



MULTIPLE SHOOTS FROM LEAF EXPLANTS OF *SOLANUM NIGRUM*. L-A WIDELY USED PLANT IN ANTITUMORIGENIC MEDICINE

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ABSTRACT

MS medium fortified with 2.0 mg/l BAP 0.5 mg/l L-2.0mg/l Kn or 3.0 mg/l L-G Glutamic acid also induced shoot buds on leaf segments. Sometimes *S. nigrum* is confused for the more toxic deadly nightshade (*Atropa belladonna*), which is in a different genus within Solanaceae. A comparison of the fruit shows that the black nightshade berries grow in bunches, whereas the deadly nightshade berries grow individually. Another distinction is black nightshade flowers have white petals. Regeneration shoots from *Solanum nigrum* L leaf explants of callus and In Vitro multiple shoots were obtained on MS Medium within BAP, NAA, L-Glutamic acid and Kinetin, Coconut milk (CM). High frequency plant regeneration from leaf explants of *S. Nigrum* by Ugander, et. al (2010) Callus induction and base explants of *Aloe vera* R. Prasad, Venkateshwarlu M et.al (2018). MS basal medium supplemented with various Auxons/Cytokinins BAP and NAA. Coconut water also had a role in triggering the formation of multiple shoots. Addition of BAP at 3.0 mg/l and NAA at 2.0 mg/l to the MS basal medium, induced regeneration from the leaf segments. With an increase in the level of BAP 1.0 - 3.0 mg/l the percentage of explants producing shoots also increased. The number of shoots developed on the leaf segments ranged from 1-4 to 2-3 by the addition of BAP at concentration of 1.0 mg/l or NAA at 2.0 mg/l. Among The three concentrations of coconut milk used i.e, 5, 10 and 15% of coconut milk along with 0.5 mg/l BAP proved to be ideal for multiple shoot induction. Cucumber green mottle mosaic virus Wayne, et.al (2011) and *Solanum nigrum* also suffers from downy and powdery mildews which seriously limits the crop production. Axillary buds from pump-kin were reported by Ugander, et.al (2019) & Rathore (2010). *S. nigrum* is an important ingredient in traditional Indian medicines. Infusions are used in dysentery stomach complaints and fever. Sikdar, M; Dutta, U (2008) & Read, BE (1977). The fruits are used as a tonic laxative appetite stimulant and for treating asthma and "excessive thirst". Traditionally the plant was used to treat tuberculosis. This plant's leaves are used to treat mouth ulcers that happen during winter periods of Tamil Nadu, India. In North India, the boiled extracts of leaves and berries are also used to alleviate liver-related ailments, including jaundice.

KEYWORDS: Leaf Explants, NAA, L-Glutamic acid, BAP *Solanum nigrum* L.

INTRODUCTION

The main objective of clonal propagation is to establish plants that are uniform and predictable for selected qualities. the Paleolithic and Mesolithic era of ancient Britain and it is suggested by the botanist and ecologist Edward Salisbury that it was part of the native flora there before Neolithic agriculture emerged. The plant was known and mentioned by ancient herbalists, including Dioscorides. In 1753, Carl Linnaeus described

six varieties of *Solanum nigrum* in *Species Plantarum*. Growth or *in vitro* propagated plants is often stronger than in those cloned *in vitro* phytochemical analysis and biological activities in *Morinda* Venkateshwarlu et.al (2011). The plants of Cucurbitaceae suffer from several diseases including the watermelon mosaic virus Cucumber green mottle mosaic virus Wayne et al (2011) and *Solanum nigrum* also suffers from downy and powdery mildews which

seriously limits the crop production. Axillary buds from pump-kin were reported by Ugender *et al.* (2019) & Rathore (2010) Sudarshan L, *et al.* (2000). Grubb, Adam; Raser-Rowland, Annie (2012). A simple and Reproducible procedure was devised to obtain multiple shoots from leaf segments of *Solanum nigrum* L on MS medium fortified with plant growth regulators along with coconut milk and amino acids. Fahs, Barbara. (2014).

TAXONOMIC POSSION

Sometimes *S. nigrum* is confused for the more toxic deadly nightshade (*Atropa belladonna*), which is in a different genus within Solanaceae. It reaches a height of 30 to 120 cm (12 to 47 in), leaves 4.0 to 7.5 cm (1.6 to 3.0 in) long and 2 to 5 cm (1 to 2 in) wide; ovate to heart-shaped, with wavy or large-toothed edges; both surfaces hairy or hairless; petiole 1 to 3 cm (0.5 to 1 in) long with a winged upper portion. The flowers have petals greenish to whitish, recurved when aged and surround prominent bright yellow anthers.

CULTIVATION METHODS

In the lack of organic matter, poor ventilation clay, its roots will be stunted, plant growth is weak and fruiting commodity is therefore poor. It is difficult to grow in high temperatures and high humidity. Soil pH value of black nightshade is between 5.0 and 6.0. Preferring rich organic matter; being well watered and improved verility.

