International Journal of Forestry and Crop Improvement
Volume 3 | Issue 2 | December, 2012 | 116-118

*Research Article*

# Influence of plant growth regulators on growth, yield and quality of tomato and brinjal

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**ABSTRACT :** The present investigation on influence of plant growth regulators on growth, yield and quality of tomato (*Lycopersicon esculentum* Mill.) cv. MARUTHAM and brinjal (*Solanum melongena* L.) cv. SURATI RAVAIYA was carried out at the Regional Fruit Research Station, Gujarat Agricultural University, Navsari Campus, Navsari, Gujarat during winter. The experiment was laid out in Randomized Block Design (RBD) replicated thrice including nine treatments *viz.*, 2, 4-D @ 2, 4, 6 and 8 ppm as well as NAA @ 25, 50, 75 and 100 ppm along with control (water spray). Among the treatments the foliar sprays of 2, 4-D @ 6 ppm and 4 ppm gave the highest yield of tomato (69.80 t/ha) and brinjal (64.35 t/ha), respectively, while plant height of tomato (86.40 cm) and brinjal (74.47 cm) was found to be maximum with 50 ppm NAA. For quality parameters, TSS (5.56 and 5.06 $^{O}$B) and acidity (0.60 and 0.29 %) were found maximum with foliar spray of 100 ppm NAA in tomato and brinjal, respectively. In tomato ascorbic acid was found maximum (22.46 mg/100g) with 8ppm 2,4-D while in brinjal it was maximum (16.46 mg/100g) with 100 ppm NAA.

**KEY WORDS :** Plant growth regulators, Growth, Yield, Quality, Tomato, Brinjal

**How to cite this Article :** Patel, J. S., Sitapara, H.H. and Patel, K.A. (2012).Influence of plant growth regulators on growth, yield and quality of tomato and brinjal, *Internat. J. Forestry & Crop Improv.*, **3** (2) : 116-118.

**Article Chronical :** Received : *03.08.2012;* Revised : *15.09.2012;* Accepted : *15.10.2012*

## INTRODUCTION

Tomato (*Lycopersicon esculenturn* Mill.) and brinjal (*Solanum melongena* L.) are an important fruit vegetables of Solanaceous family known to be cultivated in India since an ancient times. It is believed that the origin of tomato is tropical America while that of brinjal is India. It is cultivated as a cash crop as well as a vegetable crop on commercial base in almost all parts of India. Similarly, brinjal is also most commonly and extensively grown throughout the country because of its adaptability to wide range of agro-climatic conditions.

Gujarat occupies 38.80 and 72 thousand ha area with 97.84 and 123.6 lakh M.T. production in tomato and brinjal crops, respectively (Anonymous, 2011). Both the vegetable crops are most commonly and extensively grown throughout the country because of its adaptability to wide range of agro-climatic conditions. Plant growth regulators are known to influence on higher yields as well as quality in horticultural crops. Considering the popularity and area under tomato and brinjal as well as its market potential, the experiment was conducted to investigate the influence of PGRs under south Gujarat conditions.

## EXPERIMENTAL METHODS

The experiment on tomato cv. 'MARUTHAM' and brinjal cv. 'SURATI RAVAIYA' was conducted at Regional Fruit Research Station, Gujarat Agricultural University, Navsari (South Gujarat) during winter. Treatments comprised of foliar sprays

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of 2, 4-D @ 2, 4, 6 and 8 ppm and NAA @ 25, 50, 75 and 100 ppm with control (Simple tap water spray) replicated thrice. There were two sprays *i.e.* at 55 days and 80 days after transplanting. The observations regarding growth (plant height, no. of branches per plant and fruit diameter), yield (no. of fruits per plant and yield per ha) and fruit quality (TSS, acidity and ascorbic acid content) were recorded periodically.

## EXPERIMENTAL RESULTS AND ANALYSIS

The results obtained from the present study have been discussed in detail under following heads :

**Growth characters**:

The results revealed that the height of tomato and brinjal plants were influenced significantly due to foliar sprays of 50 ppm NAA by recording maximum height of 86.40 and 74.47 cm, respectively. While no. of branches per plant were recorded significantly maximum with sprays of 6 ppm 2,4-D in tomato (13.13) and NAA 75 ppm in brinjal (23.40) (Table 1). The significant increase in fruit diameter was registered in both (tomato and brinjal) crops with sprays of 75 ppm NAA by recording 6.49 and 5.88 cm, respectively.

