

***In vitro* rooting of different species of banana**

U. P. Bhosale^{1*}, S. V. Dubhashi¹ and N. S. Mali²

¹Department of P.G. Studies & Research in Genetics Walchand College of Arts and Science, Solapur(MS), India

²Shankarrao Mohite Mahavidyalaya, Akaluj(MS), India

ABSTRACT

Plant tissue culture is the technique of growing plant cells, tissues, and organs in an artificial prepared nutrient medium. The present investigation was undertaken to study the effect of different concentrations of growth regulators on rooting in different species of Banana such as Ardhapuri, Basrai, Shrimanti. The shoots which are developed on MS (Murashige and Skoog) medium was inoculated on same medium supplemented with combinations of growth regulators BAP (1, 3, 5, 7, 9mg/l) with IAA and IBA (1, 2, 3mg/l). With regard to different treatments the best rooting response was observed in BAP 1 mg/l +IBA 3mg/l.

Key words: Banana, rooting, BAP, IAA, IBA

INTRODUCTION

Banana is one of the most important and remunerative cash crops grown round the year in India. The energy and nutritional status of banana are much higher than other common tropical and subtropical fruits. The average yield of banana is 14 t/ha, which is lower compared to other banana-producing countries in the world [1]. Higher yield of banana can play a pivotal role in the economy of India. It is possible to increase the yield of banana by using disease free high yielding variety, modern technology of production as well as post harvest management. Banana (*Musa* spp.) is one of the most important nutritious fruit crops of the world and grown in many tropical areas where they are used both as a staple food and dietary supplements [2].

Application of tissue culture technique is a tool to produce large number of disease free plants in limited period of time and space [3]. *In vitro* propagation of different cultivar required different culture media for shoot proliferation and root differentiation [4]. However, there is still lack of information on *in vitro* rooting of banana. Now a day, the plant growth regulators are widely used in modern agriculture to promote rooting. Widiastoety and Soebijanto [5] reported that good rooting and the best survival were obtained with IBA treatment in *Hibiscus rosa sinensis*. Kundu et al. [6] reported that indol 3-butyric acid (IBA) had a highly significant effect on the percentage success of rooting, number of root and length of root production *Ixora coccinia*. Hence the present investigation was undertaken to standardize BAP with IAA and IBA concentration for *In vitro* rooting.

MATERIALS AND METHODS

The experimental material comprised of three banana cultivars Viz. Ardhapuri, Shrimanti and Basrai. From each cultivar shoot tip (meristem) was used as explant for micropropagation. For excising shoot tips, healthy suckers were collected from the field, The shoot tips about 3-4 cm length were excised, each having meristem, young leaves and node. They were washed thoroughly with a solution of Tween - 80. All traces were removed by repeated

washings under running tap water for 4 - 5 times and finally with distilled water. These shoot tips were treated with 0.1 percent HgCl₂ Solution for 7 minutes. The shoot tips were rinsed with sterile distilled water under aseptic conditions. Shoot tips were inoculated on MS [7] + 1 mg BAP/l media and kept in dark for eight days for exudation of phenols. Then actual inoculation carried on different treatment for shooting. The cultures were incubated at 25°C under 16 hours light (2000 lux) and 8 hours darkness. For induction of roots the shoots were separated and transferred on media supplemented with IAA and IBA.

Table 1: Different treatments for rooting and proliferation

Basal Medium	Cytokinin mg/l	Auxins mg/l
MS	BAP 1	IAA/ IBA 1
MS	BAP 3	IAA/ IBA 1
MS	BAP 5	IAA/ IBA 1
MS	BAP 7	IAA/ IBA 1
MS	BAP 9	IAA/ IBA 1
MS	BAP 1	IAA/ IBA 2
MS	BAP 3	IAA/ IBA 2
MS	BAP 5	IAA/ IBA 2
MS	BAP 7	IAA/ IBA 2
MS	BAP 9	IAA/ IBA 2
MS	BAP 1	IAA/ IBA 3
MS	BAP 3	IAA/ IBA 3
MS	BAP 5	IAA/ IBA 3
MS	BAP 7	IAA/ IBA 3
MS	BAP 9	IAA/ IBA 3

