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Regeneration from Stemnode Explants of *Solanum Nigrum (L)*- A Medicinal Important Plant

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ABSTRACT - The Solanaceae to which the genus Solanum belongs is a computation family containing many essential medicinal plants, fruit crops, vegetables paprika, chillies, tomatoes, potatoes, cajanus cajanaj and red night shade composed of approximately 90 genera and 3000 species. Taxonamus C section Edmonds (1977), Plant regeneration from leaf explants venugopal (2005) Patak (2014) Medicianl Meena *et al* (2010) and Harmonal differentiation *In vitro* culture regeneration Venkateshwarlu (2020). The plant has been traditionally used as hepatoprotective agent in India. Considerable progress has been made in the propagation of this plant through STEMNODE explants MS media with different combinations and concentrations of hormones supplemented with BAP, Kn, NAA and L-GLUTAMICACID. Regeneration callus, shoots from STEMNODE explants *of Soalanum nigrum*. Plant regeneration, Venkateshwarlu M (2017), protoplast cultures Hasanien *et al* (2000) phyto chemical analysis of *Solanum nigrum* Venkateshwarlu *et al* (2018) Plant regeneration Shahzad *et al* (1999) leaf explants Ugender *et al* (2010). *In Vitro* regeneration Hanan (2010). Economically important fruity crop plant and its fruits is the commercial part, harvested for extracting the vegetable and its use are hypnotic, sedative, and specific in insanity, reduce blood pressure, digestions and uterine contractions. It has become an endangered species due to its over exploitation and it is generally propagated by seeds, but propagation by seeds is not satisfactory owing to highly variable germination rates and rate of reproduction of these plants are poor. Therefore, there is an urgent need to develop tissue culture and micro propagation methods for the mass propagation and conservation of this threatened species. Hassanenin *et al* (2000) plant tissue & protoplast cultures. The night shade family has plants with many different habits.

Key words: **Plantlets, Regeneration, Stemnode explants, BAP, NAA, Kn**

I. INTRODUCTION

The biotechnological approaches for improvement will have to be *in vitro* selection techniques which have been successfully attempted in *Solanum nigrum* (L) for recovery of anthranose resistant somatic embryos after dual culture of embryogenic suspensions with culture filtrates from infected leaves and fruits. The improvement of *Solanamu nigrum* through transformation with the help of selectable marker genes will depend upon advances in research on cloned genes having horticultural importance. Production of homozygous breeding lines the potential of haploid regeneration for other cultures or from irradiated ovules should be explored. Plant regeneration from STEMNODE explants of soyabean (T.U. & Venakteshwarlu M (2011). MS medium with BAP, Kn, L-GLUTAMICACID, NAA and IAA, regeneration callus of shoots and rooting observed the best culture condition for shoot formation was the culture of MS Media.Considerable progress has been made in the propagation of this plant through *in vitro* cultures of *Solanum nigrum* made a successful induction of callus from STEMNODE explants Somatic embryogenesis Pathak (2010), Phytochemical activity Kar *et al* (2006). Medicianl proparties Wayne *et al* (2011).

II. MATERIAL AND METHODS

MS medium with 0.5 mg l^{-1} of NAA and BAP were the most effective giving high shoot regeneration frequencies associated with high number of shoots per STEMNODE explants Venkateshwarlu M (2017). Biological activities of leaves of *Solanum surattense* Venkateshwarlu *et al* (2018). All the culture tubes were incubated under 16/8h light/dark photoperiod at 25 ± 2ºC a light intensity of 40h Mol.M-2 was provided by cool-white florescent light. MS medium supplemented with combination 1.0 mg/l – 5.0 mg/l BAP, NAA, Kn, L-GLUTAMICACID and incubated under the same culture conditions. The present investigation we present the result of our efforts to develop a protocol for Plant regeneration from STEMNODE explants Young plants of *Solanum nigrum* collected from outside under shade conditions. The STEMNODE explants were collected from Healthy plants washed in a 0.1% Mercuric Chloride ($Hgcl_2$) solution for 2-3 minutes were washed thoroughly with sterile distilled water before the inoculation. Young leaves were excised from the mature

