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Fruit Yield of Tomato as Affected by NAA Spray

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Abstract: The spray application of NAA at variable concentration significantly increased the fruit yield of tomato, when compared to control. The nutrient contents were also increased in majority of cases.

Key words: Tomato, NAA and foliar spray

Introduction

The growth regulator, Naphthalene Acetic Acid (NAA) has an important effect on the fruit retention of several vegetables as well horticultural crops and thus increasing the yield substantially (Younis and Tigani, 1977; Naqvi *et al.*, 1998). The present report describes the effect of naphthalene acetic acid as a growth regulator in reducing pre-harvest fruit drop and resulting in increased number of fruits and yield in tomato crop. Seneratna *et al.*, (2000) reported that aspirin and salicylic acid induced multiple stress tolerance in bean and tomato plant.

Materials and Methods

Seeds of tomato cv. *Marmande* were surface sterilized with 3% chlorox solution for 3 minutes and then thoroughly washed with distilled water and afterwards dried on filter paper on an open place. The seeds were sown in a wooden tray filled with sterilized sand and irrigated with tap water. After germination, the seedlings were irrigated with 1/10th Hoagland solution and later on with full strength solution. After two weeks, the seedlings were transplanted to perforated plastic bags filled with desert sand and irrigated with full strength nutrient solution. One month old tomato seedlings were transplanted in the soil previously fertilized with 120 kg N/ha and 60 kg P₂O₅/ha at experimental farm, Tandojam in twelve rows at a distance of 60 cm from plant to plant and 90 cm from row to row. Two rows were assigned for each treatment. The plants were irrigated with irrigation water. The tomato plants were sprayed with aqueous solution of 0, 5, 10, 15, 20 and 25 mg NAA/L at flowering time. A 0.01 % Tween-80 as wetting agent was also used along with the NAA solution.

Results and Discussion

The spray application of naphthalene acetic acid (NAA) had significant effects on increasing number of tomato/plant, weight of tomato per fruit and fruit yield/plant compared with control (Table 1). The yield increase was due to retention of flower in the plants due to the application of different concentrations of NAA treatments. In several experiments, the yield increases have been reported (Gowda, 1977; Warade and Singh, 1977). It would suggest that spraying on various vegetable and horticultural crops have been reported (Alam and Naqvi, 1989; Naqvi *et al.*, 1998; Younus and Tigani, 1977) of naphthalene acetic acid at the time of flowering, which prevents pre-harvest flower abscission by increasing the available plant hormone (auxin) concentration at this

Table 1: Effect of naphthalene acetic acid (NAA) on the fruit yields of tomato (cv. *Marmande*)

NAA (mg/L)	Fruit yield per plant (gm)	No. of fruits/plant	Weight/fruit (g)
0	1557e (100%)	30e	51.75b
5	2681d (172%)	42d	63.75a
10	3056c (196%)	56c	54.57b
15	3078c (198%)	63b	48.86b
20	3373b (217%)	68b	49.60b
25	3769a (242%)	88a	42.83c
SE ±	43.49	1.91	2.98
LSD (0.05 %)	131.01	5.75	8.98
LSD (1 %)	181.45	7.96	12.42

critical phase of reproductive development in tomato plants (Chandramony and George, 1976; Hays, 1957; Rao *et al.*, 1977). It was observed from the Table 2 and 3, that with the spray application of NAA

Table 2: Effect of different levels of naphthalene acetic acid (NAA) on the nutrient content of tomato leaves.

