



Effect of P-solubilizers, IBA and enriched compost on rooting and growth of pomegranate (*Punica granatum* L.) cuttings cv. GANESH

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Abstract : The investigation on effect of P-solubilizers and enriched compost on rooting and growth of pomegranate (*Punica granatum* L.) cuttings was studied under green house condition during 2004-05. Among the different treatments cuttings treated with *Pseudomonas fluorescens* @ 5 g per kg of pot mixture integrated with enriched compost recorded significantly higher rooting percentage (81.25%), maximum length of longest primary root (28.07 cm), higher fresh weight (1.03 g) and dry weight (0.50 g) of roots per cutting compared to rest of the treatments. Thus from the results it can be concluded that P-solubilizers along with enriched compost had greatly influenced on root parameter of pomegranate cuttings.

Key Words : Cuttings, P-solubilizers, IBA, Compost, Pomegranate

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INTRODUCTION

Increased costs of synthetic growth regulators and environmental pollution due to their application warrant an alternative. Microbial inoculants are now widely applied in eco-friendly technology. Applications of microbial inoculants in plants have been considered more of curiosity. The unique root initiating activity of these microbial inoculants may result in early and better rooting of cuttings and layers.

The application of microbial inoculants can stimulate plant growth by fixing atmospheric nitrogen, solubilizing fixed phosphorus and other nutrients and decomposing organic wastes and residues. The P-solubilizers besides solubilizing insoluble phosphates, they are also known to produce plant growth promoting substances and benefit the plant in several ways. The enriched compost provides food for the microorganisms and macro and micronutrients required for the root growth and development of pomegranate cuttings. Hence, an attempt was made to study the effect of P-

solubilizers and enriched compost on rooting and growth of pomegranate (*Punica granatum* L.) cuttings.

MATERIALS AND METHODS

The present investigation was under taken at the Department of Agricultural Microbiology, University of Agricultural Sciences, GKVK, Bangalore, under greenhouse condition during 2004-05. Different types of P-solubilizers viz., *Bacillus megaterium*, *Bacillus subtilis* and *Pseudomonas fluorescens* were multiplied on King's Broth for 10 days. The fully grown culture when attained a population of 10^8 cells per ml then it was mixed with presterilized neutralised lignite powder and applied to polybags at the rate of 5 g per kg pot culture. The dried sieved enriched compost was collected from Organic Matter Decomposition Scheme, Department of Agricultural Microbiology, UAS, GKVK, Bangalore.

Soil, sand and enriched compost were taken at the ratio of 2:1:1 and they were mixed thoroughly. For control treatment,

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Table 1 : Effect of P-solubilizers, IBA and enriched compost on rooting and growth of pomegranate (*Punica granatum L.*) cuttings cv. GANESH

Treatments	Rooting (%)	No .of primary roots/ cutting	Length of longest primary root (cm)	Effective root zone (cm)	Fresh wt (g) per cutting	Dry wt (g) per cutting
T ₁ -control	43.75	21.00	16.33	3.07	0.70	0.33
T ₂ – IBA @ 500 ppm (check)	37.50	15.50	18.38	2.33	0.43	0.19
T ₃ -Enriched compost	50.00	24.25	20.77	3.87	0.76	0.37
T ₄ – IBA @ 500 ppm + Enriched compost	62.50	33.50	24.20	5.30	0.87	0.40
T ₅ - <i>Bacillus subtilis</i> + Enriched compost	75.00	41.00	27.73	7.40	0.99	0.47
T ₆ - <i>Bacillus magaterium</i> + Enriched compost	75.00	41.75	29.79	7.37	1.00	0.48
T ₇ - <i>Pseudomonas flourescens</i> + Enriched compost	81.25	44.50	28.07	7.62	1.03	0.50
S.E.±	8.40	1.57	0.22	0.26	0.017	0.014
C.D. (P=0.05)	24.73	4.63	0.66	0.71	0.051	0.043

only soil and sand were mixed at the ratio of 2:1. For IBA check treatment only sand was used and for enriched compost treatment 2:1 compost and sand mixture was used. The polybags were filled with pot mixture upto 2.5 cm below the rim. The filled polybags of the above mixture were arranged in replication and treatments wise in the greenhouse.

The IBA solution of 500 ppm concentration were prepared from 1000 ppm stock solution by taking 250 ml and volume made upto 500 ml with distilled water. Properly matured pencil sized thick shoots with active and well developed buds were cut from the Ganesh pomegranate variety. The cuttings of about 20-25 cm in length with at least 4-6 live buds were prepared for planting.

Microbial inoculants were weighed aseptically and inoculated in the potting mixture according to the treatments. Prepared 500 ppm IBA solution was taken in beaker and the cuttings were dipped in the solution such that a lower 2 cm portion was immersed in the solution for the period of 1 minute. After planting regular watering was done and pots were kept free from weeds upto 90 days.

After 90 days of planting the cuttings were uprooted carefully from polybags on 90th day after planting washed thoroughly under running water and adhering sand, soil particles were removed. The percentage of rooting (%), number of primary roots/ cutting, length of longest primary root (cm), effective rooting zone (cm) and fresh and dry weight of roots (g) were recorded.

RESULTS AND DISCUSSION

The data pertaining to the root parameters are presented in Table 1. Significant differences were observed due to influence of different P-solubilizers, growth regulators and their combination with enriched compost.

Among the different treatments cuttings treated with *P. fluorescens* @ 5 g per kg of pot mixture integrated with enriched compost recorded significantly higher rooting

percentage (81.25%), more number of primary roots per cuttings (44.50), maximum length of longest primary root (28.07 cm), effective rooting zone (7.62 cm), also higher fresh weight (1.03 g) and dry weight (0.5 g) of roots compared to all other treatments. However, there was no significant difference was found among the different P-solubilizers.

This could be due to ability of P-solubilizers to produce growth promoting substances like auxins, gibberellins and cytokinens to a considerable extent. These results are in line with findings of Sattar and Gaur (1987), Arshad and Frankenberger (1993). These growth promoting substances are known to enhance the cell division and root development. Presence of actively growing shoot tip was necessary during 3-4 days after cuttings were made, to produce roots (Fann *et al.*, 1983).

The increase in length of longest primary root, effective root zone, number of primary roots, fresh weight and dry weight of roots were observed in the treatment where cuttings were inoculated with P-solubilizers and enriched compost. This might be due to rapid root induction in response to colonization by these microorganisms and ability to produce growth promoting substances, availability of nutrients from compost. These results are in close agreement with the findings of Hatta *et al.* (1996).

Thus, from the study it can be concluded that different p-solubilizers along with enriched compost had greatly influenced on the rooting and growth of pomegranate cuttings as against synthetics.

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