Induction of adventitious root in *Andrographis paniculata* Cuttings using Auxin: a Rapid Propagation Technique

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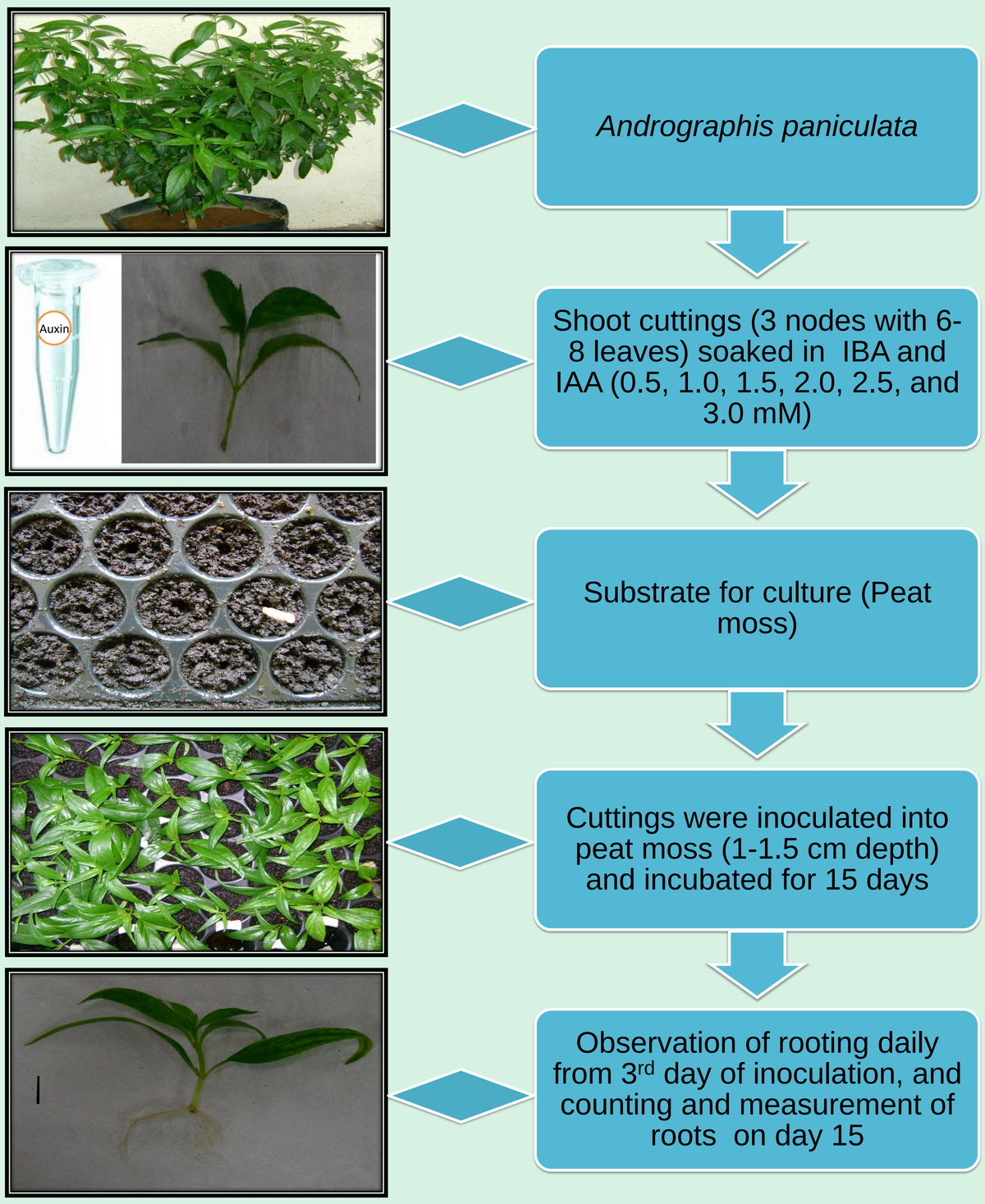
1.1 BACKGROUND

- *Andrographis paniculata (*Kalmegh) is a highly utilized medicinal plant.
- It can be grown at all kinds of places, including plainlands, hill slopes, farms, seashores, and roadsides but favors moist and shade forests and wastelands [1].
- Seed dormancy is the major constraints of large-scale propagation [1].
- Vegetative propagation using shoot and stem could be an alternative strategy for commercial cultivation.
- External auxins can influence the adventitious rooting of plants [2].
- Implementation of external plant growth regulator for production of *A. paniculata* is still limited.
- Therefore, development of a simple vegetative propagation method for *A. paniculata* for commercial production is crucial.

1.2 OBJECTIVE

To examine the rooting ability of young and old apical shoot cuttings of *A. paniculata* using exogenous auxins, IIndole-3-butyric acid (IBA) and indole-3-acetic acid (IAA).

