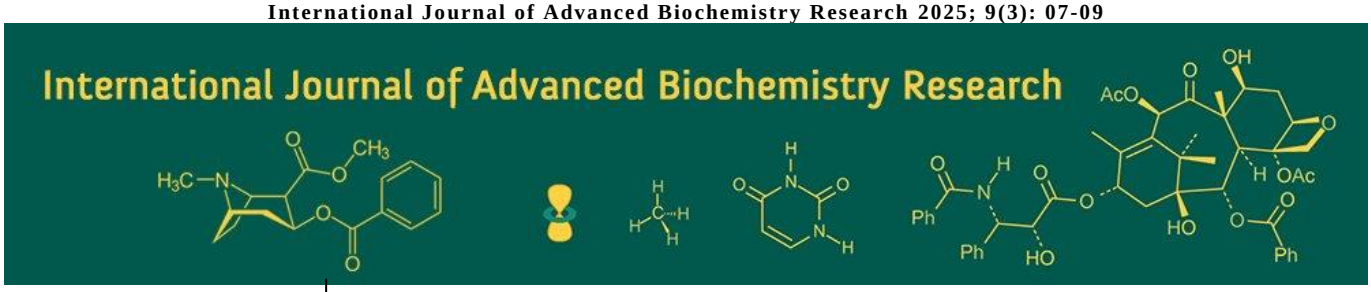


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# Response of PGRs and micronutrients on physico-chemical attributes of tomato (*Solanum lycopersicum* L.) cv. Azad $T_6$

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**Abstract**
The study entitled "Response of PGRs and micronutrients on physico-chemical attributes of Tomato (*Solanum lycopersicum* L.)" cv. Azad T6 was conducted during autumn season of 2022 at the Department of Horticulture, Tilak Dhari Post Graduate College, Jaunpur, India. The study was aimed to evaluate the impact of different micronutrients ($ZnSO_4$, Boric acid, $FeSO_4$) and plant growth regulators ($GA_3$, NAA) at two doses each on the Azad-$T_6$ tomato variety using a randomized block design with eleven treatments and three replications. Treatments were $T_1$ (control), $T_2$ (50 ppm of $GA_3$), $T_3$ (100 ppm of $GA_3$), $T_4$ (50 ppm of NAA), $T_5$ (100 ppm of NAA), $T_6$ (0.5%), $T_7$ (1%), $T_8$ (50 ppm of boric acid), $T_9$ (100 ppm of boric acid), $T_{10}$ (100 ppm of $FeSO_4$), and $T_{11}$ (150 ppm of $FeSO_4$). The findings indicated that Azad-$T_6$ tomato production, quality, and vegetative growth were all markedly enhanced by these treatments. $T_3$ ($GA_3$ at 100 ppm) was the most successful treatment, significantly increasing plant output, quality attributes, and growth and most effective in improving plant productivity and attributes.

**Keywords:** Tomato, yield and quality, PGRs and micronutrient

## Introduction
Native to western South America and Central America, the tomato (*Solanum lycopersicum* L.) is a flowering plant that belongs to the Solanaceae family of nightshades. One of the most widely grown commodities in the world today, tomatoes are used in a wide range of recipes, from salads to sauces, and are prized for their abundance of vitamins C and A, antioxidants, and lycopene, a substance that has been connected to several health advantages (Peralta & Spooner, 2001) [6]. It is very good source of vitamin A, B and C and is a good appetizer. Quality and flavor of the tomato and its products depends on chemical components such as reducing sugars, acidity, lycopene, beta carotene, dry matter, total soluble solids, etc.

Consistent application of chemical fertilizers has raised the levels of heavy metals in the soil, breaking down its quality and health and rendering it unsuitable for long-term plant development. Sustainable crop production benefits from integrated nutrient management, which incorporates organic, inorganic, and microbes. It maintains proper nutrition levels, enhances soil quality, and encourages excellent tomato yield.

