EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 7
Issue: 2
327-329
Year: 2020

SHOOT INDUCTION FROM TENDRIL EXPLANTS OF *LUFFA ACUTANGULA L. A VEGETABLE CROP PLANT*

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Article Received on 04/12/2019 **Article Revised on 24/12/2019** **Article Accepted on 14/01/2020**

ABSTRACT
Shoot induction was achieved in one of the impartant medicinal plant of cucurbitacae family, *Luffa acutangula*. MS medium supplemented with 1.0 mg/l BAP + 2.0 mg/l NAA and 2.0 mg/l L-Glutamicacid was found to be optimum to induce shoots. The present study established reliable and reproducible protocol for rapid multiple shoot induction from tendril explants of *Luffa acutangula* using different concentrations and combinations of cytokinins. Tissue culture techniques are now becoming popular as alternative means of vegetative propagation. The effect of benzyl amino purine in inducing shoot induction was already reported in some of the important medicinal plants (Komalavalli and Rao, 2000). The Tendril explants were inoculated on MS basal medium supplemented with various cytokinins i.e., BAP and NAA. Coconut water also had a role in triggering the formation of multiple shoots. Addition of BAP at 2.0 mg/l concentration or NAA at 3.0 mg/l to the MS basal medium, induced regeneration from the Tendril explants.

KEYWORDS: Tendril explants, shoots, L- Glutamic acid, NAA BAP.

INTRODUCTION
Tendril explants of *Luffa acutangula* on MS medium fortified with plant growth regulators along with coconut milk and amino acids. The plants of Cucurbitaceae suffer from several diseases including the water melon mosoic virus (Greber, 1978), Cucumber green mottle mosoic virus (Nijsden, 1984) and *Luffa acutangula* also suffers from downey and powdery mildews which seriously limits the crop production. In comparison to lactose for different straw lactose 3% of lemon grass straw (580 gram) was proved to be less effective to others. The similar findings were also reported by Singh (2005). Growth of *in vitro* propagated plants is often stronger than in those cloned *in vivo*. This is mainly due to rejuvenation and the fact that they are disease free. Propagation is carried out in aseptic conditions, free from pathogens. Georges Morel (1952) first demonstrated that virus free plants can be recovered from infected plants through shoot tip cultures.

MATERIALS AND METHODS
The Tendril segments of 1.0 cm – 2.0 cm long were cultured and surface sterilized with 0.1% $HgCl_2$ for 5-7 minutes and rinsed with sterile distilled water. They were cultured on MS medium containing 2.5% sucrose and 0.8% Agar-Agar and different concentrations of BAP, NAA and L-Glutamic acid (Table 1). The pH of the medium was adjusted to 5.8 and later was autoclaved at 120^0C for 17 minutes. Cultures were incubated under 16 hrs, illumination (250 lux) at 25 ± 2^0C temperature. Raising the level of BAP (0.5 to 3.0 mg/l) resulted in the increase in the number of shoots from hypocotyls and cotyledon explants of Niger (Nikam and Shitole, 1993). The result from this study has shown that BAP induced the activation of totipotency at the Tendril explants, which resulted in the formation of shoots. Genetic transformation and growth regulation seeding at the time of explants preparation. Compton M.E. 2000 The present commutation describes in vitro multiple shoot regeneration from shoot tip explants rooting and the successful green house establishement of Musk melon. Regeneration by organogenesis or somatic embryogenesis has been described ob a wide range of cucumis melo L cultivars (Guis et. al 200) Akasaka – Kennedy et. al 2004) Multiple shoots proliferation IAA (0.5mgl L)+BAP 2.0mgl L) was proved to be best for induction of shoots shoottip explants (M. Venkateshwarlu 2012).

Somatic enbryos induced directly from cotyledon explants on Mura Shige and Skoogs (MS) Medium fortified with different concentration of 34-dichlorophenoxyacetic acid -1.0mgl to 5.0mgl) (venkateshwarlu M Srilatha el. al 2019). Many species of the solanaceae have been regenerated by shoot organogenesis using young leaf explants Venkataiah B and Subhash K (2002) The concentration and combination of Auxins and cytokinines in the nutrient

medium (MS) is the key factr which determines successful plant regeneration Ugender & Venkateshwarlu (2019).

