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Development of Transgenic Potato with Low Starch Phosphorylase Activity (*Solanum tuberosum* L. cv. Atlantic)

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Objectives

In the cold storage, starch is converted into soluble sugars, and hexoses react with free amino acids, thereby negative affecting the processing quality of potato tubers. In this study, to investigate the relationship between gene expression of starch-degradative enzymes and cold-induced sweetening of tuber, and to prevent the production of reducing sugar by gene alteration, one of the genes for metabolic enzymes in starch degradation, starch phosphorylase was cloned, and transformed into potato for inhibition of the gene expression and activity using antisense technology.

Materials and Methods

Total RNA and polyA+RNA were isolated from *Solanum tuberosum* L. cv. Atlantic by CTAB method and GTC-GHCl method. Gene-specific primers and partial gene fragment of the starch phosphorylase were used for RT-PCR and screening. The isolated clone was sequenced. Vector construction for plant expression and *Agrobacterium*-mediated transformation has been performed.

Results and Discussion

Full length cDNA of the gene for starch phosphorylase was 2,901 bp long and encoded 966 amino acids. For the gene expression and gene alteration by the antisense technique, 1.5 kb and 1.2 kb fragments of starch phosphorylase was cloned into plant expression vector in different orientation, respectively. The transformation and regeneration of potato, and analysis of transgenic potato have been carried out. This gene for starch phosphorylase and inhibition of gene expression using antisense technique will be useful for development of starch variants and metabolic-engineered potato.

Acknowledgement

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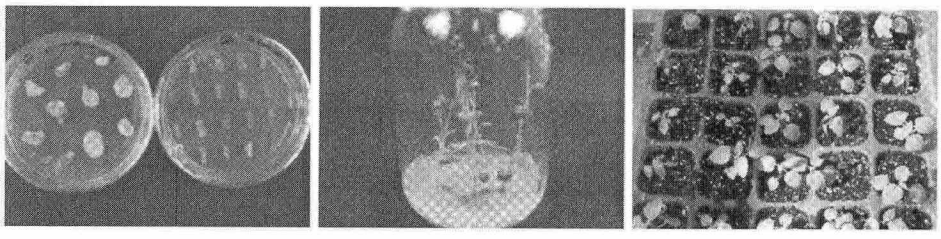

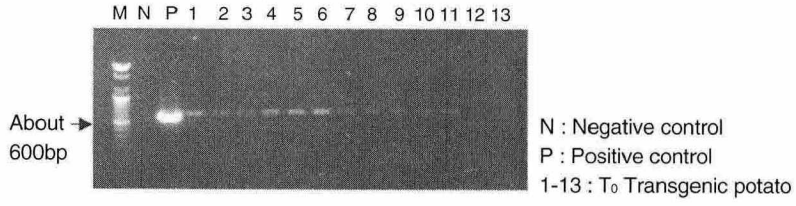

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