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## Studies on *in-vitro* multiplication in pointed gourd (*Trichosanthes dioeca* Roxb.) through single-node-cuttings

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**Abstract :** *In vitro* propagation of *Trichosanthes dioeca* Roxb. locally known as patal. 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 (3). The fruits are easily digestible and diuretic in nature. It is also known to have antiulcerous effects (5). Being a dioecious crop, the female plants are of economic importance. Propagation of pointed gourd by seeds not only leads to heterozygosity, but also leads to production of maximum proportion of male plants, which are unproductive. For rapid multiplication of pointed gourd plants, micro propagation holds promise. Standardization of media was done by using different combinations of auxins like IAA (1.0  $\mu$ M) and IBA (0.2  $\mu$ M) and Benzyl Adenine (0.5 ppm, 1.0 ppm and 1.5 ppm), alone or in combinations in basal media (Moorashige and Skoog media). In both the genotypes of parwal, rooting and shooting initiated, four days after inoculation. The intensity of root and shoot initiation varied according to cultivar in different media. Between the two female cultivars (Swarna Alaukik and Swarna Rekha), Swarna Alaukik was more prolific with regard to root and shoot initiation than Swarna Rekha. However, during later stages, the rate of rooting and shooting was at par. In cv. Swarna Alaukik, the per cent of explant having both root and shoot in case of media containing IAA+IBA was at par with that containing only BA (1.0 ppm). However, media containing a combination of IAA (1.0  $\mu$ mol), IBA (0.2  $\mu$ mol) and BA (1.0 ppm) resulted in the maximum per cent (82.5%) of plants having roots and shoots.

**Key words :** *In-vitro* multiplication, Pointed gourd (*T. dioeca*) single node cuttings

### INTRODUCTION

Pointed gourd (*Trichosanthes dioeca*) is a recent introduction in the state of Jharkhand and is performing well under these climatic conditions. The Horticulture and Agro-forestry Research Programme, Ranchi has developed two promising cultivars of Pointed gourd viz. Swarna Rekha and Swarna Alaukik. Being a dioecious crop, the female plants are of economic importance. Propagation of pointed gourd by seeds not only leads to heterozygosity, but also leads to production of maximum proportion of male plants which are unproductive. Vine cuttings through

commercial propagation of pointed gourd plants. Although, this method is an easier process, the regeneration rate is low. For rapid multiplication of pointed gourd plants, micropropagation holds promise. For this, standardization of protocol for large scale multiplication of these plants through micro propagation is of primary importance. Meagre amount of work has been carried out on micropropagation of pointed gourd<sup>1,4</sup>. Keeping this in view, efforts were made to standardize techniques for rapid and large-scale multiplication of pointed gourd plants through micro propagation.

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## MATERIALS & METHODS

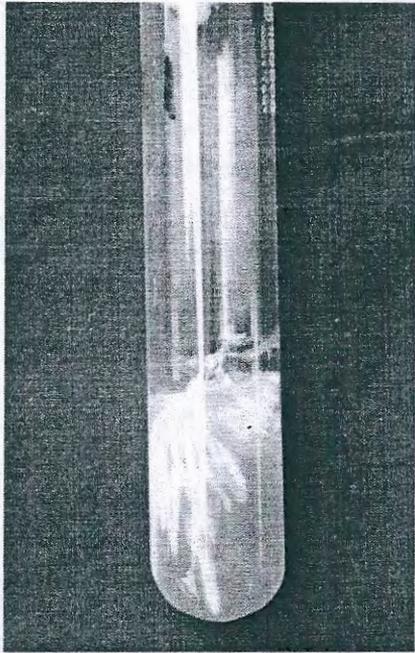
The research project was carried out during cropping season 2003 at the Tissue culture Laboratory of Horticulture and Agro-forestry Research Programme (HARP), Plandu, Ranchi. Explants from two parwal genotypes (Swarna Alaukik and Swarna Rekha) developed at HARP were used for micropropagation. For sterilization, the explants (1- 1.5cm) were thoroughly washed in running tap water and then with distilled water and then dipped in a soap solution (two drops of Tween 20 per 100ml) for 5 minutes and treated with fungicide like Bavistin for different durations (5 and 10 mins). Then they were washed on sterile distilled water for 10 minutes and dipped in 0.1N streptomycin for different durations (10, 15 and 20 mins) followed by washing with distilled water. Then the explants were dipped into mercuric chloride solutions for different duration (2, 5 and 10 mins). After three washes in sterile distilled water for 10 minutes each, the explant was cultured on different medium. Cultures were initiated in tubes (15 cm x 2.5 cm) containing 20 ml of the selected medium. Further multiplications were achieved using nodal cuttings in culture bottles (12.5 cm height x 6.5 cm diameter) containing 50 ml of the selected medium. Four micro-cuttings were cultured per bottle and there were twenty bottles per each treatment. Standardization of media was done by using different combinations of auxins like IAA (1.0  $\mu$ M) and IBA (0.2  $\mu$ M) and Benzyl Adenine (0.5 ppm, 1.0 ppm and 1.5 ppm), alone or in combinations in basal media (Moorashige and Skoog media)<sup>2</sup>. Observations were recorded on percent of successful root and shoot regeneration and pattern of regeneration.

