

## ***In vitro* Propagation of Pointed Gourd (*Trichosanthes dioica* Roxb.)**

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Pointed gourd (*Trichosanthes dioica* Roxb.) is one of the most nutritive cucurbit vegetables holds a coveted position in the Indian market during summer and rainy season. It is a perennial crop highly accepted due to its availability for eight months in a year (February–September). Being very rich in protein and vitamin A, it has certain medicinal properties and many reports are available regarding its role in circulatory system especially in lowering blood sugar and serum triglycerides (5). The fruits are easily digestible and diuretic in nature. It is also known to have antiulcerous effects (6).

Traditionally *T. dioica* is multiplied through seeds, stem cuttings and root cuttings. Propagation through seeds is not desirable due to poor germination and imbalanced male-female ratio. Seed based populations have a tendency to give more male than female plants and in some cases the ratio goes up to 85:15 (6), limiting their use as their utility ends with pollination. Additionally, due to dioecy and resulting cross-pollinated, the maintenance of true to type plant is another major problem. Stem and root cutting are labour intensive and also requires bulk amount of vines/roots, which restricts their multiplication at commercial level. *In vitro* multiplication of elite clones will be an attractive approach in order to meet the requirement of quality propagules at large scale for commercial cultivation. Hence the present investigation was carried out to establish rapid *in vitro* propagation of a superior line of pointed gourd.

**Materials and Methods:** Young vines of *T. dioica*-VRPG 101 (an advance breeding line) were collected from polyhouse grown plants. Shoot tip and nodal portions of vine were excised and washed with 1.0 % Cetrimide solution followed by surface sterilization with 0.1% HgCl<sub>2</sub> for 5 minutes. Finally explants were rinsed 4-5 times with sterile double distilled water. For establishment of cultures, explants were inoculated onto hormone free half strength MS medium (3). All the cultures including shoot initiation, and shoot growth cultures were kept in culture room maintained at 25±2°C with 16 hour

photoperiod provided, The established shoots were served as mother stock. For further multiplication, shoot tip and nodal portions were excised from mother stock and cultured onto MS medium supplemented with different BA concentrations (8.88, 17.76, 26.64, 35.52 and 44.44 µM). Multiplication rate per explant was determined at 4 week interval excluding the basal nodes which was cultured initially and the data was analyzed statistically using Analysis of variance (RBD). For root induction, *in vitro* raised shoots were cultured onto MS medium supplemented with different concentrations of IBA or NAA. Shoots with primary and secondary roots were transferred to pots containing soil and sand mixture. Plantlets were kept under controlled condition and irrigated with ¼ strength MS medium. Finally they were transferred to field for evaluation.

**Results and Discussion:** Development of efficient and reproducible regeneration protocol from cells/tissues is a pre-requisite for the successful application of recent cellular manipulation techniques for the improvement of crop plants. In this direction the choice of explants is of cardinal importance and makes an absolute difference between success and failure in inducing regeneration *in vitro*. The prime objective in this study was to get true to type plants using shoot tips and nodal portions as explants. Also the establishment of aseptic culture is must in any *in vitro* study, in *T. dioica*, the aseptic cultures were obtained by washing the explant in 1.0 % Cetrimide solution, followed by 0.1% mercuric chloride solution for 5 minutes as surface sterilization. Shoot bud development was visible within a week following inoculation of explants. Multiple shoot induction was observed on all the media tested except medium devoid of any growth regulator. Significantly higher number of shoots per explant (5.78), number of nodes/shoot (6.11) and longest shoot (3.57 cm) were observed on the medium containing 8.88 µM BA. This is an improvement of 5-6 times in the multiplication rate as compared to earlier reports. Higher concentrations of BA (i.e. 17.76, 26.64, 35.82 and 44.44 µM) produced large

amount of callus, which suppressed shoot elongation. Josekutty et al (2) reported direct organogenesis in *Coccinia indica* on the medium containing 11.0  $\mu\text{M}$  BA, 2.32  $\mu\text{M}$  Kinetin and 0.49 $\mu\text{M}$  IBA. Similar kind of results were also reported by Hoque et al. (3) in which, shoot formation was achieved in seedling explants of *T. dioica* on MS medium supplemented with 4.44  $\mu\text{M}$  BA. However, Hoque et al (1) used cotyledons rescued from physiologically matured and immature seeds. In pointed gourd multiplication through seeds is not feasible.

Among the media tested for root induction a very low concentration of IBA (0.49  $\mu\text{M}$ ) produced significantly higher number of roots per shoot. Higher concentrations of IBA favored formation of malformed and thick roots. In most of the cucurbits the root induction was achieved on either basal MS medium alone or with very low level of auxin (4). In the present study, rooting on medium containing even a very low level of NAA (0.27  $\mu\text{M}$ ) induced formation of thick, hairy and malformed roots, which were not suitable for pot transfer. The rooted platelets were transferred to pots for acclimatization and hardening and finally they were transferred to field for further growth.

The significant aspect of this work is that as compared to 8-10 plants produced by conventional root cutting, it gives a much higher multiplication rate (5.78 times in 4 weeks) from small portion of tissue with true to type plants. Another point is that

shoots continue to elongate even after transferring them to root regenerating medium. Further, a large number of plants are being produced for distribution to the farmers to fulfill local demands of quality propagules.

#### Literature cited

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