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Enhanced phytosterol biosynthesis in Siberian ginseng (*Eleutherococcus senticosus*) by introducing the squalene synthase gene

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Objectives

The present study was performed to develope the metabolic engineering of phytosterols and triterpenes yield of Siberian ginseng. Overexpression of *PSS* gene in *E. senticosus* was resulted in the remarkable increase of the phytosterol biosynthesis.

Materials and Methods

1. Plant materials : Embryogenic callus of *E. senticosus* Rupr. & Maxim
2. Genetic transformation : *Agrobacterium tumefaciens* LBA4404. Early embryo clusters were used for co-cultivation
3. PCR and Southern analysis: Transgenic plantlets were confirmed by PCR and Southern and GFP analysis
4. PSS enzyme assay: A crude microsomal fraction for PSS enzyme activity was prepared as described by Chappell et al. 1989.
5. Phytosterol and eleutheroside analysis: Phytosterols were analysed by GC and eleutherosides were analysed by HPLC

Results and Discussion

Transgenic plantlets were induced by the protocol of Jeong et al. 2003. Transgenic plantlets were confirmed by PCR, Southern and GFP analysis. PSS enzyme activity in transgenic lines was 3 times higher than wild-type. A GC analysis revealed that phytosterol (sistosterol and stigmasterol) levels in transgenic Siberian ginseng were increased remarkably. This result suggests that PSS gene may play a regulatory role for phytosterol biosynthesis and phytosterol quantitiy can be controlled by metabolic engineering.

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