

Propagation and germplasm transfer of medicinal plants using synthetic seed: a case study of *Paederia foetida*

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Abstract

Medicinal plants are vital sources of bioactive compounds used in traditional and modern medicine. However, the propagation of these plants often faces challenges such as limited seed availability, low germination rates, and slow growth. Synthetic seed technology offers an effective solution for overcoming these issues and represents a promising approach to the propagation, conservation, and transfer of germplasm. *Paederia foetida* is an important but threatened medicinal plant. The plant is popular for its use in the treatment of various diseases, including gastrointestinal related problems. Keeping the above facts in mind, an effort was made to develop synthetic seed technology of *P. foetida* by encapsulation of *in vitro* nodal segments. Sodium alginate at 3% when used with 100 mM CaCl₂ formed the optimal condition for production of proper synthetic seeds. Highest % of conversion of synthetic seeds was observed when cultured on half-strength Murashige and Skoog's medium augmented with 0.5 mg/L indole-3-acetic acid. The plantlets regenerated from these synthetic seeds were acclimatized under field conditions. Further, it was recorded that more than 60% synthetic seeds retained the germination potential even after 21 days of storage at 4 °C. The reported synthetic seed system of *P. foetida* has the potential for providing year-round availability of the plant as well as planting materials, and transfer of germplasm.