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IN VITRO PROPAGATION OF MANJADI (*ADENANTHERA PAVONINA* L.). FOR CONSERVATION OF ENDANGERMENT

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ABSTRACT

Reliable and reproducible protocol for *in vitro* propagation of medicinally important plant, *Adenanthera pavonina* L., was achieved through nodal explants. The nodal segments were cultured on MS medium supplemented with different concentrations and combinations of BAP, NAA and IBA. Maximum percentage (84.0 ± 1.3) of shootlets formation was achieved on MS medium augmented with BAP (1.5 mg/l) and NAA (0.3 mg/l). Maximum percentage (75.6 ± 0.8) of roots formation was achieved on MS medium augmented with IBA (0.8 mg/l) alone. Regenerated plants were successfully transferred to soil after acclimatizing them in the green house condition.

INTRODUCTION

Adenanthera pavonina belongs to Mimosaceae, commonly known as manjadi. It is a cultivated, an ornamental tree in Palayamkottai region. It is useful for nitrogen fixation. It has an attractive, spreading canopy. It flowers early spring to late summer fruiting in midsummer to autumn. It is also used in the treatment of cholera, inflammation, paralysis, and blood pressure in Indian folk medicine [1-4] Olajide [5] reported that, in this plant seed contain potent anti inflammatory, analgesic activities and leaves contain glucosides of beta-sitosterol and stigmasterol. Phytochemically, the seed and its pod contain glycosides, saponins, and steroids [6, 7]. The utilization of forest resources increasing every year for industrial, fuel wood and domestic consumption [8]. Within the forest region, several woody plants of nutritional importance occur naturally. Attempts made to establish large plantations of some forest tree species have showed little or no success due to inadequate silvicultural knowledge about the mode of planting, soil type, suitable nutrient requirements, nursery techniques and early growth behavior, that will guarantee effective seed germination.

Delay in germination in the nursery is a serious constraint on the efficiency of nursery management. Hence, there is need for alternative sources of planting materials. Indeed, it has been reported that knowledge of reproductive biology is very limited for most tropical tree species [9-10]. Inevitably, many species under threat or loss of genetic diversity are those of least current economic importance for which knowledge is greatly restricted. Therefore, this study investigated the effect of growth hormones for mass propagation through nodal segments of *A. pavonina* were cultured on Murashige and Skoog [11] (MS) medium supplemented with BAP, NAA and IBA.

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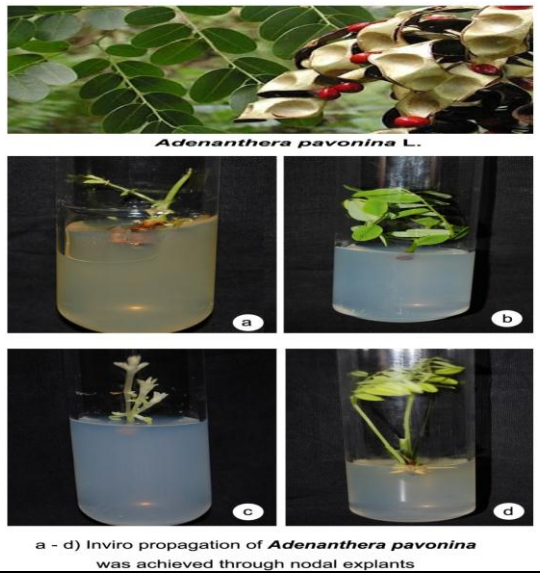
MATERIALS AND METHODS

The plant material was collected from St.Xavier's College (Autonomous), Palayamkottai in the month of December, 2015. The specimen was identified by a taxonomist - Dr. C.Murugan, Scientist, BSI, Coimbatore and the voucher specimen was deposited in the Xavier's College Herbarium (XCH-26420), Palayamkottai. Healthy shoots were washed with running tap water for 10 minutes and surface sterilized in 0.1 (w/v) $HgCl_2$ for 4 minutes.

After rinsing 3-4 times with sterile distilled water, leaves, stem nodes, internodes were cut into smaller segments (1cm) used as the explants. The nodal explants were placed vertically on MS medium supplemented with 3% sucrose, 0.6 %(w/v) agar and different concentration and combination of BAP, NAA and IBA. The pH of the medium was adjusted to 5.8 before autoclaving at 121^{o}C for 15min. The cultures were incubated at 25$\pm$2^{o}C under cool fluorescent light (2000 lux, 14 hr photoperiod). For rooting plantlets were removed from culture, washed thoroughly with tap water planted in small polycups filled with sterile garden soil (3:1), covered by unperforated polybags, and hardened for four weeks in a mist chamber before transfer to field.

Fig 1

Plate 1



a - d) Inviro propagation of ***Adenanthera pavonina*** was achieved through nodal explants

Table 1. Effect of PGR on shoot tip and nodal explants of *Adenanthera pavonina* cultured on MS medium.

Plant growth regulator (mg/l)		Percentage of response	Mean no. of shoots	Mean length of shoots
BAP	NAA			
0.5	0.1	43.3±0.8	0.78±0.6	3.6±0.4
1.0	0.2	52.5±0.5	1.76±0.3	4.1±1.3
1.5	0.3	84.0±1.3	4.62±1.6	5.8±1.1
2.0	0.4	70.2± 0.9	2.67±0.4	4.8±1.2
2.5	0.5	69.7±1.7	1.76±0.7	4.4±0.5

Table 2. Effect of Plant Growth Regulators on the rooting of shootlets of *Adenanthera pavonina* cultured on MS medium.

Plant growth regulator(mg/l)		Percentage of response	Mean no. of Roots
IBA	NAA		
0.2	0.0	53.5±0.5	0.98±0.5
0.4	0.0	63.5±0.4	1.76±0.9
0.8	0.0	75.6±0.8	3.19±0.1
1.0	0.0	69.6±0.5	2.11±0.3
0.0	0.3	42.5±0.7	0.78±0.7
0.0	0.6	49.3±0.3	0.92±0.6
0.0	0.9	55.4±0.8	1.92±0.5
0.0	1.2	63.7±0.9	2.34±0.6

RESULTS AND DISCUSSION

When MS medium augmented with different concentrations and combination of cytokinin and auxin were used, multiple shootlets emerged from the nodal segments after five days of inoculation. Effect of cytokinin and auxin on shoot multiplication from nodal segments is shown in table -1. MS medium augmented with BAP (1.5 mg/l) combination with NAA (0.3 mg/l)

showed maximum percentage (84.0±1.3). Perusal of literature suggest that BAP is most active at concentration of 1.0mg/l to 2.0 mg/l in many plant system[12]. The combination of BAP (0.50mg/l) with NAA(0.25mg/l) was highly active in *Carthamus persicus* reported by Ozdemir and Turker [13]. For root induction, the *in vitro* raised shoots were transferred on MS medium fortified with IBA (0.8mg/l) alone were observed highest frequency (75.6 ± 0.8) of roots induction. However at lower concentration of IBA (0.2mg/l) was produced very less percentage of root formation (53.5 ± 0.5) whereas NAA (0.3 mg/l) induced very less percentage of rooting formation. Therefore, at present study strongly recommended to IBA for root formation. The reduced rooting may be due to the imbalance between the endogenous auxin and exogenous supplemented auxin, IBA and NAA. Effect of IBA in rooting had been reported by earlier researchers *Dianthus caryophyllus* [14] and *Vitex negunda*[15]. Sixty five plants were transferred to the nursery field, of which eighty eight percent of plants becofmes established and no variation in morphological character could be detected.

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CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

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