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# Effect of $GA_3$ and NAA on plant growth and yield of cherry tomato (*Lycopersicon esculentum var. cerasiforme*) under polyhouse condition

**Rinchu Baby, Dr. S Saravanan, Dr. VM Prasad, Siby Baby and Geethu BL**

**Abstract**
The present investigation was under taken to study "Effect of $GA_3$ and NAA on plant growth and yield of Cherry Tomato (*Lycopersicon esculentum var.cerasiforme*) under polyhouse condition". Variety -Pusa Cherry tomato-1. The experiment was laid out in Randomized block design with 12 treatments and each replicated thrice. The treatments consist plant growth regulators $GA_3$ and NAA. Among these 12 treatments, the growth attributes like plant height, total number of leaves per plant, number of flowers /cluster are maximum, yield attributes like, average fruit weight, fruit yield are maximum and The maximum plant height (175.15) was recorded in the treatment $T_6$ ($GA_3$ 75 ppm) and minimum plant height (149.14) was observed in case of $T_1$ (control). The maximum fruit yield per plant (6.94 kg) was recorded in the treatment $T_6$ ($GA_3$75 ppm) and minimum fruit yield per plant (1.35 kg) was observed in case of $T_1$ (control).The maximum fruit diameter (5.52) was recorded in the treatment $T_6$ ($GA_3$75 ppm) and minimum fruit diameter (1.06) was observed in case of $T_1$ (control).

**Keywords:** Cherrytomato, $GA_3$ and NAA

## Introduction
A cherry tomato is a samller garden variety of tomato. Cherry tomatoes range in size from a thumbtip up to the size of a golf ball, and can range from being spherical to slightly oblong in shape. The more oblong ones often share charecteristics with plum tomatoes, and are known as *grape tomatoes*. The cherry tomato is regarded as a botanical variety of the cultivated tomato, *Solanum lycopersicum* var. *cerasiforme* Or *Lycopersicon esculentum* var. *cerasiforme*. It was widely cultivated in Central America when the Conquistadores arrived and is thought to be the ancestor of all cultivated tomatoes.
According to United States Department of Agriculture (USDA), cherry tomato contains per 100gm edible portion and they are as follows: energy – 75.4 Kj, water – 94.5gm, protein – 0.9gm, Fat – 0.2gm, carbohydrates – 3.9gm, Calcium- 10mg, Phosphorus – 24mg, iron – 0.3mg, Magnesium – 11mg, potassium – 237mg, Sodium -5.0mg, vitamin a -833 IUU, Vitamn C – 12.7mg, Niacin -0.6mg and pantothenic acid – 0.1mg (USDA, 2013).

## Materials and Methods
A field experiment entitled "Effect of $GA_3$ and NAA on plant growth and yield of cherry tomato under polyhouse condition" is going to be carried out on Experimental field, Department of Horticulture, Sam Higginbottom University of Agriculture Technology and Science. during rabi season 2017-2018. The details of the materials and methods which are going to be adopted are present here under.

## Materials
- Seedlings of cherry tomato: 900 seedlings of variety Pusa cherry tomato 1 will be used for this field experiment.
- $GA_3$: 15- 75 ppm
- NAA:25- 75 ppm
- UREA: consist of 46% nitrogen
- DAP (Di Ammonium Phosphate): consists of 18% of nitrogen and 48% of phosphorous.
- MOP (Murate of Potash): consists of 60% potassium

**Details of Treatment**

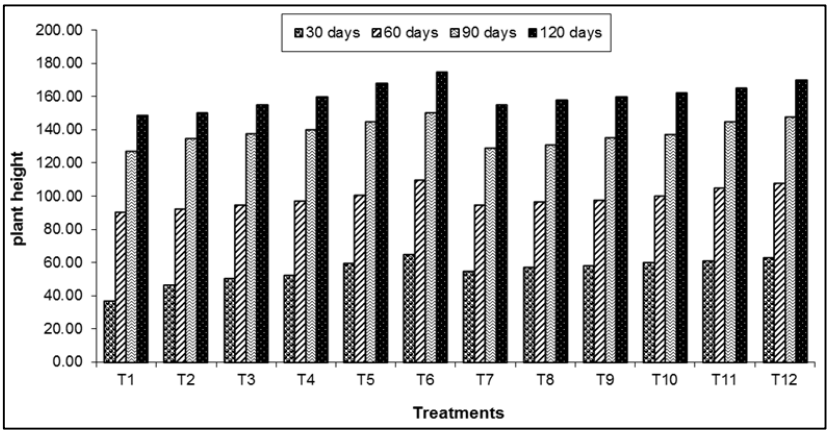
| S. No | Treatments | Treatment Combination |
|---|---|---|
| 1 | $T_1$ | Control (pure water) |
| 2 | $T_2$ | $GA_3$-15 ppm |
| 3 | $T_3$ | $GA_3$-30 ppm |
| 4 | $T_4$ | $GA_3$-45 ppm |
| 5 | $T_5$ | $GA_3$-60 ppm |
| 6 | $T_6$ | $GA_3$-75 ppm |
| 7 | $T_7$ | NAA-25 ppm |
| 8 | $T_8$ | NAA-35 ppm |
| 9 | $T_9$ | NAA-45 ppm |
| 10 | $T_{10}$ | NAA-55 ppm |
| 11 | $T_{11}$ | NAA-65 ppm |
| 12 | $T_{12}$ | NAA-75 ppm |