RESULTS AND DISCUSSION

The Tendril cuttings were inoculated on MS basal medium fortified with various cytokinins i.e., BAP and NAA. Coconut water also had a role in triggering the formation of multiple shoots. Raising the level of BAP (3 mg/l to 4 mg/l) resulted in an increase in the percentage of shoots developed from Tendril cuttings. There was no significant increase in the number of shoots on NAA at low and high concentration (Plate 1). MS medium supplemented with 10, 15, 20% of coconut milk also triggered the induction of many multiple shoots. Low concentration of L-glutamic acid (0.5 – 2.0 mg/l, along with BAP (1.0 mg/l, has produced significant mean number of multiple shoots that ranged from 2-3 to 4-5 in both the explants.

The number of shoots developed on the explants ranged from 1-4 to 2-3 by the addition of BAP at a concentration of 1.0 mg/l or NAA at 2.0 mg/l. Among three concentrations used i.e, 1.0, 1.5 and 2.0, 1.5 mg/l of coconut milk along with 0.5 mg/l BAP had proved to be ideal for multiple shoot induction. MS medium fortified with 1.0 mg/l BAP or 2.0 mg/l L-Glutamic acid also induced shoot buds on Tendril explants. Addition of NAA failed to produce many shoots but enlarged the Tendril segments. Lower levels of coconut milk (6, 12%) induced callus formation. The results from study have shown the initiation of shoot buds and formation of multiple shoots from different explants i.e. Tendril cuttings of *Luffa acutangula*. Among all explants used Tendril segments were the best for multiple shoot induction. With an increase in the level of BAP 2.0 – 3.0 mg/l the percentage of explants producing shoots also increased.

Table 1: Effect of Growth Regulators on Multiple Shoot induction from Tendril explants of *Luffa acutangul.*

Growth Regulators	Tendril	
	% frequency of shoots	Mean No. of shoots
MS + 0.5 mg/l BAP + 0.5 L-Glutamic acid	25	Callus
MS + 1.0 mg/l BAP + 1.0 L-Glutamic acid	33	Callus
MS + 2.0 mg/l BAP + 2.0 L-Glutamic acid	30	shoots (1-4)
MS + 3.0 mg/l BAP + 3.0 L-Glutamic acid	22	shoots (2-4)
MS + 0.5 mg/l NAA + CM	25	Callus
MS + 1.0 mg/l NAA + CM	16	Callus
MS + 2.0 mg/l NAA + CM	14	shoots (2-3)
MS + 3.0 Mg/l NAA + CM	12	shoots (1-2)

CM = Coconut milk water

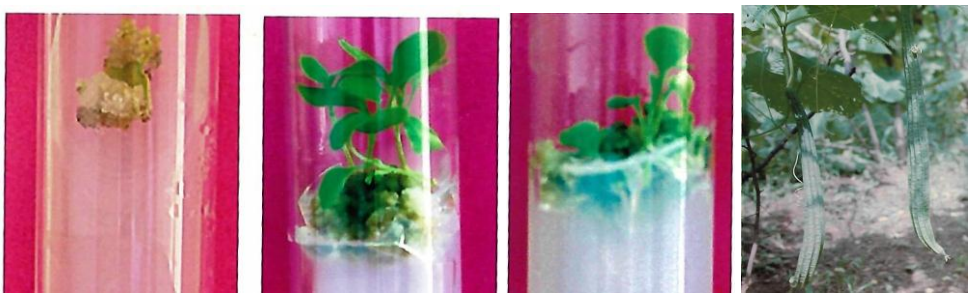

Plate I: Induction of multiple shoots from Tendril explants of *Luffa acutangula.*

CONCLUSION

The method of repeated transfer of *Luffa acutangula* tendril explant is considered to be useful for large scale production of plants, as it avoids isolation and culture of new explants. This is considered as one of the methods to increase the response in explants has suggested that repeated transfer of explant on multiplication media containing cytokinins succeeds in activating the plant materials.

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