

Hormonal induction of Rooting in *Catharanthus roseus* (Murr.) G. Don.

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ABSTRACT

Catharanthus roseus (Murr.) G. Don. is an important medicinal plant. It harbours a number of alkaloids. In its roots, ajmalicine, an alkaloid which cures neurological disorders is found whereas reserpine and serpentine also inhabited in its roots are powerful tranquilizers and sedative. Keeping this in view, root cultures are designed to enhance quantitatively and qualitatively these pharmacologically significant alkaloids. Indole butyric acid (IBA), an Auxin at 0.1 mg/l concentration in culture gave the best rooting result. It gave rise to 30 – 32 healthy roots per shoot with 6.7 cm root length after 4 weeks of culturing. This emphasizes the superiority of IBA in *in vitro* rooting in the aforesaid plant.

Key words : Ajmalicine, *Catharanthus roseus*, Indole Butyric Acid, reserpine, serpentine.

There has been a long history of use of plants in medicine. *Catharanthus roseus* (Murr.) G. Don. is one such plant belonging to the Apocynaceae family. They should multiply rapidly and produce high quality medicine⁴. The alkaloids predominating roots of *Catharanthus* are ajmalicine, reserpine and serpentine. The alkaloid ajmalicine is used to cure neurological problems. Reserpine and serpentine are powerful tranquilizers and sedative. These days due to competition and coaction, lifestyle has undergone paradigm shift and hence the need for such curatives. Therefore, root cultures are designed to enhance alkaloidal production to be used as medicine¹¹.

The *in vitro* shoots developed from the nodal explants in *Catharanthus roseus* were subjected to rooting in culture. For this, micro shoots of appropriate length (4-5 cm) were excised from the parent tissue and transferred to rooting medium comprised of half strength MS medium with varying IBA (Auxin) concentrations. The pH value at 5.5 was ascertained to be optimum for serpentine production¹. Highest serpentine production was recorded at 25°C^{7,8}. In Periwinkle, serpentine content was directly related to the intensity of light⁸. So, here 8 hours photoperiods were designed. In culture, high oxygen level were maintained through improved gaseous permeability at aerated conditions. This had

favourable impact on ajmalicine production⁶. After 6 weeks of culturing, the rooting percentage, number of roots per shoot and shoot length were recorded. The exogenous supply of cytokinin increased ajmalicine and serpentine content in Periwinkle³.

The IBA treatments inducted rooting in *Catharanthus roseus*. The root initiation occurred approximately 2 weeks after the transfer of shoots to the rooting medium. Even in the medium free of growth regulators, relatively few and smaller roots were induced. The induction of roots in IBA free medium is due to endogenous level of hormones in the regenerated microshoots. The presence of endogenous auxins in the tissues has been reported in a medicinal herb of Acanthaceae family⁹. Here, the best rooting response *i.e.* 90% were obtained on half-strength MS medium containing IBA at 0.10 mg/l concentration. Number of healthy roots per shoot were 30 – 32 with 6.7 cm of root length after 4 weeks of culturing. This was followed by 0.05 mg/l IBA strength whose 80% cultures rooted in 3 weeks with the attainment of 1.07 cm root length. At 0.50 mg/l and 1.00

mg/l IBA concentrations, cultures with rooting percentage were 70 and 60 and root length were at 3.63 cm and 4.83 cm respectively. The root number at 0.05 mg/l, 0.50 mg/l and 1.00 mg/l obtained were 10, 5 and 5.33 respectively.

Roots were healthy, thick and having well-developed secondary branches. Superiority of IBA over other auxins in root formation has also been reported in other plant species such as *Cunila galoides* (Franco and Echeverrigaray, 2001) and *Clitoria ternatea*¹⁰. Most of the workers have reported rooting in presence of IBA and/or IAA.

Nath and Buragohain⁵ reported maximum number of roots in MS media due to endogenous auxins present sufficiently.

Regenerated plantlets were successfully transferred to greenhouse conditions with 90% survival rate. No morphological variation was noticed in leaves and stems of acclimatized plantlet when compared to healthy *in vivo* plants. These plants of *Catharanthus roseus* bloomed normally. It is a positive indication as the alkaloid content is highest at flowering.