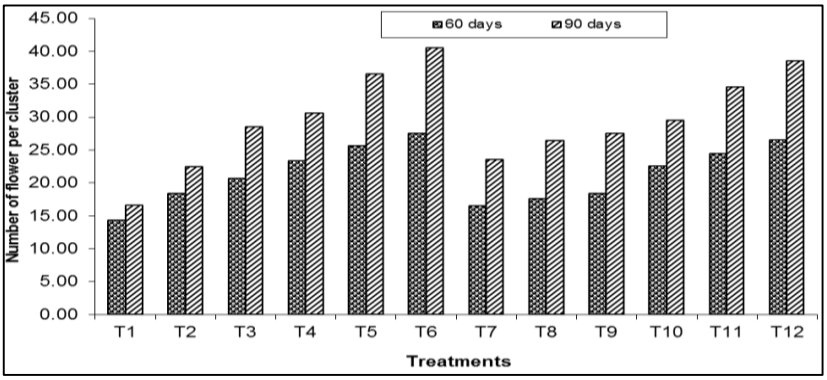
**Results and Discussion**

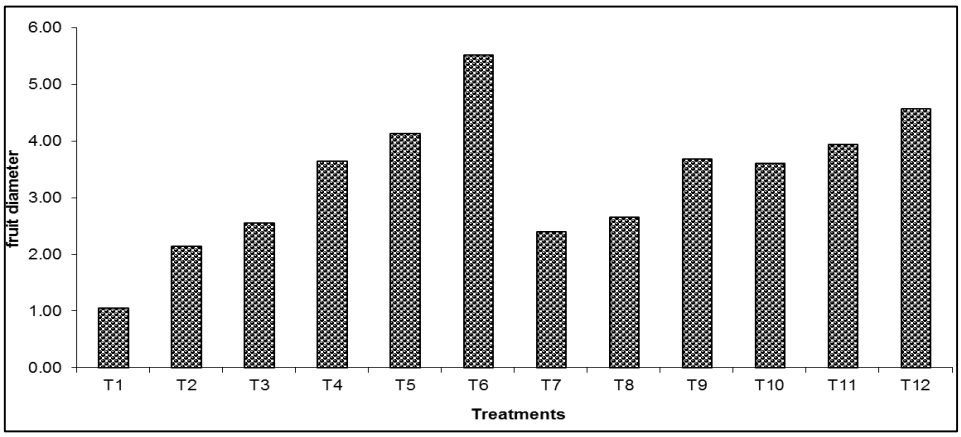
The present field experiment entitled" Effect of $GA_3$ and NAA on plant growth and yield of Cherry Tomato (*Lycopersicon esculentum var.cerasiforme)* under polyhouse condition was aimed at identifying different concentration of plant growth regulators. Twelve treatment combinations, including control were evaluated during Rabi season, 2017-2018 in the experimental unit of Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad. The results of the experiments are presented separately under the following headings.

