

Production of Spilanthol through the Hairy root culture of *Spilanthes acmella*

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Abstract:

Spilanthes acmella Murr. (Family:Asteraceae) is an important medicinal plant having a plethora of antimicrobial, antioxidant and insecticidal properties. It is also used traditionally to cure many ailments. Spilanthol, an alkylamide is a bioactive compound found in roots and all aerial parts of this plant. It is a medicinally useful secondary metabolite, widely utilized in pharmaceutical, cosmetic and toothpaste industry. Presently, spilanthol is being extracted from field grown plants and selling at a high price in the international market. The utilization of whole plant parts for large scale extraction of spilanthol is resulting in reduction of local plant populations and also erosion of genetic diversity. Hence, there is a need to search for alternative sources for sustainable spilanthol production.

Hairy roots cultures serves as a source for large scale production of secondary metabolite because of their genetic and biochemical stability and high productivity in hormone free culture conditions. In the present study, hairy roots were induced from the *S.acmella* leaf explants by genetic transforming them with *Agrobacterium rhizogenes*. The confirmation of transformation was done by Polymerase Chain reaction (PCR) by amplification of rol B and rol C primers responsible for T-DNA transfer. The hairy roots were mass multiplied on hormone free ½ MS liquid medium, dried and extracted with methanol for HPLC study to quantify the spilanthol. The HPLC analysis of hairy roots showed high content of spilanthol (0.134%) than the roots (0.056%) and leaves (0.132%) of field grown plants of *S.acmella*. Hence, hairy root culture can be employed as an alternative and sustainable source for spilanthol production, which holds immense potential for pharmaceutical applications.

Key Words: Spilanthol, Hairy root culture, *Spilanthes acmella*