(05-2-17)

Development of transgenic potato plants with enhanced tolerance to environmental stresses

Jung-Ha Yoon[1], Hei-Jin Kim[1], Dong-Hee Lee[2], Yoon-Jung Na[2], Hak-Tae Lim*

[1]Division of Biotechnology and Center for the Korea Potato Genetic Resource, Kangwon National University, Chunchon 200-701, Korea

[2]Genomine, Venturedong 306, Pohang Techno Park, Pohang 790-834, Korea

Objectives

First, we tried to establish the regeneration system for a potato cultivar (*Soluanum tuberosum* cv. Taedong). Second, we attempted to introduce the *Arabidopsis SIK* (*Stress Inducible Kinase*) gene into the same potato cultivar (cv. Taedong) through a *Agrobacterium tumefaciens* transformation system to see the function of this gene in the transgenic potato plants.

Materials and Methods

1. Material

Plant - a potato cultivar (*Solanum tuberosum* cv. Taedong)

Agrobacterium strain - EHA105/pNB96

2. Methods:

In order to transform potato plants, leaf discs were first placed on MS medium containing BAP 2.25 mg/l, IAA 0.01 mg/l, and carbenicillin 500mg/l after inoculating with *Agrobacterium tumefaciens*. Subsequently, they were transferred to the medium containing BAP 2.25 mg/l, GA 5.0 mg/l, kanamycin 50mg/l, and carbenicillin 500mg/l to regenerate shoots. For root induction, regenerated shoots were planted on the medium containing kanamycin 50mg/l, carbenicillin 500mg/l, and NAA 0.01mg/l.

Results and Discussion

A potato cultivar (cv. Taedong) was transformed with the *AtSIK* expression cassette harboring *neomycin phosphotransferase* gene (*NPT II*), *bar* gene, and *AtSIK* gene. Based on the preliminary regeneration experiments, we found that the particular plant hormone combinations are required for the genetic transformation of a potato cultivar (cv. Taedong), as described above in Methods. To confirm putative transgenic potato plants, PCR analysis was performed by three different sets of primers for NPTII, bar, and *AtSIK* genes. In addition, RT-PCR was conducted to see the expression of the *AtSIK* gene in the transgenic potato plants. These transgenic potato plants will be further used to analyze the levels of tolerance to various environmental stresses compared to non-transgenic potato plants.

* *Corresponding author* : Hak-Tae, Lim, TEL: 033-250-6474, E-mail: potatokorea@empal.com