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Research Article

In vitro Production from Axillary Bud Explants of *Solanum seaforthianum*

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ABSTRACT

The number of shoots developed from *Solanum seaforthianum* axillary bud explants ranged from 1–4 per explant when cultured on Murashige and Skoog (MS) medium supplemented with appropriate concentrations of growth regulators. Among the various treatments tested, 0.5 mg/L BAP was found to be optimal for multiple shoot induction. MS medium fortified with 1.0 mg/L BAP or 2.0 mg/L L-glutamic acid also promoted shoot bud formation from axillary bud explants. The effects of different growth regulators, including BAP, NAA, IAA, kinetin (Kn), and L-glutamic acid, were evaluated for their influence on shoot induction, callus formation, and plant regeneration. Regeneration from *Solanum seaforthianum* leaf explants was successfully achieved on MS basal medium supplemented with 2.0 mg/L BAP and 3.0 mg/L NAA. An increase in the concentrations of BAP, Kn, and IAA (2.0–3.0 mg/L) enhanced the percentage of explants producing shoots. These results indicate that the type and concentration of plant growth regulators play a crucial role in the in vitro regeneration and propagation of the species. The species has become widely naturalized beyond its native range and is considered invasive in several regions, including Australia, Africa, Indochina, the Pacific Islands, and India, where it can suppress native vegetation and adversely affect livestock. The plant exhibits high tolerance to heat but is sensitive to frost. It contains moderate amounts of tropane alkaloids, including atropine, scopolamine, and hyoscyamine, and is therefore regarded as mildly toxic and unsuitable for consumption.

1. Introduction

Axillary buds from *Solanum seaforthianum* were reported by Jelaska (1974) M. Venkateshwarlu (2008). D. Srinivas, et al(2025). "Different concentrations and combinations of cytokinins from leaf explants of *Trichosanthes cucumerina* in the present paper, a simple and reproducible procedure was devised to obtain multiple shoots from *Solanum seaforthianum* axillary bud explants on MS medium fortified with plant growth regulators along with coconut milk and amino acids. The main objective of clonal propagation is to establish plants that are uniform and predictable for selected qualitie. (Mandaloju Venkateshwarlu, 2026; Kumar Thatipamula et al., 2017). Effect of Various Growth Regulators on Stem Explant Responses in Merremia emarginata. In vitro Production of Solanum spp. (M. Venkateshwarlu, 2012; Mamidala et al., 2020). Most of these species are widely distributed throughout tropical and subtropical regions. Modern technologies and the rapidly developing industrial sector are neither available nor affordable to a large section of the population (P. Karunara Rao & M. Venkateshwarlu, 2025). Multiple shoots were successfully regenerated from leaf explants of Solanum nigrum.

2. Materials and Methods

The Axillary buds from *Solanum seaforthianum* explants were surface sterilized using mercuric chloride solution containing few drops of Tween-20 for 2-4 min followed by rinses in sterilized double distilled water. Axillary bud explants of 1.0 – 1.5 cm length were cultured and surface sterilized with 0.1% $HgCl_2$ for 4-6 minutes and rinsed with sterile distilled water. These explants were washed under running tap water in common laboratory detergent for 15 minutes then the outer explants axillary buds were removed one by one and when last two nodes remained the surface sterilization containing 2.5% sucrose and 0.8% Agar-Agar. The pH of the medium was adjusted to 5.8 and later was autoclaved at 1200C for 17 minutes. Cultures were incubated under 16 hrs illumination (250 lux) at 25±20C temperature. The processed explants subjected to two hour running tap water washing prior to sterilization. They were cultured on MS medium supplemented with various levels of BAP, Kn and IAA was tested development of regenerative system involves use of plant material sterilization obtained from selected Axillary bud explants.

3. Results and Discussion

MS medium supplemented with 10, 15, 20% of coconut milk also triggered the induction of multiple shoots. Low concentration of L-Glutamic acid (0.5 – 3.0 mg/l, along with BAP (1.0 mg/l, produced significant mean number of multiple shoots that ranged from 2-3 to 5-6 in the axillary bud explants. Shoot multiplication was obtained from shoot apices of Niger when cultured on MS medium supplemented with 1.0 to 3.0 mg/l BAP, Kn, IAA and L-Gltamic acid. Raising the level of BAP (3.0 to 4.0 mg/l) resulted in an increase in the number of shoots from axillary bud explants of Niger. A transfer of cultures to auxin-cytokinin supplemented MS medium facilitated elongation of callus with shoots. In brief present efforts on selected axillary bud explants led to the limited success in these *Solanum seaforthianum* species. Recent development in molecular biology and genetic transformation however, have made it possible to identify isolate and transfer desirable genes in in vitro crop production plant let regeneration from Biotechnological Applications subjected to varying concentrations of natural and synthetic phytohormones in combinations.