2. MATERIALS AND METHODS



3. RESULTS

- A simple and rapid vegetative propagation method has been developed for *A. paniculata.*
- Different auxins significantly affected on the root regeneration time, number of roots and length of roots induced.
- Juvenile cuttings were more responsive to induce root by auxin; Young apical shoot took 6.33 days where as old apical shoot took 8.33 days for Indole-3-butyric acid to regenerate roots.
- Maximum 100% propagule can be grown in the field since no acclimatization required.
- This study can be used for mass multiplication of the species at commercial level without prior training.

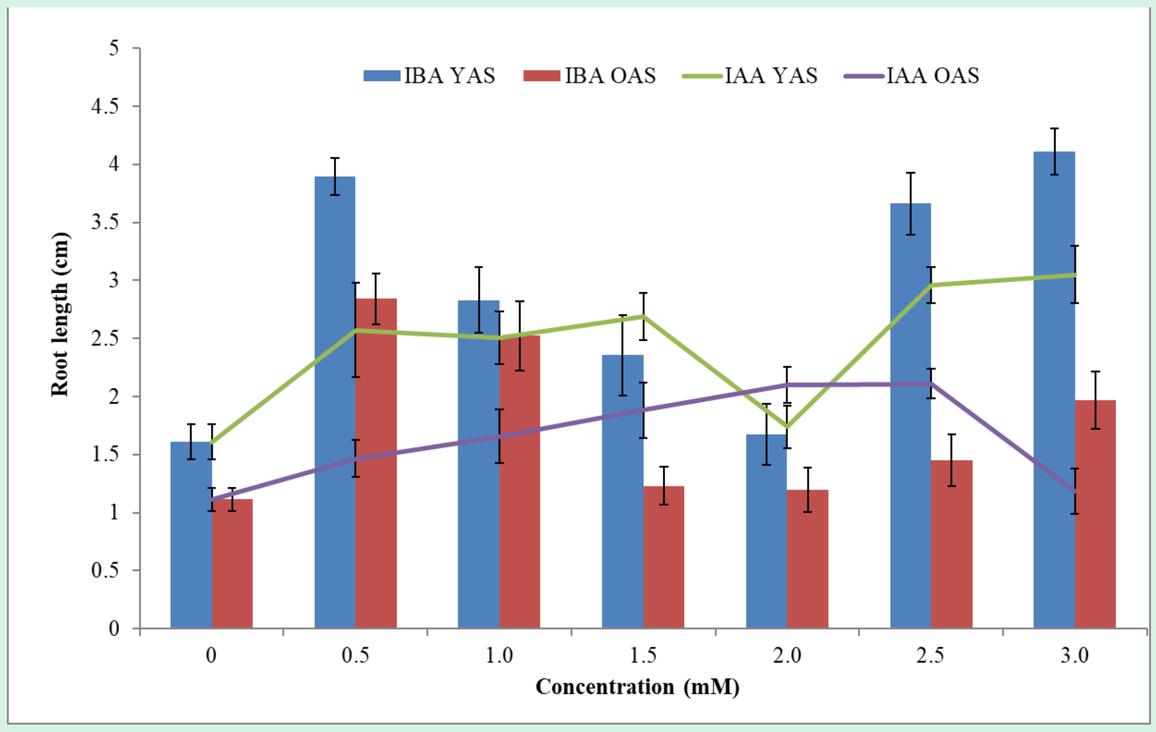


Figure 1. Rooting response in young and old apical shoot cuttings of *A. paniculata* under treatment of IBA and IAA dosages (0.5, 1.0, 1.5, 2.0, 2.5, and 3.0 mM).

4. CONCLUSION AND RECOMMENDATION

The present findings revealed that 3.0 mM of IBA induced adventitious roots very quickly in YAS and OAS of *A. paniculata*, respectively. The technique applied in this study could be used for large scale propagation and conservation of *A. paniculata*. Further study should be conducted to examine the effects of Auxins in different soaking duration.

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REFERENCES

1. Hossain, M.S.; Urbi, Z. Effect of Naphthalene Acetic Acid on the Adventitious Rooting in Shoot Cuttings ofAndrographis paniculata(Burm.f.) Wall. ex Nees: An Important Therapeutical Herb. *International Journal of Agronomy* **2016**, *2016*, 1-6, doi:10.1155/2016/1617543.
2. Hossain, S.; Urbi, Z.; Karuniawati, H.; Mohiuddin, R.B.; Moh Qrimida, A.; Allzrag, A.M.; Ming, L.C.; Pagano, E.; Capasso, R. *Andrographis paniculata* (Burm. f.) Wall. ex Nees: An Updated Review of Phytochemistry, Antimicrobial Pharmacology, and Clinical Safety and Efficacy. *Life* **2021**, *11*, doi:10.3390/life11040348.
3. Hossain, M.S.; Urbi, Z.; Sule, A.; Hafizur Rahman, K.M. Andrographis paniculata (Burm. f.) Wall. ex Nees: a review of ethnobotany, phytochemistry, and pharmacology. *ScientificWorldJournal* **2014**, *2014*, 274905, doi:10.1155/2014/274905.