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Development of Transgenic Sweetpotato (*Ipomoea batatas* Lam.) Using Multiple Stress-tolerant Expression Vectors

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Objectives

To develop transgenic sweetpotato (*Ipomoea batatas* Lam.) with enhanced tolerance to multiple stresses, we constructed the expression vectors using multiple stress-tolerant genes such as NDPK2 and SOD/APX genes under the control of a stress-inducible *SWPA2* promoter. Transgenic sweetpotato (cv. Yulmi and White star) were successfully developed by a particle bombardment transformation.

Materials and Methods

1. Materials
- Plant materials: Sweetpotato (Ipomea batatas Lam.) cv. Yulmi and White star
- Vectors:
  E35S pro::NDPK2/pCAMBIA2300 (EN vector)
  SWPA2 pro::NDPK2/pCAMBIA2300 (SN vector)
  SWPA2 pro::mSOD1+SWPA2::APX/pCAMBIA2300 (SSA vector)

2. Methods: Embryogenic callus culture, Particle bombardment, PCR analysis and Southern blot analysis

Results and Discussion

The application of the molecular genetic techniques would contribute to enhance the novel potentials of sweetpotato. Several reports on plant regeneration of sweetpotato have been reported, but genetic transformation of sweetpotato are very limited. Previously, we established plant regeneration system of three major cultivars of sweetpotato in Korea by embryogenesis. In this study we have developed the transformation system of sweetpotato. Embryogenic callus of sweetpotato were transformed by particle bombardment using three expression vectors such as EN, SN and SSA. Bombarded calli were subcultured at 3 weeks intervals for 5 months. Kanamycin-resistant calli transferred to MS medium containing 100 mg/L kanamycin. Upon transfer to MS basal medium with 100 mg/L kanamycin, they developed onto plantlets through somatic embryogenesis. The putative transgenic plants were selected by PCR with SWPA2- or NDPK2-specific primer. Southern blot analysis of PCR-positive regenerants confirmed that the foreign genes was inserted into genome of the regeneranted plantlets. The further characterization of transgenic plants is under investigation in terms of multiple stress tolerance.

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