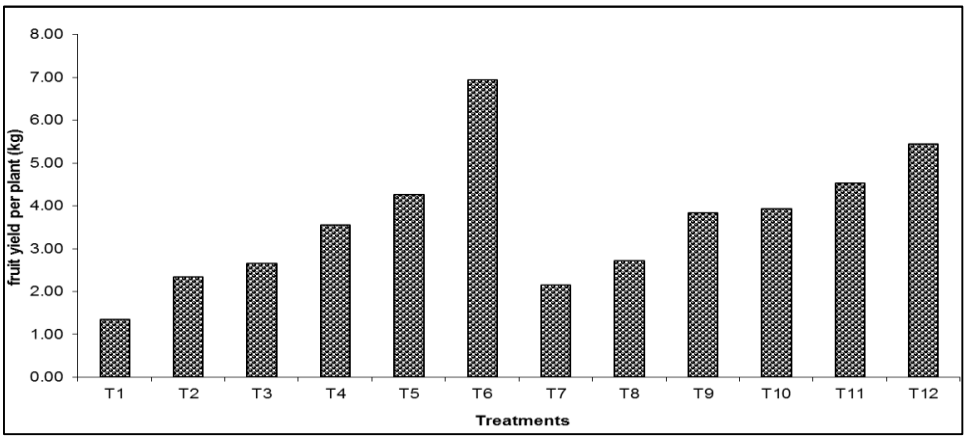
The maximum plant height (175.15) was recorded in the treatment $T_6$ ($GA_3$ 75 ppm) and minimum plant height (149.14) was observed in case of $T_1$ (control). The maximum number of flower per cluster (62.52) was recorded in the treatment $T_6$ ($GA_3$75 ppm) and minimum number of flower per cluster (20.36) was observed in case of $T_1$ (control). The maximum number of fruit per plant (265.67) was recorded in the treatment $T_6$ ($GA_3$75 ppm) and minimum number of fruits per plant (238.66) was observed in case of $T_1$ (control). The weight of fruit was found maximum (10.23 g) in the treatment $T_6$ ($GA_3$75 ppm) and minimum weight of fruit (5.74 g) was observed in case of $T_1$ (control). The maximum fruit diameter (5.52) was recorded in the treatment $T_6$ ($GA_3$75 ppm) and minimum fruit diameter (1.06) was observed in case of $T_1$ (control). The maximum fruit yield per plant (6.94 kg) was recorded in the treatment $T_6$ ($GA_3$75 ppm) and minimum fruit yield per plant (1.35 kg) was observed in case of $T_1$ (control).

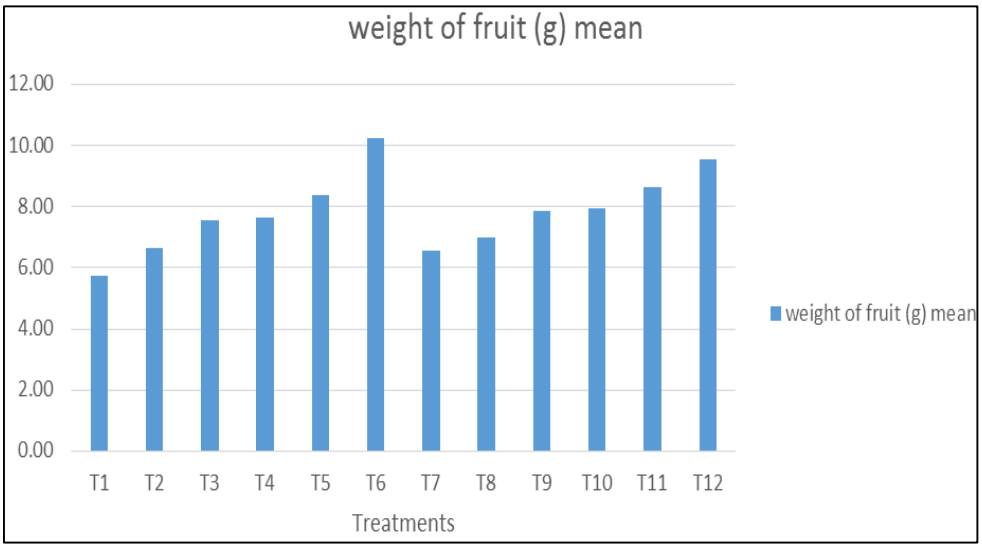
| Treatment symbol | Plant height (cm) | No. of flowers/ cluster | No.of fruits/ plant | Average fruit weight(g) | Fruit diameter | Fruit yield per plant |
|---|---|---|---|---|---|---|
| $T_1$ | 149.14 | 20.36 | 238.66 | 5.74 | 1.06 | 1.35 |
| $T_2$ | 150.25 | 28.43 | 243.16 | 6.63 | 2.15 | 2.35 |
| $T_3$ | 155.24 | 32.55 | 245.67 | 7.53 | 2.55 | 2.66 |
| $T_4$ | 160.10 | 40.58 | 248.36 | 7.62 | 3.65 | 3.55 |
| $T_5$ | 168.12 | 58.39 | 255.74 | 8.36 | 4.13 | 4.26 |
| $T_6$ | 175.15 | 62.52 | 265.67 | 10.23 | 5.52 | 6.94 |
| $T_7$ | 155.23 | 30.54 | 243.55 | 6.54 | 2.40 | 2.16 |
| $T_8$ | 158.23 | 35.47 | 246.28 | 6.97 | 2.66 | 2.73 |
| $T_9$ | 160.18 | 42.56 | 248.18 | 7.84 | 3.69 | 3.84 |
| $T_{10}$ | 162.58 | 48.51 | 249.64 | 7.95 | 3.61 | 3.93 |
| $T_{11}$ | 165.35 | 57.55 | 250.74 | 8.62 | 3.95 | 4.54 |
| T | 170.28 | 60.46 | 260.45 | 9.55 | 4.57 | 5.45 |