The chemical composition of tomato varies greatly with variety, soil and climatic condition in which they are grown. The use of biofertilizers, which are more cost-effective and environment friendly, can help lessen reliance on chemical fertilizers. The use of *Azospirillum* inoculants in vegetable crops has been very important as they create growth-promoting and antifungal compounds in addition to fixing nitrogen from the atmosphere., micronutrients are necessary for plant development, yield, and quality, even though they are needed in small amounts. They facilitate the absorption of essential nutrients and serve as catalysts for a number of organic processes, such as nitrogen fixation, respiration, photosynthesis, chlorophyll production, enzyme activity, hormone synthesis, and cell development. Studies on the foliar application of micronutrients to various crops have demonstrated yield increases of up to 20% and promote long-term crop production. Micronutrients such as boron, copper, molybdenum, and zinc applied through the foliage can improve tomato output, fruit set, and vegetative growth (Arora *et al*. 1982) [1].

## Materials and Methods

The current study, "Response of PGRs and micronutrients on physico-chemical attributes of Tomato (*Solanum lycopersicum* L.)" cv. Azad $T_6$**"** was concentrated on particular edaphic (soil-related) and meteorological variables. It discussed the materials employed, experimental methods, and treatment evaluation standards. The methods used in the study were categorized into different groups. Three replications of the Randomized Block Design were used to assess the var. Azad-$T_6$ as influenced by different treatments were $T_1$ (control), $T_2$ (50 ppm of $GA_3$), $T_3$ (100 ppm of $GA_3$), $T_4$ (50 ppm of NAA), $T_5$ (100 ppm of NAA), $T_6$ (0.5%), $T_7$ (1%), $T_8$ (50 ppm of boric acid), $T_9$ (100 ppm of boric acid), $T_{10}$ (100 ppm of $FeSO_4$), and $T_{11}$ (150 ppm of $FeSO_4$). Fruit length, fruit diameter, Storage behavior at ambient temperature, TSS (°Brix), ascorbic acid (mg/100 gm), average fruit weight (g), yield (kg/plant) were measured as per standard procedure. Data recorded was analyzed using statistical methods based on observations made during the experiment.

## Result and Discussion

Analysis of variance for Randomized Block Design was used to determine whether the differences between the treatments for the different characters were statistically significant.

### Fruit length (cm)

The treatments $T_2$ ($GA_3$ 100 ppm) and $T_4$ (NAA 100 ppm) had the highest fruit lengths (6.24 and 5.67). The experiment's results showed that the Control ($T_0$) had the smallest fruit length (4.77).

### Fruit width (cm)

The maximum fruit width (12.68 cm) was noted in treatment $T_1$ ($GA_3$ 50 ppm) followed by $T_2$ ($GA_3$ 100 ppm) 11.18 cm. The experiment's results showed that the control ($T_0$) had the least fruit width (5.65).

### Average fruit weight (g)

Treatments $T_2$ ($GA_3$ 100 ppm) and $T_1$ ($GA_3$ 50 ppm) had the highest fruit weight (63.41, and 59.51 respectively). However, control ($T_0$) showed the minimum average fruit weight (36.45).

### TSS ($^0$Brix)

Application of plant growth regulators had a substantial impact on TSS ($^0$Brix) content. Treatments $T_2$ ($GA_3$ 100 ppm) and $T_1$ ($GA_3$ 50 ppm) had the highest TSS values (5.84, and 5.23) while, control ($T_0$) had the lowest TSS (3.5).

### Ascorbic acid (mg/100 gm)

$T_2$ ($GA_3$ 100 ppm) and $T_3$ ($GA_3$ 50 ppm) had the highest levels of ascorbic acid (17.41, and 17.43). Treatment $T_2$ had significant effect over all the treatments. In contrast, the control ($T_0$) had the lowest levels of ascorbic acid (15.24).

### Storage behaviour at ambient temperature

$T_2$ ($GA_3$ 100 ppm) and $T_1$ ($GA_3$ 50 ppm) had the maximum number of days of self-life at ambient room temperature (15.41 days, and 14.47 days). Treatment $T_2$ had significant effect over all the treatments. In contrast, the control ($T_0$) had the minimum self-life at ambient room temperature (10.39).

