**Development of Efficient *In Vitro* Regeneration Protocol for Transgenic Papaya (*Carica papaya* L*.*)**

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Papaya (*Carica papaya* L*.)* is a fast-growing semi-woody tropical herb that belongs to the family Caricaceae. *Papaya ring spot virus* is a serious disease that affects papaya production in most countries in the world including Sri Lanka. The development of transgenic papaya through *Agrobacterium*-mediated transformation of somatic embryos is a successful method to control the damage of *papaya ring spot virus* disease. Efficient *in vitro* regeneration protocol needs to regenerate these transgenic papayas. The present investigation aimed to develop an efficient *in vitro* protocol for the regeneration of transgenic papaya (*Carica papaya* L*.*) using somatic embryogenesis. Three-week-old embryogenic callus was used for *Agrobacterium-mediated* callus transformation and co-cultivation. The transformed callus was selected with Kanamycin 50 mg/L in a co-cultivation medium. Then the co-cultivated callus was inoculated on new Murashige and Skoog medium with different concentrations of poly ethylene glycol (60 mg/L, 50 mg/L, and 40 mg/L), Kanamycin 50 mg/L, Cefotaxime 500 mg/L. Another experiment was done using embryogenic calluses with matured somatic embryos. After *Agrobacterium-mediated* callus transformation and co-cultivation, the callus was inoculated into MS medium with different concentrations of poly ethylene glycol (60 mg/L, 50 mg/L, and 40 mg/L), Kinetin 2 mg/L and antibiotics. The number of highest transformed calli was obtained from embryogenic calli which have matured somatic embryos. The highest callus area was recorded in MS medium which contained PEG 60 mg/L with an average of 28.55%. The highest numbers of regenerated calli were recorded in MS medium which contained PEG 60 mg/L. In conclusion, a protocol for *in-vitro* regeneration of putative transgenic papaya (*Carica papaya* L*.)* was developed. Poly ethylene glycol 60 mg/L is the most suitable concentration for somatic embryogenesis. Embryogenic callus which has matured somatic embryos were more suitable for *Agrobacterium*-mediated co-cultivation.

**Keywords**: *polyethylene glycol, regeneration, transgenic papaya*