

## ***In vitro* propagation of various explants of *Spilanthes paniculata* (DC.) Jansen**

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### **SUMMARY**

*Spilanthes paniculata* (DC.) Jansen, a wonderful medicinal herb containing pharmaceutically active constituents or secondary metabolites has been raised *in vitro*. Various explants (leaves, internodes, roots, cotyledons, petioles of cotyledons, etc.) were cultured on MS media supplemented with different auxins (*e.g.*: 2,4-D, IAA, IBA, NAA) at concentration 2 mg l<sup>-1</sup>. Different types of calli with varied amounts were obtained. The callusing responses from cotyledonary and leaf explants in MS medium supplemented 2,4-D (3-4 mg l<sup>-1</sup>) were 75% and 80%, respectively. MS medium supplemented with BA (4 mg l<sup>-1</sup>) gave better multiple shoot regeneration than MS medium supplemented with Kn. Multiple shoots were regenerated on MS medium supplemented with BA (3-4 mg l<sup>-1</sup>) and NAA (1 mg l<sup>-1</sup>) to the culture medium. High frequency of shoot proliferation (up to 90%) was recorded with maximum shoot length of 4.439 ± 0.180 cm having 4.55 ± 0.166 nodes per shoot in MS medium fortified with BA (4 mg l<sup>-1</sup>) in combination with NAA (1 mg l<sup>-1</sup>). Shoots rooted best on half strength MS medium supplied with NAA (1 mg l<sup>-1</sup>), 80% of the plantlets were successfully acclimatized and established in soil. Transplanted plantlets showed normal flowering without any morphological variation.

**Key words :** Callus culture, Compositae, Diuretic, Medicinal herb, Spilanthol, Toothache plant.

Toothache plants are annual herbs, or short-lived perennials, approximately half meter tall with prostrate or ascending branched cylindrical hairy stems and simple ovate opposite leaves with stipules (Nakatani and Nagashima, 1992). Few species of *Spilanthes* including different varieties such as *Spilanthes acmella* L., *S. acmella* L. var. *oleracea* Clarke, *S. acmella* Murr., *S. acmella* var. *calva*, *S. paniculata* (DC.) Jansen, *S. oleracea* Jacq., *S. alba*, *S. ocymifolia* etc. have been popularly called as toothache plant (Jayaweera, 1981; Nakatani and Nagashima, 1992; Jayasinghe, 1994; Raju and Raju, 1996; Ramsewak *et al.*, 1999; Oudhia, 2003; Shipard, 2003; Altaffer, 2005). They belong to family Compositae, the tribe Helianthae, and the sub-tribe Ecliptinae. They have characteristic flower heads, which distinguishes individual species. The herb is widely distributed in tropics and sub-tropics including tropical America, North Australia, Africa, Malaya, Borneo, India, Sri Lanka etc. (Jayaweera, 1981; Oudhia, 2003; Altaffer, 2005). About sixty species of *Spilanthes* have been reported from various parts of the world including India (Oudhia, 2003).

Phytochemically, flowers of *Spilanthes acmella* are reported to contain amino acids (Mondal *et al.*, 1998; Peiris *et al.*, 2001), alkaloids (Peiris *et al.*, 2001) and *N*-isobutylamides (Ramsewak *et al.*, 1999; Nakatani and Nagashima, 1992) (spilanthol; undeca-2*E*,7*Z*,9*E*-trienoic acid isobutylamide; undeca-2*E*-en-8,10-diyonic acid

isobutylamide; 2*E*-*N*-(2-methylbutyl)-2-undecene-8,10-diyamide; 2*E*,7*Z*-*N*-isobutyl-2,7-tridecadiene-10,12-diyamide and 7*Z*-*N*-isobutyl-7-tridecene-10,12-diyamide). Krishnaswamy *et al.* (1975) isolated myricyl alcohol,  $\alpha$ - and  $\beta$ -amyrins,  $\beta$ -sitosterol, stigmaterol and other compounds from the air-dried whole plant of *Spilanthes acmella*. Presence of a mixture of C<sub>22</sub> to C<sub>35</sub> normal hydrocarbons was reported in the flower heads of *Spilanthes acmella* (Baruah and Pathak, 1999). Bohlmann *et al.* (1980) reported about presence of *N*-isobutylamides from *Spilanthes alba*. *N*-2-Phenylethylcinnamamide was isolated from *Spilanthes ocymifolia* (Borges-Del-Castillo *et al.*, 1984). Flavonoid glycoside (tetrahydroxydihydrochalcone 3'-*O*-glucoside, possessed hypoglycemic activity) from *Spilanthes calva* (Ravichandran and Sulochan, 2000), eudesmanolide from *Spilanthes leiocarpa* (Bohlmann *et al.*, 1985) and secondary volatile metabolites including sesquiterpenes ( $\alpha$ - and  $\beta$ -bisabolones, caryophyllene and cadinenes), nitrogenated compounds (*N*-(isobutyl)-2*E*,6*Z*,8*E*-decatrienamide; *N*-(2-methylbutyl)-2*E*,6*Z*,8*E*-decatrienamide; decatrienamide; *N*-(isobutyl)-6*Z*,8*E*-decadienamide and *N*-(2-phenylethyl)-2-*E*,6*Z*,8*E*-decatrienamide) and oxygenated compounds, were reported from *Spilanthes americana* (Mutis) Hieron (Stashenko *et al.*, 1996).

The flowers and leaves of *Spilanthes acmella* L. and *S. acmella* L. var. *oleracea* Clarke have a pungent

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