**Table 1:** Effect of micronutrients and PGRs on fruit length, Fruit width, average fruit weight and number of fruits per cluster of tomato Variety Azad-$T_6$

| Treatment Combinations | Fruit length (cm) | Fruit width (cm) | Average fruit weight (g) | Storage behavior at ambient temperature | TSS ($^0$Brix) | Ascorbic acid (mg/100 gm) |
|---|---|---|---|---|---|---|
| $T_0$ Control | 4.77 | 5.65 | 36.45 | 10.39 | 3.5 | 15.24 |
| $T_1$ $GA_3$ 50 ppm | 5.55 | 11.18 | 59.51 | 14.47 | 5.23 | 17.43 |
| $T_2$ $GA_3$ 100 ppm | 6.24 | 12.68 | 63.41 | 15.41 | 5.84 | 17.41 |
| $T_3$ NAA 50 ppm | 5.35 | 10.2 | 58.3 | 12.51 | 5.18 | 17.37 |
| $T_4$ NAA 100 ppm | 5.67 | 11.19 | 60.71 | 13.59 | 5.31 | 17.34 |
| $T_5$ $ZnSO_4$ 0.5% | 4.84 | 9.37 | 50.52 | 12.3 | 4.81 | 16.4 |
| $T_6$ $ZnSO_4$ 1% | 5.22 | 10.17 | 49.83 | 12.12 | 4.15 | 16.4 |
| $T_7$ Boric acid 50 ppm | 5.26 | 8.97 | 44.01 | 12.57 | 4.69 | 15.66 |
| $T_8$ Boric acid 100 ppm | 5.2 | 9.67 | 48.57 | 11.34 | 4.2 | 15.26 |
| $T_9$ $FeSO_4$ 100 ppm | 5.14 | 9.22 | 43.22 | 12.43 | 4.14 | 16.31 |
| $T_{10}$ $FeSO_4$ 150 ppm | 5.24 | 9.21 | 52.44 | 11.51 | 4.16 | 15.15 |
| C.D. at 0.5 | 0.24 | 0.47 | 2.48 | 0.49 | 0.19 | 0.84 |
| S. Em | 0.08 | 0.16 | 0.83 | 0.16 | 0.06 | 0.28 |
| S. Ed. | 0.11 | 0.22 | 1.18 | 0.23 | 0.09 | 0.40 |

## Conclusion

The study concluded that the application of different micronutrients and plant growth regulators significantly influenced the physico-chemical attributes of the Azad-$T_6$ tomato variety. Among the treatments, $GA_3$ at 100 ppm ($T_3$) proved the most effective, leading to the highest improvements in quality attributes of tomato. These findings highlight the potential of plant growth regulators, particularly $GA_3$, in optimizing tomato cultivation for better quality.

## References

1. Arora SK, Pandita ML, Singh K. Effect of parachlorophenoxy acetic acid, boron, copper, molybdenum and zinc on the fruit quality of tomato varieties in summer and the rainy season. Indian Journal of Agricultural Sciences. 1982;52(10):648-652.
2. Azeem M, Ahmed R. Foliar application of some essential minerals on tomato (*Lycopersicon esculentum*) plant grown under two different salinity regimes. Pakistan Journal of Botany. 2011;43(3):1513-1520.

3. Bihari M, Narayan S. Effect of pruning and spacing on tomato (*Lycopersicon esculentum* Mill.) variety Tol sytay. Vegetable Science. 2009;36(3 Suppl):425-427.
4. Bose US, Tripathi SK. Effect of micronutrients on growth, yield and quality of tomato cv. Pusa Ruby in MP. Crop Research. 1996;12(1):61-64.
5. Chattopadhyay A, Dutta S, Karmakar K, Bhattacharya I, Hazra P. Technology for Vegetable Crop Production. Directorate of Research, BCKV, Kalyani, Nadia, West Bengal; 2007. p. 1-226.
6. Peralta IE, Spooner DM. Granule-bound starch synthase (GBSSI) gene phylogeny of wild tomatoes (*Solanum* L. section *Lycopersicon* [Mill.] Wettst. *subsection* Lycopersicon). American Journal of botany. 2001 Oct;88(10):1888-1902.