NAA level (mg/L)	Nutrient content in leaves (% dry weight) at 45 days							
	N	P	K	Ca	Mg	Na	Fe	Mn
0	5.94a	0.26b	2.21d	2.16cd	1.03d	1.36c	0.31b	0.037c
5	4.81bc	0.26b	2.47c	1.90d	1.08cd	1.41b	0.53a	0.037c
10	4.01cd	0.35a	2.90ab	1.56e	1.22bc	1.36c	0.42a	0.046c
15	3.64d	0.23b	2.86b	2.33bc	1.24bc	1.30d	0.44a	0.016a
20	5.91ab	0.26b	2.38cd	2.50b	1.36ab	1.34c	0.46a	0.011b
25	5.21ab	0.35a	3.14a	2.89a	1.48a	1.49a	0.42a	0.015a
SE ±	0.29	0.017	0.079	0.104	0.046	0.05	0.024	8.72
LSD (0.05%)	0.88	0.05	0.24	0.31	0.14	NS	0.072	26.26
LSD (1%)	1.22	0.07	0.33	0.43	0.19	NS	0.100	36.37

Table 3: Effect of different levels of naphthalene acetic acid (NAA) on the nutrient content of tomato leaves.

NAA	Nutrient content in leaves (% dry weight) at 60 days							
	N	P	K	Ca	Mg	Na	Fe	Mn
0	5.35a	0.17d	2.79c	1.55c	0.50c	1.30bc	0.113a	0.018d
5	5.32a	0.22c	2.79c	2.16a	0.60b	1.39ab	0.094bc	0.015d
10	5.07a	0.20d	3.69a	2.05a	0.65b	1.33bc	0.102ab	0.054b
15	2.11b	0.37a	2.88c	1.20d	0.50c	1.26c	0.086d	0.030c
20	2.23b	0.25b	3.26b	1.74b	0.70a	1.44a	0.084c	0.062a
25	2.17b	0.23b	2.30d	1.50c	0.60b	1.28c	0.083cd	0.062a
SE ±	0.096	0.094	0.073	0.059	0.023	0.032	0.005	1.95
LSD (0.05 %)	0.29	0.03	0.22	0.18	0.07	0.10	0.015	5.89
LSD (1 %)	0.41	0.04	0.31	0.25	0.09	0.021	-	8.15

increased the nutrient contents by tomato leaves at both the harvest occasions. All the nutrient were sufficiently adequate for the normal growth of tomato plants. This situation has also resulted in the increased fruit yield of tomato. It would suggest that spraying of naphthalene acetic acid at the time of flowering prevents pre-harvest flower abscission by increasing the available auxin concentration at this critical phase of reproductive development.

References

- Alam, S. M. and S. S. M. Naqv, 1989. Effect of naphthalene acetic acid on the fruit yield of tomato (*Lycopersicon esculentum* Mill). Pak. J. Bot., 21: 275-278.
- Chandramony, D. and M. K. George, 1976. Planofix foliar spraying on some varieties of Capsicum, Agri. Res. J. Kerala., 14: 196-197.
- Gowda, S.T., 1977. Influence of Planofix on seed yield of green gram. Ind. J. Agron., 22: 117-118.
- Hays, W. B., 1957. Fruit growing in India. Kitabistan, Allahabad, pp: 94.
- Naqvi, S. S. M., S. M. Alam, S. Mumtaz and M. Hanif, 1998. Effect of Co and Ag ions and naphthalene acetic acid on cotton (*Gossypium hirsutum* L.) yield. The Pak. Cottons (Karachi, Pakistan), 42: 65-69.
- Rao, D. V. S., Rao, D. V. and V. Suryanarayana, 1977. Effect of starters of L-NAA on tomato var. Pusa early dwarf. South Ind. Hort., 25: 138-141.
- Seneratna, T., D. Touchell, E. Bunn, K. Dixon, 2000. Acetyl salicylic acid (Aspirin) and salicylic acid induce multiple stress tolerance in bean and tomato plant. Plant Growth Regul., 30: 157-161.
- Warade, S. D. and K. Singh, 1977. Effect of Planofix on control of flower drop and fruit set in chillies (*Capsicum annum* L.). Pesticides, 11:24-26.
- Younis, M. E. and S. E. Tigani, 1977. Comparative effect of growth substances on the growth, flowering and fruiting of tomato plants. Acta. Agron. Acad. Societ. Hung., 26: 89-103.