*International Journal Of Engineering Research And Development*
*e- ISSN: 2278-067X, p-ISSN: 2278-800X, www.ijerd.com*
*Volume 20, Issue 1 (January. 2024), PP. 44-46*

# Production of plantlets from axillary explants of *Pitaya roja* fruit crop plant.

Mandaloju Venkateshwarlu
*M.Sc, Ph.D., (Botany) M.Sc (Bio-tech), FSAB, FHAS, SFS, CFE, SES and (LLB).*
*Department of Botany, Kakailya University ,*
*Warangal - 506 009. Telangana, India.*

***ABSTRACT***
*The production of plants from axillary bud explants has proved to be the most generally applicable and reliable method of true to type in vitro propagation. In Vitro multiple shoots were obtained on MS Medium within BAP, NAA, L-Glumatic acid and Kinetin. High frequency plant regeneration from shoottip explants.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 rolein triggering the formation of mult1ple 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. Mandaloju Venkateshwarlu (2022 & 2023) In Vitro Regeneration from stem node explants. The number of shoots developed on the shoottip segments ranged from 1-4 to 2-3 by the addition o BAP at concentration of 1.0 mg/I or NAA at 2.0 mg/l. Among he 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. MS medium fortified with 2.0 mg/l BAP 0.5 mg/l L-2.0mgl/l Kn or 3.0 mg/l L-G Glutamic acid also induced shoot buds on shoottip segments. In vitro organogenesis and embryogenesis on the other hand must undergo developmental changes which usually involve the formation of callus with subsequent reorganization into plantlets.*
***Keywords:*** *Shoottip explants, NAA, L-Glutamic acid, BAP, IAA.*

---

Date of Submission: 29-12-2023 Date of Acceptance: 08-01-2024

---

## I. INTRODUCTION

The names of *Pitahaya* and *pitaya* derive from mexico and *pitaya roja* in Central America and South America. The fruit may also be known as a strawberry pearthe genes *Stenocereus* while pitahaya are dragon fruit refers to fruit genes Selenicereus, both in the family Cactaceae it grows throughout tropical and sub tropical world regions. Subsequently in extending the demonstration to the orchids a novel method of clonal propagation was revealed by moral (1965) and Sunitha et al (2000). As the nutrient content of raw pitaya coarbohydrates 82.14g;Sugars, 82.14g;protein-3.57g;vitamins c,9.2mg; calcium 107mg; sodium 39mg. Mg = milligrams, g = grams. In the present paper, a simple and reproducible procedure was devised to obtain multiple shoots from axillary bud segments on MS medium fortified with plant growth regulators. The main objective of clonal propagation is to establish plants that are uniform and predictable for selected qualities. Growth or *in vitro* propagated plants is often stronger than in those cloned *in vitro* phyto chemical analysis and biological activities inmomrdica Venkateshwarlu *et al* (2011). The plants of Cucurbitaceae suffer from several diseases including the water melon mosaic virus Wayne *et al* (2011) Cucumber green mottel 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).

## II. MATERIAlS AND METHODS

The axillary bud induction is one of the most efficient method of micropropagation in plants tissues, since the emerging buds especially from meristematic organs and tissues posses a great potential for vigorous development. Yadav *et al* (1990): The present investigation describes a multiple shoots using axillary bud cultures as the source of direct production of multiple shoots in Dragon plant. They were cultured on MS medium containing 2.5% sucrose and 0.8% Agar- Agar and different concentrations or BAP. NAA and L-Glutamic acid shoottip segments of *Pitaya roja* were cultured and surface sterilized with 0.1% HgCl for 5-7 minutes and rinsed with sterile distilled water. Cultures were incu- bated under 16 hrs .illumination (250 lux) at 25± 2°C tempera- ture.Each treatment consisted of 10-15 replicates. The data was recorded at the end of eighth week in vitro propagation of Zyzlus Sudhershan et al (2000) cloning protocol Campstrini (2006). The pH of he

medium was adjusted to 5.8 and later was autoclaved at 120 °C for 17minutes. Rajendraprasad, Venkateshwarlu M (2018) experimental mutagenesis on cicer tissue culture studies stem node explants, multiple shoots in cucumis Venkateshwarlu m (2008) and (2019). Multiple shoots initiation from axillary bud explants was observed with in 20-25 days after inoculation. Fully elongated healthy shoots were transferred on to half strength MS root induction IAA 0.5mg/l to 3.0 mg/l. After three weeks they were transplanted to poly bags containing mixture of soil+Sand+ manure in 1:1:1 ration and kept under shade house for a period of four weeks. The superiority of BAP over other Cytokinines for multiple shoot formation has been reported as it was observed in the present investigation.