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plants of *Solanum nigrum* (L) and washed thoroughly in Tween 20 followed by rinsing in running water for 10 min. The explants were surface sterilized with $HgCl_2$ (0.1%) for 5 min, rinsed 3-4 times with sterile double distilled water. STEMNODEs of 5 mm diameter were cultured with their surface on modified Murashige and Skoog's basal medium (MS) (Murashige, T. and Skoog, F. 1962) supplemented with 2.0 mg/l sucrose and 0.5-3.0 mg/l Benzyladenine (BAP and Kinetin (Kn). Multiplications of shoots were tested in the same media or by adding a-naphthalene acetic acid (NAA), L-GLUTAMICACID, IAA 1.0-3.0 mg/l and roots are obtained from half strength MS medium supplemented with 0.5-1.0 mg/l, MS medium with 0.5 mg l^{-1} IBA and half strength MS basal and liquid medium. All cultures were maintained at 25 ± 2^0C with 70 ± 5% Relative humidityon a 16-hour photoperiod under cool white fluorescent light of about 3000-lux for 16 h per day. Treatments were replicated three times and each replicates contained 20 cultures.

III. RESULTS AND DISCUSSIONS

But in the present experiment, a higher level of NAA (3.0 mg/l) and BAP (3.0 mg/l) was found best for callus induction, growth and also for shot induction. MS medium supplemented with 1.5 or 0.5 mg l^{-1} of BAP and Kn shoot regeneration was obtained within 20-25 days and proliferation was also observed in the same concentration of medium has also showed that 0.5 mg/l of cytokinin (BAP and Kn) was found best for shoot regeneration and shoot proliferation. *In vitro* regeneration trails followed by *in vivo* plant STEMNODEs acclimatization. The results showed a variable shoot forming capacity depending on the combination of growth regulators used in the culture medium. The number of shoots produced increased with the concentration of BAP and Kn until 1.5 mg/l or 0.5 mg/ l of the cytokinin and showed high frequency of explants exhibiting compact green callus with shoots (4-6). The present study demonstrates the successful shoot regeneration from the *in vitro* cultured STEMNODE explants of *Solanum nigruim(L)* and the efficacy of the plant growth regulators was assessed by counting the number of shoots per leaf callus as well showed that 3.0 mg/l NAA and 2.0 mg/l BAP was found best for callus induction and growth. (Plate-I, Table-I). Fig-I Ex-Plant, Fig-II Callus, Fig-III Plant Regeneration. A series of in vivo and in vitro plants were successfully produced and chemical analysis revealed contents of high frequency of shoots directly from STEMNODE explants. Plant growth regulators and concluded that BAP, Kn, L-glutamicacid the highest frequency of the well growing shoots.

Table 1. Regeneration from stemnode explants of *Solanum nigrum* (L)

Growth regulators (mg/ l)	stemnode explants showing callus response	No. of shoots explants
NAA (1.0) + BAP (1.0) L-Glutamic acid	40	Callus
NAA (2.0) + BAP (1.5) L-Glutamic acid	30	Green Callus
NAA (1.5) + BAP (2.0) L-Glutamic acid	25	Shoots(2-4)
NAA (2.0) + BAP (3.0) L-Glutamic acid	20	Callus Shoots(3-6)
IAA (2.0) + BAP (2.0) L-Glutamic acid	15	Shoots
2,4,D (1.0) + BAP (2.0) L-Glutamic acid	30	Shoots (1-3)
Kn (1.0) + BAP (1.0) L-Glutamic acid	25	Green Callus
Kn (2.0) + BAP (2.0) L-Glutamic acid	20	Callus with shoot
Kn (3.5) + BAP (3.0) L-Glutamic acid	15	Shoots (2-5)
Kn (4.0) + BAP (4.0) L-Glutamic acid	10	Shoots (2-6)

Pate- 1. Regeneration from stemnode explants of *Solanum nigrum* (L)

Fig – I

Fig – II

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Fig - III

IV. CONCLUSION

The shoot then hardened and later transferred to soil under greenhouse condition. Regenerated plants were transferred to pots from polycups with 70-85% survival along with seed raised controls. Stemnode explants cultured on various concentrations of harmons differentiated developed green callus *Soalanum nigrum* with shoots culture on the MS media. The best results were obtained when Solanum nigrum shootip explants. Media supplemented with BAP, 2.0 mg/l, Kn, NAA, 2, 4-D, found most effective for rooting response.

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