RESEARCH PAPER

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Development of triploid plantlets from immature endosperm of *Garcinia gummi-gutta* var. gummigutta (L) Rob.

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The inoculated immature endosperm bits of 1cm size onto ½ MS supplemented with 3.0 mgl^{-1} each of BA and Kinetin induced adventitious buds and subsequent proliferation of multiple shoots. These triploid plantlets were rooted, hardened and planted out. Development of regeneration protocol from triploid parenchymatous tissue of endosperm not only overcome the dearth of demands for true-to-type propagules but also surpassed the gender dimorphism. Evolving seedlessness through *in vitro* endosperm culture may also be helpful to avoid the processing difficulty and to support the establishment of domestic HCA extraction unit for Women empowerment.

Key words : *Garcinia gummi-gutta* var. gummigutta, Polygamodioecious, Kodampuli, Immature seeds, Endosperm culture, Triploid, Seedlessness, Life style diseases, Shoot bud differentiation, Regeneration, Direct organogenesis.

INTRODUCTION

Garcinia gummi-gutta var. gummigutta (L) Rob. known in vernacular as Kodampuli or Malabar Tamarind belongs to the family Clusiaceae (Lewis and Neelakantan, 1965). This under-exploited perennial backyard spice tree has excited the scientific world because of the presence of anti-obesity plant metabolite (-) hydroxy citric acid (HCA) in its fleshy fruit rind. Though its cultivation has confined to coastal Kerala and Sri Lanka, the vast stretches of coastal saline belts of Indian sub-continent and the entire south east Asian countries may be used for extensive cultivation. Piling up of the obesity related life style diseases, diabetes and heart ailments, especially in the third world countries has warranted the extensive cultivation of this miscellaneous backyard spice tree for supporting the indigenous pharmaceutical industry.

During processing removal of seeds is highly laborious, time consuming and expensive. Where seed is not commercially important, development of seedless types will be a great boon (Wang and Chang, 1978). *In vitro* technique is an effective tool for the production of seedless types through triploid endosperm culture. The seeds of Kodampuli possess endosperm throughout its developmental stages (Richard, 1990). Triploid nature of endosperm is the characteristic feature of angiosperms and is formed as a result of triple fusion around the time of fertilization (Thomas and Chathurvedi, 2008). When one sperm nuclei inside a pollen grain fuses with the two polar nuclei at the centre/interior of the embryo sac of female gametophyte forming a primary endosperm cells. This process of triple fusion develops into endosperm is called double fertilization. The endosperm tissue being triploid, the plantlets developed from it will also be triploids. Furthermore, the seedless triploids in general are observed to have heterotic vigour as compared to other ploidy levels. The conventional approach to develop triploids is to cross tetraploids with diploids (Straub, 1973). But the lengthy pre-bearing age of perennial crop like Kodampuli nullify the importance of tetraploid development and subsequent production of triploids through conventional crossing techniques (Rajendran *et al.*, 2002). This approach is not only laborious in the perennial trees but also requires more than 100 years to release seedless variety with stable characteristics (Esen and Soost, 1973; Gupta, 1982; Rajendran *et al.*, 2004). Hence, the totipotency of triploid cells of endosperm may be profitably exploited as an alternative method for evolving seedless types in crop improvement programme of perennial tree species like Kodampuli.

Endosperm of some species is responsible for seed dormancy (Basra, 1994). Seed dormancy of 7-8 months, dioecious nature and the lack of large scale multiplication protocol for productive female trees stand in the way of extensive cultivation of this therapeutically important crop. However, it is noteworthy to emphasize the regeneration of plantlets from triploid endosperm tissue of Kodampuli or Malabar Tamarind to compensate incompetent