Table 1. *In vitro* Production from Axillary bud explants of Solanum seaforthianum.

Growth Regulators	Auxillary bud explants	
	% frequency of shoots	Response of Callus hoots
MS + 0.5 mg/l BAP + Kn	40	Green callus
MS + 1.0 mg/l BAP + Kn	35	Green callus with shoots
MS + 2.0 mg/l BAP + IAA	30	Callus + shoots (1-3)
MS + 3.0 mg/l BAP + IAA	25	shoots (3-4)
MS + 0.5 mg/l NAA + BAP	20	Green callus
MS + 1.0 mg/l NAA + L-Glutamic acid + BAP	30	Green callus with small shoots
MS + 2.0 mg/l NAA + L-Glutamic acid + BAP	25	Callus with shoots (4-6)
MS + 3.0 Mg/l NAA + L-Glutamic acid + BAP	22	shoots (3-5)
MS + 4.0 mg/l NAA + L-Glutamic acid + BAP	15	shoots (2-4)

This concentration facilitated development on an average 4-6 new shoots per culture supplemented MS medium fortified with various cytokinins i.e., BAP, Kn, IAA & NAA also had a role in triggering the formation of multiple shoots. (Plate -1 Fig -1,2,3 & 4) The mean number of shoots developed on the leaf segments ranged from 1-2 to 2-4 by the addition of different concentrations of BAP and IAA (Table 1). Raising the level of BAP (3.0 mg/l to 4.0 mg/l) resulted in an increase in the percentage of shoots developed from leaf segments. There was no significant increase in the number of shoots on NAA at low and high concentrations.

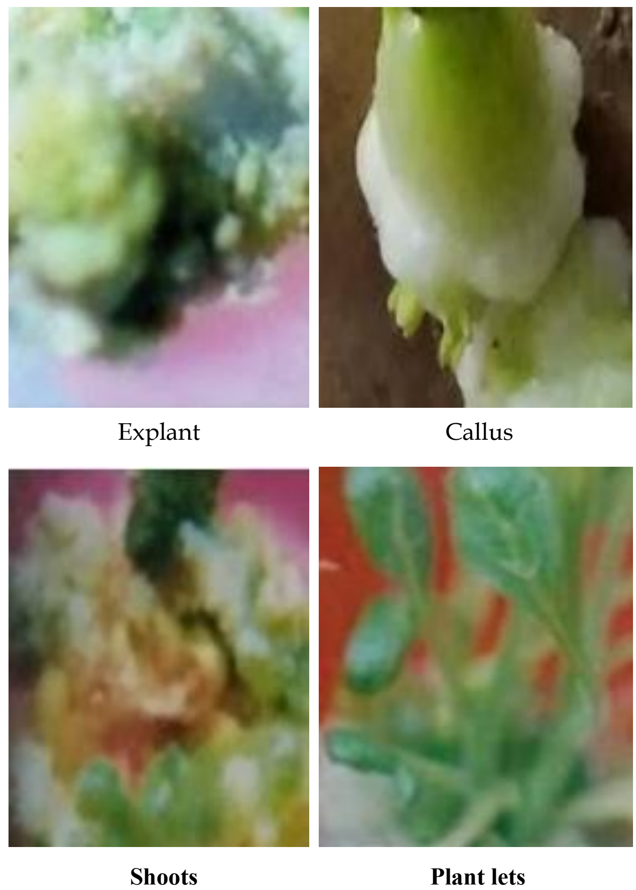

Figure-1. *In vitro* Production from Axillary bud explants of *Solanum seaforthianum*

4. Conclusion

In want of basic tissue culture regeneration protocols, work on culture the axillary bud explants with an increase in the hormonal concentrations. The development of suitable reproducible technology that the improvement programs can be taken up through tools of genetic engineering obtained from mature crop plants are recalcitrant to regenerate and inherent problems like contamination and browning are associated with these explants

Competing interests:

The authors declare that they have no competing interests

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