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IN VITRO SHOOT CULTURE OF *AERVA LANATA [L.] A.L. JUSS.* AN IMPORTANT MEDICINAL PLANT

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ABSTRACT

AERVA LANATA [L.] A.L. JUSS. is an important medicinal plant known for its prolonged hypertensive and hypoglycemic activity**.** In the present study callusing was achieved in *Aerva lanata* plant. Response of callus of *Aerva lanata* was observed on MS medium supplemented with BAP, NAA and IAA in various combinations.

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INTRODUCTION

Aerva lanata known as polpala is a prostrate to decumbent sometime erect herb, found throughout tropical India as a common weed in field and wasteland (Krishnamurthy 2003). *Aerva lanata* is an important medicinal plant of Amranthaceae known for its prolonged hypertensive and hypoglycemic activity. It contained steroidal glycoalkaloid solanin and chaconine. This plant is valued for antidiabitic and antibiotic properties. It has many Ethno medicinal uses (Chopra et al. 1992). It is used as carminative and sudirific in catarrhal condition in Brazil, & Argentina (Ricardo Ayerza (h) and Wayne Coates, 1996). The plant has been reported to posses' diuretic (Udupihille and Jiffry 1986). It is anthelmintic demulcent and is helpful in lithiasis, cough, sore, throat and wounds (Pullaiah *et. al.*,2003) and a nephroprotective action in rats (Shirwaikar *et. al.*2004).

Population size of the plant is low & its distribution is also not common hence In-vitro propagation has been tried and presented it in this paper.

MATERIAL AND METHOD

Plant was collected from Hislop College (Itwari) and campus premises of RTM Nagpur University of Nagpur (M.H.). Material was dried in shade and seeds were removed from plant and kept in sterile Petri plate. Seedlings were grown on filter paper. Cotyledons along with plumules were used as explants. All the operations were done in between the flames of two spirit lamps. Seedlings were washed, sterilized in distilled water, and then immersed in 0.1% $Hgcl^2$ solution for 2min.Then; it was thoroughly washed 2-3 times with DDW (double distilled water) and was kept in sterile Petri plate with a filter paper to absorb the excess water. The explants were gently placed on the gelled medium.

The explants were aseptically culture with their surface touching the MS medium (Murashinge and Skoog) containing 3.0% (w/v) sucrose, 0.8 %(w/v) agar (1.0mg/l) BAP and different concentrations of NAA & IAA (0.5-2.5mg/l). The pH of the media was adjusted to 5.8 before autoclaving at 121°c for 15 minutes.

RESULT & DISCUSSION

Callus from explants were obtained through *in vitro* culture. After a week period of inoculation, callus tissue originates at the cut ends and margin of the explants. The morphogenetic response of calli varied on the different concentration of

i) Ms+BAP(1.0mg/l)+NAA(1.0mg/l)+IAA(.5mg/l- 2.5mg/l)
ii)Ms+BAP(1.0mg/l)+IAA(1.0mg/l)+NAA(.5mg/l- 2.5mg/l)

Auxin in medium induced white friable, green friable calli (Table-1).

Variable con. Of IAA (0.5mg/l & 1.0mg/l) resulted in W.F. callus with the % of callusing 65&72% and concentrations of (1.5- 2.5mg/l) of IAA were resulted in G.F. callus with the % of callusing71-70% respectively. Green compact calli produces higher frequency of shoot regeneration in 6 weeks on same medium.

As far as with the second combination of medium having variable con. Of NAA (0.5mg/l &1.5mg/l) resulted in W.F.callus with the % of callusing 60 & 70% and con. Of (1.0, 2.0&2.5mg/l) of NAA were resulted in G.F.callus with the % of callusing 91, 90, and 81% respectively.

Table: 1Effect of different concentration of IAA on callus induction of seedling axis of *Aerva lanata L.*

Growth hormones (mg/l)	% of callusing	Nature of callus
MS+BAP(1.0mg/l)+NAA (0.5mg/l)+IAA(0.5mg/l)	65	W.F.
MS+BAP(1.0mg/l)+NAA (0.5mg/l)+IAA(1.0mg/l)	72	W.F.
MS+BAP(1.0mg/l)+NAA (0.5mg/l)+IAA(1.5mg/l)	71	G.F.
MS+BAP(1.0mg/l)+NAA (0.5mg/l)+IAA(2.0mg/l)	70	G.F.
MS+BAP(1.0mg/l)+NAA (0.5mg/l)+IAA(2.5mg/l)	70	G.F.

