

Induction of high frequency somatic embryogenesis and analysis of developmental stagewise expression of *SERK1* gene during somatic embryogenesis in cultures of *Vigna radiata* (L.) R.Wilczek

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Vigna radiata (L.) R.Wilczek (Fabaceae), commonly called Green gram or Mung bean, is an important legume with potential nutritional, medicinal and health benefits cultivated widespread throughout the rain-fed areas of arid and semi-arid tropics and subtropics. Being an affordable source of carbohydrate, vitamins, minerals and phytonutrients besides protein, Green gram finds demand for its nutrient digestibility, food processing properties and bioavailability. Though India ranks top in world mung bean production (>50%), it is unable to meet the local demand. Biotic and abiotic stresses restrict mung bean yield considerably and researchers have been working on resistant varieties to overcome these challenges. In this study, towards improving yield, an effective protocol for attaining high frequency somatic embryogenesis (SE) in green gram has been proposed. Type of explants and age of source seedlings for obtaining explants were found to influence the formation of embryogenic calli. Various combinations and concentrations of 2,4-dichlorophenoxyacetic acid and indole-3-acetic acid with kinetin were optimized for developing embryogenic calli. Embryogenic calli when exposed to osmotic stress created by D-mannitol and sorbitol and dehydration stress imposed by polyethylene glycol were found to produce somatic embryos. Calli incubated for 6 h in specified hormone free nutrient medium supplemented with 4% polyethylene glycol was optimal for induction of high frequency SE. Subsequent to stress incubation, the cultures formed only early stage somatic embryos. Supplementation of proline was found essential for the maturation of somatic embryos. Cotyledonary stage somatic embryos were converted into plantlets and subsequently established in garden soil. Semi-quantitative Reverse Transcription-PCR based transcript level analysis of *SERK1* gene expression was carried out during different developmental stages of somatic embryogenesis. Expression of *SERK1* was specifically associated with the embryogenic calli and calli enriched with globular stage somatic embryos.

Keywords: Embryogenic competence, Green gram, Mung bean, Proline, Polyethylene glycol