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SHORT COMMUNICATION

Regeneration of plants from alginate-encapsulated shoot tips of *Withania somnifera* (L.) Dunal, a medicinally important plant species

Ajay K. Singh[a], Rachna Varshney[b], Manu Sharma[b], Shyam S. Agarwal[b], Kailash C. Bansal[a,*]

[a]*National Research Centre on Plant Biotechnology, Indian Agricultural Research Institute, New Delhi-110 012, India*
[b]*Division of Pharmaceutics, Delhi Institute of Pharmaceutical Science and Research, New Delhi-110 031, India*

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Summary

A protocol was developed for plant regeneration from encapsulated shoot tips collected from *in vitro* proliferated shoots of *Withania somnifera*. The best gel composition was achieved using 3% sodium alginate and 75 mM $CaCl_2 \cdot 2H_2O$. The maximum percentage response (87%) for conversion of encapsulated shoot tips into plantlets was achieved on MS medium supplemented with 0.5 mg/l IBA after 5 weeks of culture. The conversion of encapsulated shoot tips into plantlets also occurred when calcium alginate beads having entrapped propagules were directly sown in autoclaved soilrite moistened with $\frac{1}{4}$-MS salts.

Introduction

Withania somnifera (family *Solanaceae*) is an important medicinal plant. The propagation of *W. somnifera* through seeds is restricted due to poor viability and death of young seedlings under natural environmental conditions. During the past few years, considerable efforts have been made for *in vitro* plant regeneration of this medicinally important plant species using various explants (Roja et al., 1991; Rani and Grover, 1999; Kulkarni et al., 2000). However, synthetic seed production has not yet been reported in *W. somnifera* using vegetative propagules or somatic embryos.

Vegetative propagules after encapsulation can be used in germplasm conservation of an elite plant species, and also for exchange of axenic plant materials between laboratories (Maruyama et al., 1997). There are only few reports on encapsulation

Abbreviations: BAP, 6-benzylaminopurine; IBA, indole-3-butyric acid; LSD, Fischer's least significant difference; MS0, Murashige and Skoog (1962) medium without any plant growth regulator

*Corresponding author. Tel.: +91 11 25843554; fax: +91 11 25843984.
E-mail address: kailashbansal@hotmail.com (K.C. Bansal).

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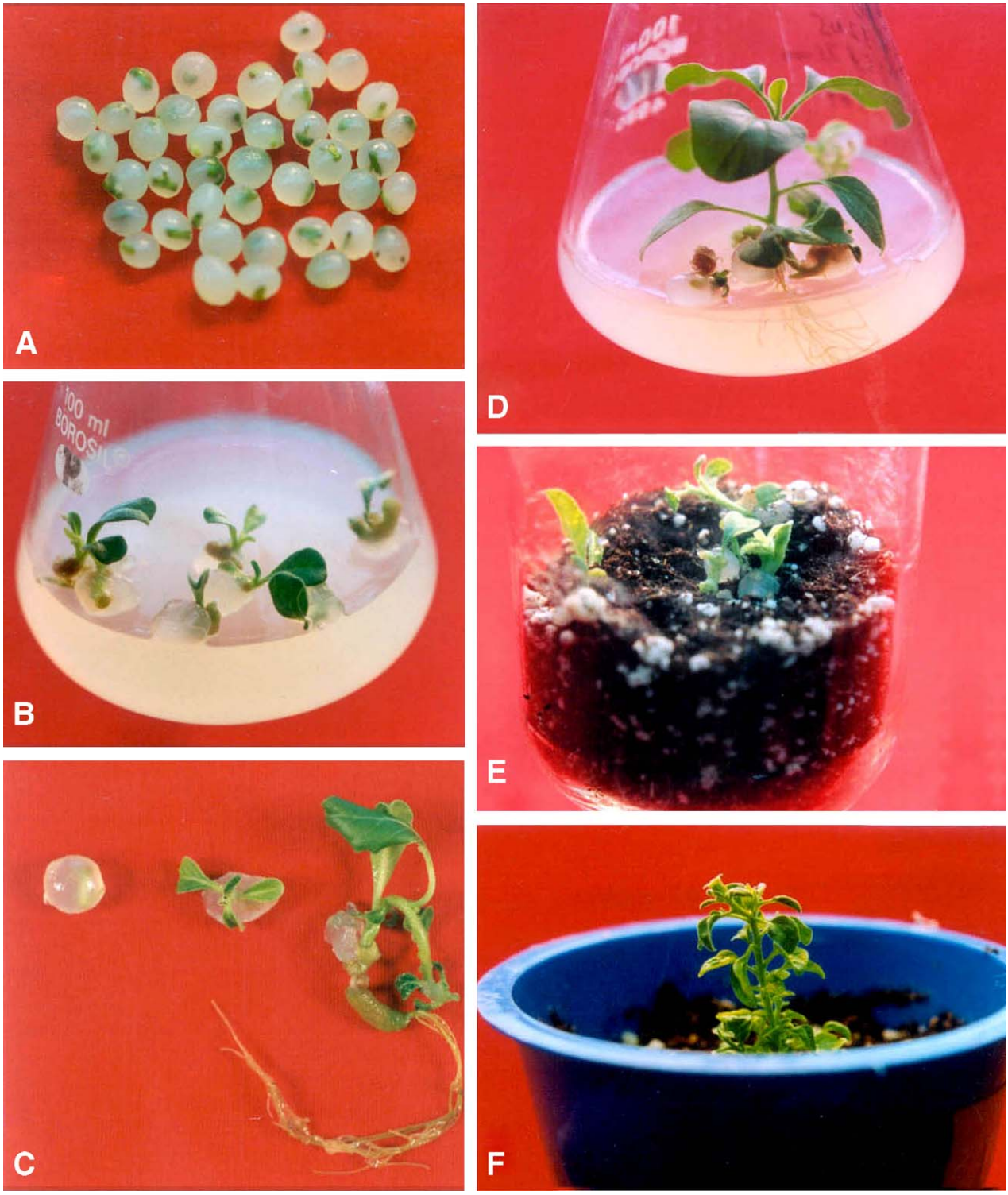

Figure 1. Plant regeneration from encapsulated shoot tips of *Withania somnifera*: (A) calcium alginate beads formed by the encapsulation of shoot tips using 3% sodium alginate and 75 mM $CaCl_2 \cdot 2H_2O$, (B) shoot formation from encapsulated shoot tips on MS medium after 3 weeks of culture, (C) shoot formation and conversion of encapsulated shoot tips into plantlets on MS medium containing 0.5 mg/l IBA after 4 weeks of culture, (D) plant regeneration from encapsulated shoot tip on MS medium containing 0.5 mg/l IBA after 5 weeks of culture, (E) plants recovery from encapsulated shoot tips in soilrite moistened with $\frac{1}{4}$-MS salts after 5 weeks of sowing and (F) a healthy plant established in pot under field conditions.