Table: 2Effect of different concentration of NAA on callus induction of seedling axis of *Aerva lanata L.*

Growth hormones (mg/l)	% of callusing	Nature of callus
MS+BAP(1.0mg/l)+IAA(0.5mg /l) +NAA(0.5mg/l)	60	W.F.
MS+BAP(1.0mg/l)+ IAA (0.5mg/l)+ NAA (1.0mg/l)	91	G.F.
MS+BAP(1.0mg/l)+ IAA (0.5mg/l)+ NAA (1.5mg/l)	70	W.F.
MS+ MS+BAP (1.0mg/l)+ IAA (0.5mg/l)+ NAA (2.0mg/l)	90	G.F.
MS+BAP(1.0mg/l)+ IAA (0.5mg/l)+ NAA (2.5mg/l)	81	G.F.

WF- Whitish friable., G.F. - Greenish friable.
Note: MS+BAP (1.0mg/l) +NAA (0.5mg/l) is fixed in Table 1 and Table 2 MS +BAP (1.0mg/l) +IAA (0.5mg/l) in all cultures.
Each value represents 20 replicates and each experiment was repeated at least thrice.

Table 3. Effect of different concentration of IAA/NAA subculture on plantlet regeneration of *Aerva lanata L.*

Growth hormones(mg/l)	%of callus	No of multiple callus (mean±SD)	Plantlet length (mean±SD)
i)MS+BAP(1.0mg/l)+NAA (0.5mg/l)+IAA(0.5mg/l)	28	1.5± 0.57	1.0 ±0.01
MS+BAP(1.0mg/l)+NAA (0.5mg/l)+ IAA(1.0mg/l)	37	2.5 ± 0.57	2.0± 0.00
MS+BAP(1.0mg/l)+NAA (0.5mg/l)+ IAA(1.5mg/l)	48	4.05± 1.00	3.0± 0.57
MS+MS+BAP(1.0mg/l)+NAA (0.5mg/l)+ IAA(2.0mg/l)	32	4.0 ± 00	2.5±0.57
MS+BAP(1.0mg/l)+NAA (0.5mg/l)+ IAA(2.5mg/l)	40	4.0± 1.00	2.9± 0.01
MS+BAP(1.0mg/l)+IAA (0.5mg/l)+NAA(0.5mg/l)	25	5.0±0.47	0.5± 0.50
MS+BAP(1.0mg/l)+IAA (0.5mg/l)+NAA (1.0mg/l)	40	6.0± 0.33	0.7±0.56
MS+BAP(1.0mg/l)+IAA (0.5mg/l)+NAA (1.5mg/l)	22	5.0 ±1.00	0.3 ± 0.50
MS+BAP(1.0mg/l)+ IAA (0.5mg/l)+ NAA (2.50mg/l)	35	5.5± 0.57	0.6 ±0.50
MS+ BAP(1.0mg/l)+ IAA (0.5mg/l)+ NAA (2.5mg/l)	30	5.0± 0.22	0.6 ± 0.50

Green compact calli product higher frequency of shoot regenerate in 6 weeks on same medium. The higher frequency of shoot obtained on MS medium supplemented with 1.5 mg/l IAA and (1.0mg/l) BAP in addition with (0.5mg/l) NAA is (48%) followed by (1.0mg/l) NAA +(1.0mg/l) BAP in addition with (0.5mg/l) IAA (40%) (Table-3).