Table – 1. Summary of the effect of Auxin (IBA) on Root Induction in shoots of *Catharanthus roseus* on half-strength MS-medium

Growth Regulator conc. (mg/l) IBA)	Culture with rooting Percentage	No. of roots	Root length (in cm.)	Days of Rooting (in weeks)
0.05	80	10.33 ± 0.34	1.07 ± 0.3	3
0.10	90	31 ± 0.58	6.7 ± 0.4	4
0.50	70	5 ± 0	3.63 ± 0	3
1.00	60	5.33 ± 0.34	4.83 ± 0	3

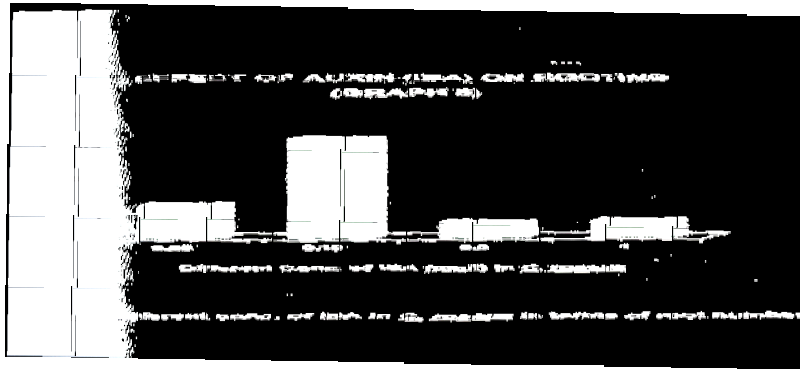


Fig. 1

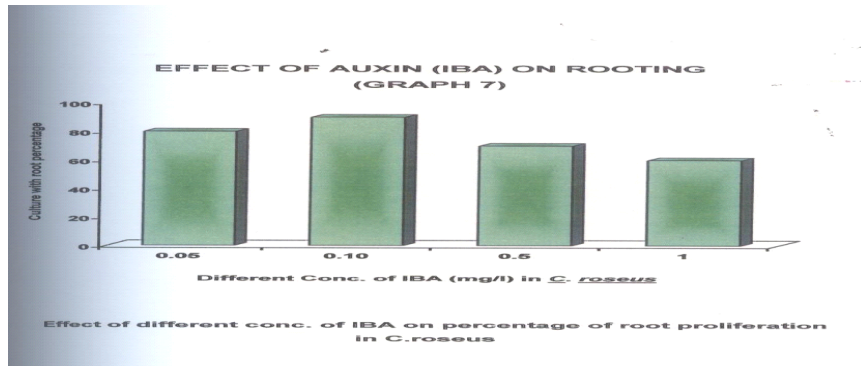


Fig. 2

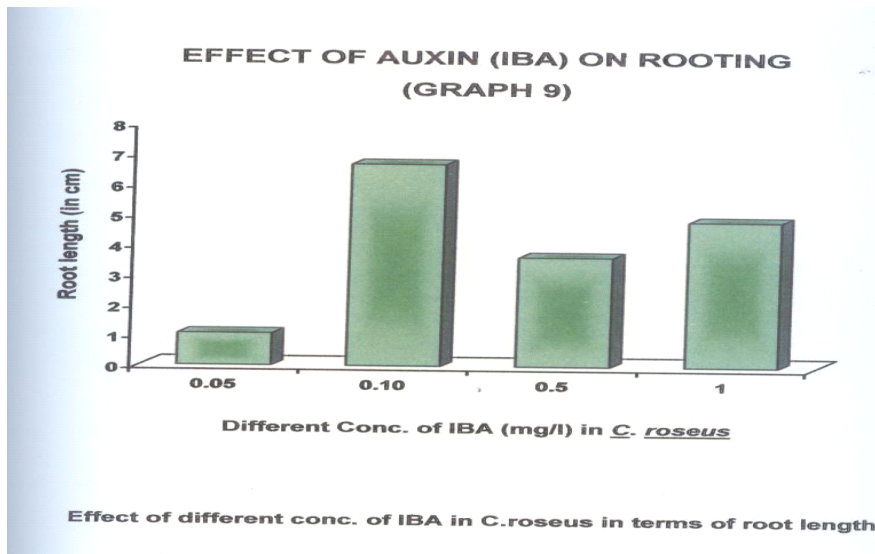


Fig. 3

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