control) and solution of Cycocel (250 ppm and 500 ppm). The average conductivity of saturation extract for the years at planting and after last picking is presented in Table 1. There were five treatment combination combinations which replicated three times in completely randomized block designs. Finally, the observations were recorded on growth parameters such as Plant height (cm), Number of branches at last picking, days to flower initiation and dry weight of shoot at last picking and yield parameters such as fruit weight per plant, total number of fruit per plant and fruit yield per plant (kg).

Table 1. Electrical conductivity (dS/m) of saturation extract from various salinized soils at planting and after last picking of tomato

Pot salinity level (EC dS/m)	At planting	After last picking
S_1(control: 0.2 dS/, ECe)	0.23	0.31
S_2 (2.0 dS/m ECe)	2.02	2.21
S_3 (4.0 dS/m ECe)	4.01	4.08
S_4 (6.0 dS/m ECe)	6.02	6.29
S_5 (8.0 dS/m ECe)	8.01	8.48

Results and Discussion

Results showed in table 1 that significantly the highest plant height was recorded under C_1 (250 ppm cycocel as a root dip) treatment as compared to C_0 (root dip in distilled water) and C_2 (500 ppm cycocel as a root dip) at last picking *i. e* 60.91, 60.32 and 52.30 among different salinity levels S_2, S_3 and S_4 in pooled analysis. The number of branches was also maximum in C_1 (250 ppm cycocel as a root dip) treatment i.e. 9.93, 9.32 and 7.01 among different salinity levels S_2, S_3 and S_4 in pooled analysis. The dry weight of shoot was found also high in C_1 (250 ppm cycocel as a root dip) treatment *i.e.* 23.70, 20.95 and 18.32 among different saline soils. While the days to flower initiation was found minimum at C_1 (250 ppm cycocel as a root dip) treatment *i.e.* 44.53, 55.55 and 61.67 at different saline soils.

It is seen from the table 3 that the yield parameters was significantly affected by different cycocel levels in different saline soils. The tables showed that the fruit weight was highest in C_1 (250 ppm cycocel as a root dip) treatment *i.e.* **65**.75, 59.87 and 54.54 among different salinity levels S_2, S_3 and S_4 in pooled analysis as compared to C_0 (root dip in distilled water) and C_2 (500 ppm cycocel as a root dip). The total number of fruits also found maximum in C_1 (250 ppm cycocel as a root dip) treatment *i.e.* 45.24, 38.75 and 32.14 among different saline soils pooled analysis. And The fruit yield per plant was also observed highest in C_1 (250 ppm cycocel as a root dip) treatment as compared to C_0 (root dip in distilled water) and C_2 (500 ppm cycocel as a root dip) *i.e*. 2.88, 2.21 and 1.02 under different saline soils pooled analysis . These observations corroborate with the findings of Schindlor (1974), Salma *et.al.* (1981), Kazim and Mehsin (1996) and Mangal (1995).

Cycocel would have helped in increasing photosynthetic activity of plant, which probably resulted into the higher yield in salinized soil. Secondly, high level of cycocel retards stem elongation by inhibition of cell division and cell elongation. Also, it partially blocked the system which provides active gibberellins to the growth mechanism.

References

[1] Kazim, A.A. and Mehsin, M. (1990) Effect of application of cycoceal and saline water on growth and yield of tomato plants. *Mesopotamia J Agric*., 15: 151-167.

[2] Mangal, J.L.; Singh, G.R. and Arora, S.K. (1995) Induction of salt tolerance in tomato. *Haryana J. Hort. Sci*., 24 (2): 148-151.

[3] Salama, F.M.; Khodary, S.F.A. and Likal, M.H. (1981). Effect of soil salinity and NAA on growth. Photo-synthetic pigment and mineral composition of tomato and other plants. *Phyton*, **21**: 177-178.

[4] Schindlor, E. (1974) *Land wirthschaftliche Forschling*., 27(3/4): 349-57.

Table 2: Effect of cycocel levels on growth of tomato under different salinity levels (pooled data)

Cycocel levels/ Salinity levels	Plant height			Number of branches			Day to flower initiation			Dry weight of shoot		
	C_0	C_1	C_2	C_0	C_1	C_2	C_0	C_1	C_2	C_0	C_1	C_2
S_1	67.30	64.10	61.50	8.89	10.00	10.60	42.43	35.75	31.02	26.46	23.86	21.10
S_2	56.90	60.91	57.25	8.35	9.93	8.74	50.07	44.53	46.47	20.86	23.70	21.14
S_3	51.84	60.32	56.38	7.38	9.32	8.54	60.48	55.55	56.84	17.36	20.95	19.75
S_4	48.87	52.30	47.16	5.73	7.61	6.56	66.74	61.67	63.41	15.77	18.32	15.77
S.Em	0.10			0.03			0.01			0.13		
C.D. at 0.05	0.27			0.08			0.03			0.35		

Table 3: Effect of cycocel levels on yield of tomato under different salinity levels (pooled data)

Cycoceal levels/ Salinity levels	Fruit weight (gm)			Total no. of fruits per plant			Yield per plant (kg)		
	C_0	C_1	C_2	C_0	C_1	C_2	C_0	C_1	C_2
S_1	67.61	71.98	75.19	44.13	49.11	48.56	2.88	3.33	3.61
S_2	60.31	65.75	61.31	39.67	45.24	41.97	2.30	2.88	2.40
S_3	54.69	59.87	57.34	31.75	38.75	35.09	1.67	2.21	1.90
S_4	38.71	54.54	50.58	25.93	32.14	28.94	1.20	1.62	1.35
S.Em	0.18			0.03			0.01		
C.D. at 0.05	0.50			0.09			0.03		