## III. RESULTS AND DISCUSSION

The axillary bud explants of dragon fruit crop plant cultured on different hormonal combination showed varied results. The axillary buds become active within week after inoculation and new shoots become distinct by the second and third week with internodes. The results of the study have shown the initiation of shoot buds and formation of multiple shoots from axillary bud segments. Addition of NAA failedlo produces many shoots, but enlarged theleaf segments. Lower levels of coconut milk (5 & 10%) induced callus formationLeaf 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 format on of multiple shoots Kanna *et al* (2005) *In Vitro* micropropagation *Solanum nigrum* Ram *et al* (2002). The mean number of shoots developed on the leaf segments ranged from 1- 4 to 2 - 3 by the additionof different concentrations of BAPand NAA the level of SAP (3.0 mg/l to 4.0 mg/l) resulted in anincrease in the percentage of shoots developed with 10, 15,20% of coconut milk also triggered the induction of multiple shoots (Plate I). Low concentration of L- Glulamic acid (0.5 - 3.0 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 multiplicalion was obtained form axillary bud explants cultured on MS Medium supplemented with 1.0 to 3.0 mg/I BAP.Raising the levelof BAP (0.5 to 2.0 mg/l) resulted in an increase in the number of shoots from axillary bud segments of Dragon fruit plant suggested that the formation of multiple shoots at the axillary bud region of the leaf of soyabean indicated the existence of totipolencyin this regionwhich can be activated with the addition of BAP.

According to the present observations the explants were collected from field grown plants through out the year to determine the ideal season for culture establishment explants cultures on the development of multiple shoots. The smaller (1cm) explants could initiate more multiples than the longer (2.0cm) explants. The size of the axillary bud explants was found to play an important role in initiation and elongation of shoots tried to give multiples only a single shoot developed from each node. Axillary bud explants proliferation and also recoded high percentage70-80% of explants establishment during this period. MS medium fortified with different concentrations of Cytokinining i.e., BAP and Kn individually and also in combination with 0.5mg/l, BAP (0.5-3.0mg/l) maximum number of shoots were induced at 0.5mg/l, BAP in comparison to 0.5-3.0mg/l as a role growth regulators BAP alone Geetha and Shetty (2000), Jelaska S (1974) when BAP and Kn, L-Glutamic acid concentration was increased (above 2.0mg/l-3.0mg/l) the rate of shoot multiplication and elongation was reduced in the present investigation Balendres *et al* (2019) and Boning (2006). Huang (1980) and Jas Rani *et a*l (1999) (Table-1) (Plate-I).

**Table-I Production of axillary bud explants from *Pitaya roja***

| Growth Regulators | Axillary bud Explants | |
|---|---|---|
| | % Frequency of Shoots | Mean no. of Shoots |
| MS + 0.5 mg/l BAP + NAA+Kn | **35** | **Callus** |
| MS + 1.0 mg/l BAP + NAA+Kn | **30** | **Callus** |
| MS + 2.0 mg/l BAP + NAA+Kn | **25** | **Shoots (1-2)** |
| MS + 3.0 mg/l BAP + NAA+Kn | **20** | **Shoots (2-4)** |
| MS + 0.5 mg/l NAA + Kn+IAA+L-Glutamic acid | **30** | **Callus+ Small buds** |
| MS + 1.0 mg/l NAA + Kn+IAA+L-Glutamic acid | **20** | **Callus + Small buds** |
| MS + 2.0 mg/l NAA + Kn+IAA+L-Glutamic acid | **15** | **Shoots (3-5)** |
| MS + 3.0 mg/l NAA + L-Glutamic acid | **10** | **Shoots (3-4)** |
| MS + 4.0 mg/l NAA + L-Glutamic acid | **20** | **Shoots (4-6)** |

**Plate-I:- Production of axillary bud explants from *Pitaya roja***



## IV. CONCLUSSION:

However the axillary bud explants proliferation was found be more on 0.5mg/l BAP in combination with Kn and L-Glutamic acid compared to 0.5mg/l-3.0mg/l. Our result on multiple shoots using axillary bud culture shows the considerable importance for large scale propagation. Their type of clonal propagation has advantage by producing true to type plants from a single individual in a relatively short time.

## REFERENCES:


[1]. Kanna T.M.S., SM Nagarajan and S. Kulothungan (2005). Micropropagation od Solanum nigrum L a medicinal herb plant Archies: 609-305.

[2]. Rathore, MS and Shekawat N.S. (2010) Ex Vivo implication of Phytohormonous on various in vitro responses in Leptadenia reticulata (Retz) night Am-An endangered plant Envi. Exp. Bilogy 49: 215-220.