The marked increase in growth characters might be due to the possible stimulation of meristematic tissues by auxin accelerating greater cell division and cell enlargement in growing portions. Findings are in accordance with the findings of Viradia (1982) and El-Soad *et al.* (1976).

**Yield and yield attributing characters**:

The sprays with 6 and 4 ppm 2, 4-D showed significant increase in no. of fruits per plant in tomato (79.40) and brinjal (48.20), respectively whereas, minimum no. of fruits per plant was recorded with sprays of 8 ppm 2,4-D in both the crops (*i.e.* 56.46 and 32.46, respectively). Similarly, yield per ha was significantly higher with sprays of 6 ppm 2, 4-D in tomato (69.80

**Table 1 : Influence of plant growth regulators (foliar sprays) on growth characters of tomato and brinjal**

| Treatments | Plant height (cm) | | No. of branches per plant | | Fruit diameter(cm) | |
|---|---|---|---|---|---|---|
| | Tomato | Brinjal | Tomato | Brinjal | Tomato | Brinjal |
| 2,4-D 2 ppm | 66.03 | 56.93 | 6.80 | 14.33 | 4.43 | 4.46 |
| 2,4-D 4 ppm | 71.38 | 72.08 | 8.33 | 21.60 | 5.63 | 4.70 |
| 2,4-D 6 ppm | 82.20 | 63.63 | 13.13 | 16.06 | 6.18 | 5.52 |
| 2,4-D 8 ppm | 58.65 | 68.33 | 9.86 | 19.40 | 6.25 | 5.65 |
| NAA 25 PPM | 68.15 | 69.16 | 10.40 | 20.83 | 4.60 | 4.53 |
| NAA 50 PPM | 86.40 | 74.47 | 12.33 | 21.06 | 5.90 | 4.89 |
| NAA 75 PPM | 80.75 | 70.29 | 9.66 | 23.40 | 6.49 | 5.88 |
| NAA 100 PPM | 73.38 | 67.00 | 9.53 | 18.86 | 5.18 | 5.39 |
| Control | 72.61 | 62.80 | 7.86 | 13.26 | 4.73 | 4.57 |
| S.E. ± | 3.96 | 2.90 | 0.75 | 1.16 | 0.45 | 0.31 |
| C. D. (P=0.05) | 11.90 | 8.71 | 2.24 | 3.48 | 1.36 | 0.94 |
| C. V. % | 9.38 | 7.48 | 13.22 | 10.72 | 14.3 | 10.72 |

**Table 2 : Influence of plant growth regulators (foliar sprays) on yield and yield characters of tomato and brinjal**

| Treatments | No. of fruits per plant | | Fruit yield (t/ha) | |
|---|---|---|---|---|
| | Tomato | Brinjal | Tomato | Brinjal |
| 2,4-D 2 ppm | 68.86 | 45.33 | 59.13 | 59.25 |
| 2,4-D 4 ppm | 73.66 | 48.20 | 63.84 | 64.35 |
| 2,4-D 6 ppm | 79.40 | 40.40 | 69.80 | 58.83 |
| 2,4-D 8 ppm | 56.46 | 32.46 | 56.06 | 48.33 |
| NAA 25 PPM | 71.93 | 35.80 | 59.22 | 54.49 |
| NAA 50 PPM | 76.00 | 38.80 | 67.04 | 58.75 |
| NAA 75 PPM | 66.86 | 43.33 | 66.61 | 62.25 |
| NAA 100 PPM | 60.80 | 33.86 | 57.70 | 53.57 |
| Control | 51.53 | 31.60 | 46.57 | 39.77 |
| S.E. ± | 2.38 | 3.27 | 3.40 | 4.09 |
| C.D. (P=0.05) | 7.14 | 9.81 | 10.21 | 12.28 |
| C. V. % | 6.15 | 14.59 | 9.72 | 12.77 |