RESULTS AND DISCUSSION

Table no. 2 & 3 reveals that among various treatments the best rooting response was observed in BAP 1 mg/l +IBA 3mg/l, followed by BAP 1 mg/l +IAA 3mg/l, lowest rooting was recorded in BAP 9 mg/l +IBA 3mg/l and 3mg/l IAA here rooting was not observed. Genotype response variably for rooting profuse rooting was observed in variety Shrimanti in BAP 1 mg/l + 3 mg /l IBA (average 9 roots per plantlets).(fig. no. 3.) In general shrimanti responded well for 3 mg IAA and 3 mg IBA, for remaining treatments same rooting frequency (2-5 roots / plant let) was observed. The cultivar Ardhapuri showed highest rooting (average 7 roots per plant lets) in MS media supplemented with BAP 1 mg/l + IAA 3 mg/l (fig no. 1) Ardhapuri produced profused rooting in MS media supplemented with 1 mg/l BAP with 2 mg/l IBA in average 6 roots per plant lets no rooting was observed in 9 mg/l BAP with 1 mg/l & 3 mg/l IAA & IBA. In cultivar Basrai rooting was observed in 1 mg/l BAP with 3 mg/l IAA (6 roots per plantlets) (fig. No.2) and 1 mg/l BAP with 2 mg/l IBA (5 roots per plantlets) (fig. No. 2) no rooting was observed in media supplemented with BAP 9 mg/l with 1 mg/l & 3 mg/l IAA and BAP.

Table 2: An effect of different concentration of BAP & IAA on induction of roots in different genotype

Basal Medium	Cytokinin BAP mg/l	Auxin IAA mg/l	Average no. of roots in Ardhapuri	Average no. of roots in Basrai	Average no. of roots in Shrimanti
MS	1	1	3	2	3
MS	3	1	2	1	2
MS	5	1	1	1	2
MS	7	1	-	-	2
MS	9	1	-	-	-
MS	1	2	4	3	4
MS	3	2	3	2	4
MS	5	2	2	2	2
MS	7	2	2	-	2
MS	9	2	4	-	-
MS	1	3	7	6	7
MS	3	3	5	5	5
MS	5	3	4	3	4
MS	7	3	2	3	2
MS	9	3	-	-	-

Table 3: An effect of different concentration of BAP & IBA on induction of roots in different genotype

Basal Medium	Cytokinin BAP mg/l	Auxin IBA mg/l	Average no. of roots in Ardhapuri	Average no. of roots in Basrai	Average no. of roots in Shrimanti
MS	1	1	2	2	3
MS	3	1	2	1	2
MS	5	1	1	1	2
MS	7	1	1	-	-
MS	9	1	-	-	-
MS	1	2	6	5	6
MS	3	2	5	3	4
MS	5	2	5	3	2
MS	7	2	4	2	2
MS	9	2	-	1	-
MS	1	3	4	4	9
MS	3	3	2	2	5
MS	5	3	2	2	4
MS	7	3	-	-	2
MS	9	3	-	-	-

Fig. 1: Effect of BAP and IAA/IBA on root induction in Ardhapuri



BAP and IAA

BAP and IBA

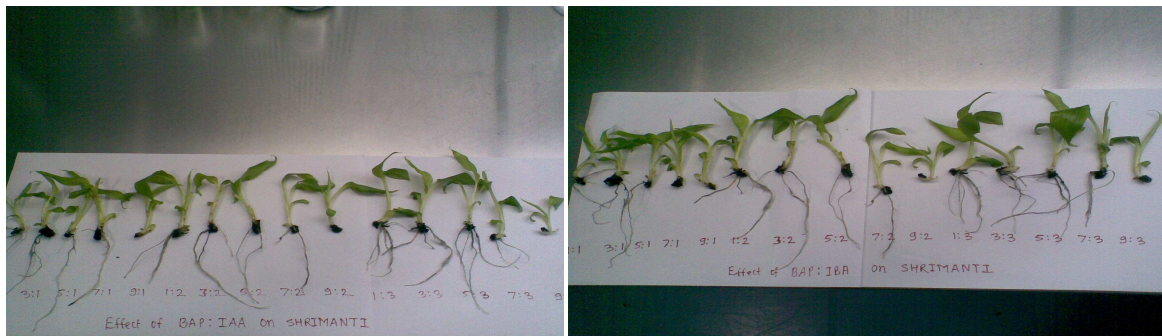
Fig. 2: Effect of BAP and IAA/IBA on root induction in Basrai



BAP and IAA

BAP and IBA

Fig. 3: Effect of BAP and IAA/IBA on root induction in Shrimanti



BAP and IAA

BAP and IBA

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