MATERIAIS AND METHODS

MS medium containing 2.5% sucrose and 0.8% Agar-Agar and different concentrations of BAP, NAA and L-Glutamic acid Leaf segments of *Solanum nigrum* L of were cultured and surface sterilized with 0.1% HgCl for 5-7 minutes and rinsed with sterile distilled water. Cultures were incubated under 16 hrs illumination (250 lux) at 25± 2°C temperature. Each treatment consisted of 10-15 replicates. The data was recorded at the end of eighth week in vitro propagation of Zylus Sudharsan *et al.* (2000) cloning protocol Campstrini (2006). The pH of the medium was adjusted to 5.8 and later was autoclaved at 120°C for 17 minutes. Rajendraprasad, Venkateshwarlu, M (2018) experimental mutagenesis on cicer tissue culture studies leaf explants, multiple shoots in cucumis Venkateshwarlu M. (2008 & 2019). Lower levels of coconut milk (5 & 10%) induced callus formation Leaf explants were inoculated on MS basal medium fortified with various Auxins cytokinins i.e., BAP and NAA. Coconut water also had a role in triggering the formation of multiple shoots Kanna *et al.* (2005) *In Vitro* micropropagation *Solanum nigrum* Ram *et al.* (2002).

PHYTOCHEMICAL STUDY

It was a traditional European medicine used as a strong sudorific analgesic and sedative with powerful narcotic properties, but was considered a "somewhat dangerous remedy". Internal use has fallen out of favor in Western herbalism due to its variable Phytochemical and toxicity. The active ingredient of the plant, solanine, inhibits the proliferation of different cancer cells in vitro, such as breast cancer and pancreatic cancer.

MEDICINAL PROPERTIES

* *S. nigrum* is an important ingredient in traditional Indian medicines. Infusions are used in dysentery, stomach complaints, and fever. The juice of the plant is used on ulcers and other skin diseases

* *S. nigrum* is a widely used plant in oriental medicine where it is considered to be antitumorigenic, antioxidant, anti-inflammatory, hepatoprotective, diuretic, and antipyretic.

* Water extracts of *Solanum nigrum* have shown a cytotoxic activity in reducing ROS generation of the human MM cell line A-375.

* *S. nigrum* is a widely used plant in oriental medicine where it is considered to be antitumorigenic, antioxidant, anti-inflammatory, hepatoprotective, diuretic, and antipyretic.

RESULTS AND DISCUSSION

The mean number of shoots developed on the leaf segments ranged from 1- 4 to 2 - 3 by the addition of different concentrations of BAP and NAA the level of SAP (3.0 mg/l to 4.0 mg/l) resulted in an increase in the percentage of shoots developed with 10, 15, 20% of coconut milk also triggered the induction of multiple shoots (Plate I, Table-1 fig.1, fig.2 & fig 3). Low concentration of L- Glutamic acid (0.5 - 2.0 mg/l, along with SAP (1.0 mg/l, produced significant mean number of multiple shoots that ranged from 2-3 to 5- Sin the leaf segments. Shoot multiplication was obtained from leaf explants cultured on MS Medium supplemented with 1.0 - 4.0 mg/l BAP. Raising the level of BAP (0.5 to 2.0 mg/l) resulted in an increase in the number of shoots from leaf segments of *Solanum nigrum* L suggested that the formation of multiple shoots at the leaf region of the leaf of soybean indicated the existence of totipotency in this region which can be activated with the addition of BAP. The Results of the study have shown the initiation of shoot buds and formation of multiple shoots from leaf segments. Addition of NAA failed to produce many shoots, but enlarged the leaf segments.

Table I: Multiple shoots from leaf explants of *Solanum nigrum* L.

Growth Regulators	Leaf Explants	
	% Frequency of Shoots	Mean no. of Shoots
MS + 0.5 mg/l BAP + NAA L-Glutamic acid	45	Callus
MS + 1.0 mg/l BAP + NAA L-Glutamic acid	40	Gree Callus
MS + 2.0 mg/l BAP + NAA L-Glutamic acid	35	Shoots (2-4)

MS + 3.0 mg/l BAP + NAA L-Glutamic acid	30	Shoots (2-6)
MS + 0.5 mg/l NAA + Kn+CM	25	Callus+ Small buds
MS + 1.0 mg/l NAA + Kn+CM	20	Callus + Small buds
MS + 2.0 mg/l NAA + Kn+CM	15	Shoots (2-4)
MS + 3.0 mg/l NAA	20	Shoots (1-4)
MS + 4.0 mg/l NAA	10	Shoots (3-6)

Plate-I: Multiple shoots from leaf explants of *Solanum nigrum* L.



Fig. 1: Leaf Explants



Fig. 2 callus



Fig.3 plant lets

CONCLUSION

MS Medium supplemented with various Auxons/Cytokinins BAP and NAA. Coconut water also had a role in triggering the formation of multiple shoots. Addition of BAP at 2.0 mg/l and NAA at 3.0 mg/l to the MS Medium, induced regeneration from the leaf segments.

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