

# ***In vitro* Micropropagation and Molecular Genetic Analysis of Cactus (*Echinocactus grusonii*) Variants Using SDS-PAGE and RAPD Fingerprinting**

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## **ABSTRACT**

An effective method for rapid micropropagation of *Echinocactus grusonii* (Golden Barrel Cactus) using tissue culture technology was established. Callus initiation was achieved on MS medium containing 0.6 mg/l BAP. Production of stock callus cultures, as well as long term maintenance of callus were achieved onto the same medium supplemented with 0.6 mg/l 2,4-D. Two callus lines with varying capacities for regeneration were produced on the same callus production medium. Proliferation of 30 shoots via organogenesis occurred on MS medium containing either 0.5 mg/l BAP alone or in combination with 0.1 mg/l NAA. *In vitro* propagated plants were genetically analyzed using SDS-PAGE of soluble protein extracts and RAPD fingerprints. SDS-PAGE protein profiles of 30 random *in vitro* derived plants showed no evidence for genetic variations when compared to the protein profile of the *in vivo* control plants. However, RAPD fingerprints generated by PCR amplification of DNA, using two random primers, revealed polymorphism in the *in vitro* derived plants. Based on genetic analysis at the molecular level, true to type cactus plants *in vitro* or off-type variants could be identified.

**Key words:** *In vitro*, propagation, *Echinocactus grusonii*, fingerprinting, SDS-PAGE, RAPD

## **INTRODUCTION**

Most cacti and succulent plants belonging to *cactaceae* are known to be medicinal and ornamental plants. They are propagated vegetatively through cuttings and some of them by seeds. However, seed germination of most species of *cactaceae* is affected by long dormancy periods, low viability and some environmental factors such as diseases and pests (Lucia *et al.*

1990). Therefore, introduction of plant tissue culture technology, as an alternative tool for rapid mass propagation, seems to be a vital demand needed to overcome such constraints. However, *in vitro* culture of cactus and succulent plants has received little attention, although such plants not only have numerous commercial values of their medicinal and cosmetic components, but also play a role in home and garden decoration, as ornamental plants.