

Short Communication

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EFFECT OF NAA ON THE FRUITY YIELD OF TOMATO (*LYCOPERSICON ESCULENTUM* M.)

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INTRODUCTION

A large number of growth regulators like NAA, GA₃, IBA and IAA have been used to obtain their beneficial effects on the growth and yield of different crops. To study the response of a growth regulator NAA treatments on the yield of tomato, seeds of tomato (*Lycopersicon esculentum*) sterilized with 3% chlorox solution washed and dried, were sown in wodden tray containing sterilized and tap water irrigated sand. After germination it was irrigated with 1/10th Hoagland solution, and its concentration increased gradually to full strength. The seedling were then kept in the growth room under a photoperiod of 14th hr. at 26°. After 15 days seedlings were transfered to perforated plastic bags (60 x 40 cm) and irrigated with nutrient solution. One month old seedlings transplanted in the soil manured earlier with 67 kg N/ha (urea) and 45 kg P₂O₅/ha (superphosphate) in AERC export farm in twelve rows (4 plant in each row) at a distance of 60 cm from plant to plant and 90 cm from row to row. Two rows assigned for each treatment. The mean average temperature was 20° during growing season (November-March). The only source of water was irrigation during the season. The plant were sprayed with a aqueous solution of (water) 5, 10, 15, 20 and 25 ppm NAA at flowering time. In addition wetting agent Tween 0.07 % and insecticide anthio 0.1 % were also used.

RESULT AND DISCUSSION

Foliar spray of naphthaleneacetic acid had pronounced effect on increasing the yield of tomato fruits. Increasing concentrations of NAA significantly increased the yield by increasing number of fruits retained in the tomato cultivar tested (Table 1). Compared with control the percent increase was 172 at 5 to 242 at 25 ppm NAA. It was further observed that the increase in yield was not due to increase in the size of the fruit but due to increased retention of fruits per plant.

Results obtained indicating the increase in yield of fruits with NAA treatments are similar to those already reported for tomato [1,2], chilli [4], mango [5] and citrus

[6]. These workers also sprayed aqueous solution of NAA at concentration ranging from 5-25 ppm to above plants and found stimulating effects on fruit and grain yields, Chandramony and George [3] reported 132 % increased in fruit yield of chilli cv. Kantari by spraying 20 ppm NAA. In several experiments using 10-25 ppm NAA on mango, chilli and cotton, increased in yields have been reported for mango cvs. Dasehri to 199 % Langra 133 %, Sindhri 100 %, chilli cv. Ghotki 162 % cotton cv. Qalandri 153 % compared to control [4,5].

Table 1. Effect of naphthalene acetic acid on the fruit yield of tomato (cv. Marmande).

Levels of NAA (ppm)	Number of fruit/plant	Wt./fruit (g)	Fruit yield/plant (g)	Percent increase over control
0	30 a	51.75 b	1557 a	100
5	42 b	63.75 e	2681 b	172
10	56 c	54.57 b	3056 c	196
15	63 d	48.86 b	3078 c	198
20	68 d	49.60 b	3373 d	217
25	88 e	42.83 a	3769 e	242
L.S.D. 1%	7.96	12.42	181.45	-

It is therefore concluded that foliar spraying of naphthalene acetic acid at the time of flowering prevent pre-harvest flower abscission by increasing the available auxin concentration at this critical phase of reproductive development.

Key words: Growth regulators, Tomato, Nutrient contents.

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mined was sieved through a set of sieves and a number of close size fractions were obtained as presented in Table I. Material from each fraction was split into a ruled side and 300 to 500 particles were counted under the microscope. The particles representing different classes, i.e. clean chromite, locked chromite, and gangue, were calculated on percentage basis of the total particles counted. The application of the formula given at the bottom of Table I gave the percent liberation of chromite. As a result of particle counting, the mesh of liberation is found to be 350 microns (44 mesh B.S.S.).

Table I. Calculation of percent chromite liberation.

Particle size (microns)	Free chromite grains (%)	Compound grains (%)	Total grains (%)	Chromite liberation (%)
75-150	21.00	0.00	21.00	100.00
150-300	22.72	13.64	36.36	62.24
300-475	22.00	22.48	44.48	49.46
475-750	12.00	38.24	50.24	23.88
750-1000	12.00	47.12	59.12	20.30

$$\text{Percent chromite liberation} = \frac{\% \text{ free chromite}}{\% \text{ free chromite} + \% \text{ locked chromite}} \times 100$$

Percent chromite liberation calculated by the formula (8)

sample preparation. A truck load of a representative sample of chromite ore, weighing about 10 tonnes, was received through the courtesy of Pakistan Chrome Mines, Multan, Pakistan.

The ore as received had a wide size range and comprised about 30% 40% and 30% material in the size ranges 150-300mm, 75-150 mm and minus 75 mm respectively.

The ore was prepared for processing by using a jaw crusher, a roll crusher, a double deck vibrating screen and a rod mill to obtain products 100 percent passing 1.4, 1.18

INTRODUCTION

The chromite ore in the Zhoj valley igneous complex is found in the form of lensular masses [1-3]. The nature of ore in these lenses varies with respect to its chemical composition and physical characteristics [4]. The ore contains varying proportions of Cr₂O₃ and associated gangue minerals, the common gangue minerals being serpentine, olivine, diopside, hematite, pyroxene and talc.

A number of studies [5-7] have been carried out at the Minerals and Metallurgy Research Centre of the PCSIR Laboratories Complex, Lahore, on the processing of low grade chromite ores occurring at various places in the two important chromatic complexes of the country, viz. Zhoj Valley and Malakand. This study is based on yet another chromite deposit in the Muslim Bagh area of the Zhoj Valley complex.

MATERIALS AND METHODS

Mineralogy. The ore is seen to be partly massive and contains a low grade designated type. The grain size varies from 0.5 mm to 1.2 mm occasionally 2 mm. The ore is partly altered to ferromagnesian indicating secondary alteration processes. The gangue is consequently altered to serpentine, talc and magnesite indicating the mobility of magnesium in the area.

The first section study of the ore samples reveals the presence of serpentine with globular chromite. The sample shows yellowish brown to yellowish green colour and is probably magnetite, which is in all cases a product of alteration of some other silicate minerals. The chromite is seen to be black with metallic lustre in reflected light.

Liberation studies. The ore was crushed in order to study the liberation of chromite. A representative sample of the ore was crushed and ground to minus 0.7 mm (20 mesh). The sample so ob-