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Transgenic sweetpotato plants expressing spike protein of porcine epidemic diarrhea virus

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Porcine epidemic diarrhea virus (PEDV) causes enteritis in swine of all ages, and is fatal in neonatal piglets. The spike protein of PEDV is a primary target antigen for developing an effective vaccine against coronaviruses, since it mediates essential biological functions. Sweetpotato [*Ipomoea batatas* (L.) Lam.] is one of the most important crops to secure a staple food supply in 21st century and is an attractive plant producing plant-based vaccine. To develop transgenic sweetpotato plants expressing antigen against PEDV, we constructed the transformation vectors using partial fragment of PEDV spike protein (SP1) under the control of a CaMV 35S promoter or sporamin promoter with high expression in the storage roots of sweetpotato (referred to as 35S::PEDV-SP1 and Spo::PEDV-SP1, respectively). Transgenic sweetpotato plants were successfully developed by *Agrobacterium*-mediated transformation. Kanamycin-resistant embryogenic calli were selected on MS medium containing 400 mg/L claforan and 100 mg/L kanamycin. Embryogenic calli transferred to hormone-free MS medium with kanamycin gave rise to somatic embryos and then converted into plantlets in the same medium. The putative transgenic plants were selected by PCR with nptII or SP1-specific primer. Southern blot analysis of PCR-positive regenerants confirmed that the SP1 gene was inserted into genome of sweetpotato plants. Northern blot analysis reveled that SP1 gene of PEDV was highly expressed in transgenic sweetpotato leaves. Transgenic plants are growing in the field of Mokpo Experiment Station, NICS, RDA for mass propagation. The further characterization of transgenic sweetpotato plants and activities of the plant-derived antigen are under study.

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Enhanced tolerance to oxidative stress in transgenic potato plants expressing CuZnSOD, APX and NDPK2

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Oxidative stress is one of the major factors causing injury to plants exposed to environmental stress. To develop transgenic plants with enhanced tolerance to multiple environmental stresses, we are trying to manipulate the antioxidative mechanism under the control of an oxidative stress-inducible *SWPA2* promoter. In a previous study, we developed SSA potato plants expressing genes of both superoxide dismutase (CuZnSOD) and ascorbate peroxidase (APX) in chloroplasts (referred to as SSA plants) or nucleoside diphosphate kinase 2 (NDPK2) in cytosols (SN plants) under the control of *SWPA2* promoter. Both SSA and SN plants