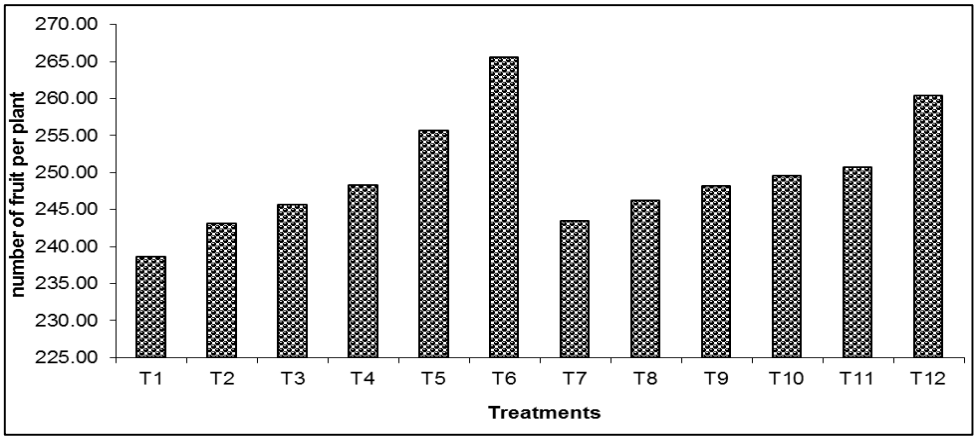



fruit diameter
6.00
5.00
4.00
3.00
2.00
1.00
0.00
T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12
Treatments


fruit yield per plant (kg)
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12
Treatments


weight of fruit (g) mean
12.00
10.00
8.00
6.00
4.00
2.00
0.00
T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12
Treatments
weight of fruit (g) mean


number of fruit per plant
270.00
265.00
260.00
255.00
250.00
245.00
240.00
235.00
230.00
225.00
T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12
Treatments

## Conclusion

Considering the result of the present investigation it may be concluded that treatment $GA_3$ (75ppm) was found to be the best treatment for better plant growth, yield and quality of cherry tomato with maximum cost benefit ratio (6.56:1). The information obtained from the experiment is helpful to design nutrition programme according to plant growth. Based on the above results it can be recommended that $GA_3$ (75ppm) should applied to cherry tomato for better growth and yield under agro climatic conditions of Allahabad.

## References


1. Abdel-rahman. Patterns of hormones, respiration and ripening enzymes during development, maturation and ripening of cherry tomato fruit. Physiologia Plantarum., 2008; 39(2):115-118.
2. Alam SM, Khan MA. Fruit yield of tomato as affected by NAA spray. Asian J Plant Sci. 2002; 1(1):24.
3. Alfonso A, Alonso RM. Effect of NAA and BA on root formation in tomato shoots cultured *in vitro*. Ciencias de la Agri. 1981; 10:41-45.
4. Ali M, Sharmin A, Saki S, M-ul-Hasan AI, Moniruzzaman M. Effect of plant growth regulators on growth and yield of tomato (*Lycopersicon esculentum* Mill.) varieties. International Journal of Sustainable Agricultural Technology. 2012; 8(1):1-6.
5. Ayub RA, Rezende BLA. Gibberellic acid contribution to tomato fruit size. [Portuguese] Biotemas. 2010; 23(4):25-28.
6. Bernadete M, Martins G, Roberto P, Camargo D, Costro E. Bioregulators on the morphology and productivity of tomato fruit, CV. Angela Gigante. Bragantia. 1997; 56(2):s237-247.
7. Bhosle AB, Khrbhade SB, Sanap PB, Gorad MK. Effect of growth hormones on growth, yield of summer tomato (*Lycopersicon esculentum Mill*).Orissa Journal of Horticulture. 2002; 30(2):63-65.
8. Bokade N, Bhalekar MN, Gupta NS, Deshpande A. Effect of growth regulators on growth and yield of tomato in summer. J Maharashtra Agric. Univ. 2006; 31(1).
9. Butcher DN, Street HE. The effect of Gibberellins on the gowth of excised tomato Roots. J Expti. Bot. 2002; 11(2):206-216.
10. Akhtar N, Bhuian AH, Quadir A, Mondal F. Effect of NAA on yield and quality of summer tomato. Annals Bangladesh Agric. 1996; 6(1):67-70.
11. Bhosle AB, Khorbhade SB, Sanap PB, Gorad MJ. Effect of plant hormones on growth and yield of summer tomato. (*Lycopersicon esculentum* Mill.). Orissa J Hort. 2002; 30(2):63-65.
12. Gupta PK, Gupta AK. Efficacy of plant growth regulators (IAA and NAA) and micronutrient mixture on growth, flowering, fruiting and shelf life of tomato. (*Lycopersicon esculentum* Mill.). Bioved. 2000; 11:25-29.