Root was developed within a week on the same medium. In the present investigation IAA, BAP and NAA provide optimum callus and multiple shoot initiation from leaf explants. Padmanabhan *et. al.* (1973) reported that optimum callus induction and regeneration was obtained on MS medium containing 0.5mg/l IAA+KN 3.0 mg/lGunny and Rao *et.al*, 1978 suggested that 0.5mg/l IAA& 2.0 mg/l BAP provide optimum regeneration (60%). Jawahar *et al*., (1998) suggested that 2.5 mg/l NAA & 1.5 mg/l KN induced higher frequency of shoot proliferation. Muthukumar *et al*., (1998) reported maximum callus and regeneration at 2mg/l BAP alone. However in the present study optimum callus and regeneration occurred only on MS medium supplemented with 1.0 mg/l IAA+1.0 mg/l NAA in addition with MS medium. Thus the IAA &BAP combination provide better result in present investigation, with 75% of callus and 68% of regeneration being obtained (Table 1,2,3 and Plate 1).

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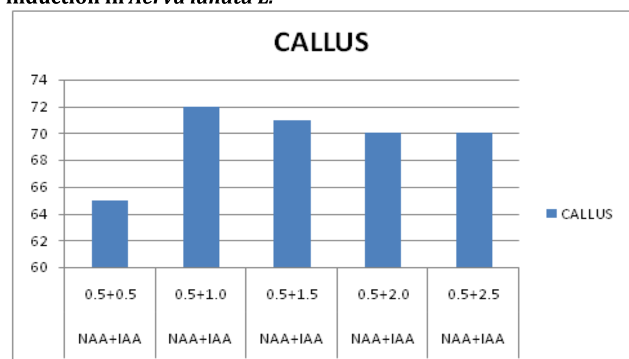
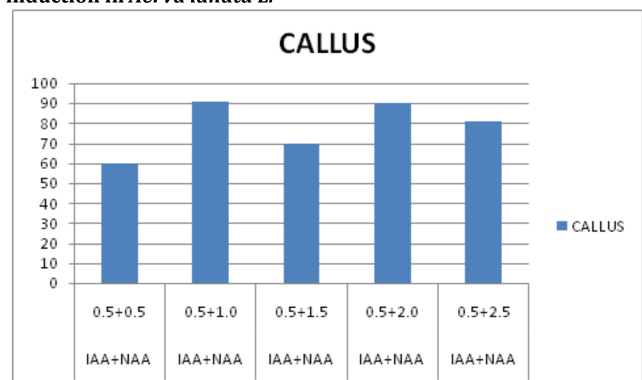
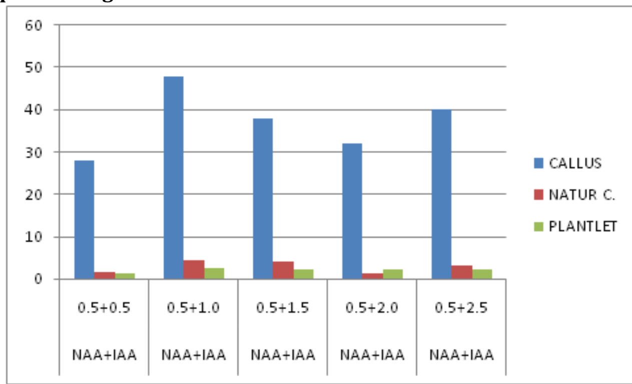
Graph no.: 1 Effect of different concentration of IAA on callus induction in *Aerva lanata L.*



Graph no. : 2 Effect of different concentration of NAA on callus induction in *Aerva lanata L.*



Graph no. 3 Effect of different concentration of IAA of subculture on plantlet regeneration *Aerva lanata L.*



Graph no. 4 Effect of different concentration of NAA of subculture on plantlet regeneration *Aerva lanata L.*

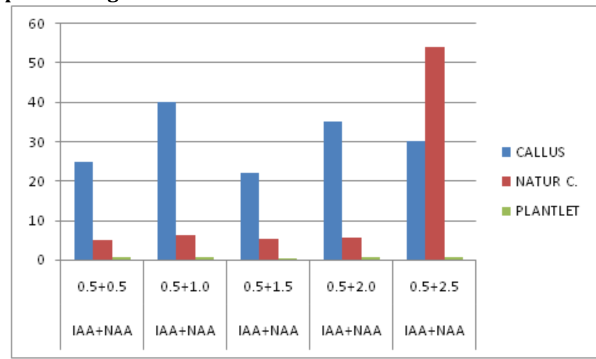


Plate:1: Showing different stages of *in-vitro* regeneration of *Aerva lanata*