**Table 3 : Influence of plant growth regulators (foliar sprays) on quality parameters of tomato and brinjal**

| Treatments | TSS ($^0$Brix) | | Acidity (%) | | Ascorbic acid (mg/100g) | |
|---|---|---|---|---|---|---|
| | Tomato | Brinjal | Tomato | Brinjal | Tomato | Brinjal |
| 2,4-D 2 ppm | 3.66 | 4.73 | 0.56 | 0.26 | 18.34 | 11.65 |
| 2,4-D 4 ppm | 3.86 | 4.80 | 0.52 | 0.24 | 18.95 | 12.35 |
| 2,4-D 6 ppm | 4.30 | 5.90 | 0.55 | 0.27 | 20.54 | 14.42 |
| 2,4-D 8 ppm | 5.23 | 6.13 | 0.49 | 0.22 | 22.46 | 16.01 |
| NAA 25 PPM | 3.90 | 4.83 | 0.45 | 0.25 | 18.69 | 10.71 |
| NAA 50 PPM | 4.20 | 5.33 | 0.51 | 0.28 | 21.24 | 13.08 |
| NAA 75 PPM | 4.82 | 6.23 | 0.56 | 0.23 | 19.85 | 15.37 |
| NAA 100 PPM | 5.56 | 5.06 | 0.60 | 0.29 | 17.35 | 16.46 |
| Control | 3.76 | 4.56 | 0.53 | 0.31 | 15.71 | 9.40 |
| S.E. ± | 0.23 | 0.38 | 0.03 | 0.02 | 0.90 | 1.00 |
| C.D. (P=0.05) | 0.64 | 1.15 | 0.08 | 0.05 | 2.70 | 3.01 |
| C. V. % | 8.48 | 12.53 | 8.19 | 10.30 | 8.12 | 13.13 |

t/ha) and 4 ppm 2, 4-D in brinjal (64.35 t/ha) while, minimum with 8 ppm 2, 4-D in both the crops (56.06 and 48.33 t/ha, respectively) (Table 2).

The increase in yield attributing characters as well as yield might be due to the large number of flowers and fruits in treated plants attributed to the accumulation of the food material in plants which ultimately helped in earlier flower initiation, more fruit set and rapid fruit development which all together resulted into the higher yield. These findings are in agreement with those of Viradia (1982), Sharma and Tiwari (1987) and Mehta *et al.* (1989).

**Quality parameters**:

Maximum TSS content (5.56 $^0$B) was recorded with foliar sprays of 100 ppm NAA in tomato, while it was maximum under foliar sprays with 75 ppm NAA in brinjal (6.23 $^0$B). The foliar sprays with 25 ppm NAA and 8 ppm 2, 4-D recorded minimum acidity in tomato (0.45 %) and in brinjal (0.22 %), respectively. The maximum ascorbic acid content in tomato (22.46 mg/100g) and in brinjal (16.46 mg/100g) was recorded with foliar sprays of 8 ppm 2, 4-D and 100 ppm NAA, respectively (Table 3). Higher TSS might be due to synthesis of more sugar owing to larger leaf area available in each treated plants.

## REFERENCES

Anonymous (2011). Directorate of Horticulture Database, Gandhinagar, (GUJARAT) INDIA.

El-Soad, I. A. A., Omran, A F. and Ashour, N. I. (1976). Stimulatory effects of 2, 4-D on growth and yield of tomato. *Egyptian J. Hort.*, **3**(2): 149-155.

Mehta, A.K., Singh, R.P. and Lal, G.(1989). Effect of concentration and methods of application of 2,4-D on yield, fruit quality and seed quality of tomato. *Veg. Sci.*, **16** (1): 1-8.

Sharma, N.K. and Tiwari, R.S. (1987). Effect of 2, 4-D application on tomato cv. Pusa ruby. *South Indian J. Hort.*, **35** (5): 390-92.

Viradia, R.R. (1982). Effect of growth regulators on growth, yield and quality of tomato cv. Pusa ruby. M. Sc. (Ag.) Thesis, Gujarat Agricultural University, S.K. Nagar, GUJARAT (INDIA).

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