

**Title** Delay of postharvest ripening and senescence of tomato fruit through virus-induced *LeACS2* gene silencing

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### Abstract

Plant virus-induced gene silencing (VIGS) is currently a powerful tool for the study of gene function in plants. Here we report the silencing of *LeACS2* by vacuum-infiltration and the tobacco rattle virus (TRV)-based VIGS method, which leads to a significant delay of the postharvest ripening and senescence of tomato fruit. Harvested mature green tomato fruit were vacuum-infiltrated with *Agrobacterium* strain GV3101 containing pTRV1 and pTRV2-*LeACS2*. Because of the silencing of *LeACS2*, the ethylene climacteric and pigment changes were clearly delayed. The onset of fruit ripening and senescence was significantly postponed, and transcription of *LeACS2* and ACC synthase activity were also suppressed in treated tomato fruit during storage. The silencing of *LeACS2* by vacuum infiltration, however, did not alter the contents assayed at the end of storage. Our results indicate that vacuum infiltration is a highly efficient TRV-based VIGS method to silence *LeACS2* in harvested tomato fruit. It can obviously delay ripening and senescence, and is a potential method for postharvest preservation of tomato fruit.