[3]. Sudarshan L, Aboel MN and hussain J (2000). In Vitro propagation of Ziziplus maritiana cuctivar umrdu by shoots tip and nodal multiplication. Curr. Sci. 80(2) 290-292.

[4]. Waynem, Watt JM and MG. Breyer-Brandwijk (2011) Solanum nigrum L in the medicinal and poisonous plants of Southern and Eastern Africa. PP-996-1000.

[5]. Venkateshwarlu M, N Raju Odelu G, Srilatha T, Ugender T (2017). Studies on phytocvhemical analysis and bilogical activities in Mamordica dioica Roxb through Fruit. The pharma Innovations and Journal 6(12) 437-440.

[6]. Ugender T Venkateshwarlu M Anitha Devi U Srilatha T and Prameela K (2019) In Vitro plantlet regeneration from Cotyledonary explants of Solanum torvum (Swartz) a medicinal important plant. International multi disciplinary E – Research Journal PP – 99-106.

[7]. Rajendra Prasad, Venkateshwarlu m, Rajesham and N Raju (2018). High frequency callus induction from shoot base explants of Aloe Vera (L) Burm F An Important plant, medicinal plant European Journal of Bio-Medical & Pharmaceutical Sci. Vol. 5 Issue-01. PP. 363-373.

[8]. Ugender T Shekar GPV and Manjula P (2010). High frequency plant regeneration from leaf explants of Solanum nigrum advances in plant Sci. 23(1) 15-17.

[9]. Rao C.S. Eganathan P Anand A, BalaKrishna P and Reddy TP (1998). protocol for in vitro propagation of Excocaria agallocha a medicinal important plant Mangrove Sps. Plant Cell Rep. 17: 861-865.

[10]. Ram D, Kalloo G Banerjee M.K. (2002). Popularing Kakrol and Kartolo. The indiegenous nutrition S vegetables Indian Hort. Vol. 9: 6-9.

[11]. Rajashekaran S, Sivaghanam K and Subramanian S (2006). Modulatory effect of Aloe vera leaf get extraction oxidative stress in rats treated with sterptosotocin J Pharma and Phamacol 52(2) 241-246.

[12]. Campestrini Ach, Kuhnen S Lemos M (2006) Cloving protocol of Aloe vera as study case for the Tailormade biotechnology to small farmers J. F. Tech Management and Innovation 1(5) 76-79.

[13]. M. Venkateshwarlu (2008). Effect of gamma rays on different explants of callus treatment of multiple shoots in Cucumis melo CV Bathesa J Eniviron. Niol. 29 (5) 789-792.

[14]. Mandaloju Venkateshwarlu (2019). Tissue culture studies callus treatment on stem node explants of Citrullus valgaris L perpex indian journal research vol. (8) ISS-12 No 2280-1991.

[15]. Rajendra Prasad Venkateshwarlu M Odelu G B Madan Mohan and Bapu Rao M (2018). Studies on experimental Mutagenesis on chick pea (Cicer aritinum L Induced by UV rays and EMS Ejbps Vol.5 ISS-08 pp 506-511

[16]. Geetha S and Shetty S A (2000). In vitro propagation of Vanilla planifolia a tropical orchid. Curr. Sci. 79: pp886-889.

[17]. Morel G (1965). Clonal propagation of orchids by meristem culture Cymbidium Soc. News Vol.20 pp: 3-11.

[18]. Yadav V, Malan L and Jaiswal V.S. (1990). Micro propagation of Morus niger from shoottip axillary nodal explants of mature trees Scientia Hort. Vol.44 pp: 61-64.

[19]. Sunitha C and Handique P.J. (2000). High frequency In vitro shoot multiplication of Plumbaga indica a rare medicinal plant Curr. Sci. Vol.78. pp: 1187-1188.

[20]. Manddoju Venkateswarlu (2022).In Vitro Regeneration from stem node explants of Celestrus paniculatrus (wild). International Journal of novel research and development (IJNRD) (UGC Aproved Journal). ISSN:2456-4184- vol.7 ,Isse-01 Jan-22 pp:125-128. Impact factor: 8.76.

[21]. Dr. Mandaloju Venkateshwarlu (2023). Invitro Shoot Induction from Stemnode Explants of Trichosanthes cucumeriana (L) BuLetin For Technology and History (BTH) ISSN No:0391-6715 BTH-Journal Volume-23, Issue-3,2023-Accepted(12-3-2023) SCOPUS and UGC Aproved-Group-II Journal Manscript ID:BTH/1481