

**Title** Pre-storage putrescine application suppresses ethylene biosynthesis and retards fruit softening during low temperature storage in 'Angelino' plum

**Author** Ahmad S. Khan, Zora Singh and Nadeem A. Abbasi

**Citation** Postharvest Biology and Technology, Volume 46, Issue 1, October 2007, Pages 36-46

**Keywords** ACS; ACO; ACC; *Exo*-PG; *Endo*-PG; PE; EGase; Enzymes

### Abstract

To investigate the role of putrescine (PUT) in ethylene biosynthesis and fruit softening of plum (*Prunus salicina* Lindl. cv. Angelino), fruit on trees were sprayed 1 week before anticipated commercial harvest, or after harvest fruit were dipped in an aqueous solution containing different concentrations of PUT (0.0, 0.1, 1.0 and 2.0 mM), and 'Tween 20' (0.01%) as a surfactant. Following PUT treatments fruit were stored at  $0 \pm 1$  °C and  $90 \pm 5\%$  RH for 0, 3 and 6 weeks. Ethylene production, activities of 1-aminocyclopropane-1-carboxylic acid synthase (ACS) and 1-aminocyclopropane-1-carboxylic acid oxidase (ACO) enzymes, and 1-aminocyclopropane-1-carboxylic acid (ACC) content, fruit firmness and activities of fruit softening enzymes including *exo*-polygalacturonase (*exo*-PG), *endo*-polygalacturonase (*endo*-PG), pectin esterase (PE) and *endo*-1,4- $\beta$ -d-glucanase were estimated after 0, 3 and 6 weeks storage. Pre- and postharvest PUT application reduced ethylene production after 3 and 6 weeks of storage as compared to untreated fruit. Preharvest spray application of higher PUT concentrations substantially reduced ethylene production compared to lower PUT concentrations and postharvest PUT treatments. Activities of ACS enzymes and ACC contents during storage decreased with increased concentration of PUT applied irrespective of the methods of its application, both in skin and pulp tissues. Preharvest PUT-sprayed fruit exhibited lower ACO activities than postharvest PUT-treated skin and pulp tissues. The preharvest spray application of higher concentrations of PUT (2.0 and 1.0) significantly reduced the activities of fruit softening enzymes (*exo*-PG, *endo*-PG, PE and EGase) in skin and pulp tissues during storage. In conclusion, pre-storage application of PUT retarded plum fruit softening during low temperature storage through suppressed ethylene biosynthesis and reduced activities of fruit softening enzymes such as PE, EGase, *exo* and *endo*-PG in skin and pulp tissues.