## RESULTS & DISCUSSION

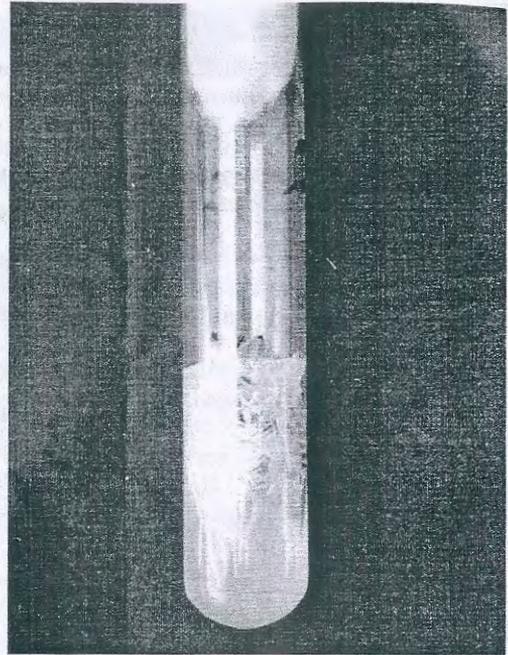
Sterilizing the explants in 0.1% mercuric chloride (5 min), 0.05% Bavistin (10 min) and 0.1% streptomycin (20 min) resulted in minimum fungal as well as bacterial infection. Dipping in  $HgCl_2$  for more than 5 min resulted in

mortality of the explants. For standardization of media, rapid *in vitro* multiplication of 2 female cultivars has been achieved (Swarna Alaukik and Swarna Rekha)<sup>1</sup> and one male line of pointed gourd by culturing shoot tip and nodal explants on Murashige and Skoog medium containing IAA (1.0  $\mu$ M) and IBA (0.2  $\mu$ M). However, they could not obtain multiple shoots by using cytokinins in the media. Hence, in parwal efforts were made to standardize a suitable media composition having both rooting and shooting promoters together. The explants were cultured in media containing rooting hormones like IAA (1.0  $\mu$ mol) and IBA (0.2  $\mu$ mol) and shoot inducing hormones like BA (0.5 ppm, 1.0 ppm and 1.5 ppm), alone or in combinations.

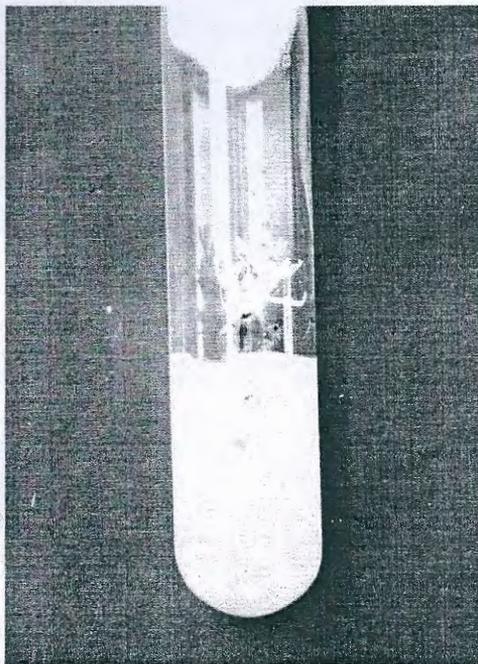
In both the genotypes of parwal, rooting and shooting initiated, four days after inoculation. The intensity of root and shoot initiation varied according to cultivar in different media. Among the two cultivars, Swarna Alaukik was more prolific with regard to root and shoot initiation than Swarna Rekha. However, during later stages, the rate of rooting and shooting was at par. In cv. Swarna Alaukik, the per cent of explant having both root and shoot in case of media containing IAA+IBA was at par with that containing only BA (1.0 ppm). However, media containing a combination of IAA (1.0  $\mu$ mol), IBA (0.2  $\mu$ mol) and BA (1.0ppm) resulted in the maximum per cent (82.5%) of plants having roots and shoots. In general explants cultured on IAA medium resulted in profuse rooting without shoot initiation with swelling of the roots in form of tubers. The plants on IBA medium resulted in good rooting but poor shoot proliferation. In case of explants cultured on BA medium, proliferation of shoot was rapid with poor root growth. Contrary to the findings of Mythili and Thomas (1999), 10% of the plants with 1.5 ppm BA produced multiple shoot (6-14 shoots per node). These multiple shoots can be used for further multiplication, for improved production of the pointed - gourd crop<sup>3,5,7</sup>.



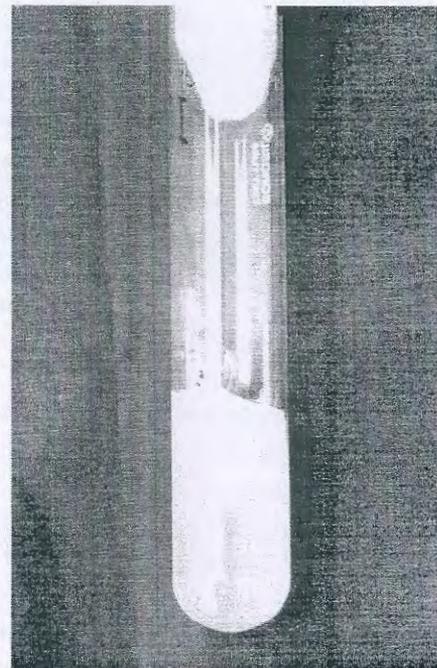
Formation of tuberous root of pointed gourd in media containing IAA (1.0  $\mu\text{mol}$ )



Profuse rooting with poor shoot regeneration in media containing IBA (0.2  $\mu\text{mol}$ )



Multiple shoot regeneration in pointed gourd in media containing BA (1.5 ppm)



Proliferation of root and shoot in media containing IAA (1.0  $\mu\text{mol}$ ), IBA (0.2  $\mu\text{mol}$ ) and BA (1.0 ppm)

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