

Title Physiological and biochemical bases of sprout inhibition in stored onion *Allium cepa* L. cv. Red Creole bulbs by pre- or postharvest application of ethylene

Author Y.Y.Soe, E.P. Serrano

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Abstract

The physico-chemical and physiological bases of sprout inhibition with pre- and postharvest application of ethylene were investigated in 'Red Creole' onion bulbs during storage at 6-8°C and under ambient conditions (25-30°C).

Ethylene as ethephon solution (3000 ppm) was applied to the onion plants two weeks before harvest.

Harvested bulbs were then treated with various concentrations of ethylene (0, 10, and 30 ppm) at different exposure periods (36 and 72 h) and were stored under ambient condition and low temperature for 6 months. Bulb samples were then withdrawn every month for evaluation.

Under ambient storage of preharvest ethylene treated bulbs, no sprouting was observed in all postharvest ethylene treatment until 4 months after storage (MAS). Percent sprouting at 4 MAS was significantly higher (12.24%pretreated and 6.7% in no pretreatment) in cold storage than in ambient storage. Preharvest application 00000 ppm ethephon coupled with 30 ppm+72 h postharvest ethylene treatment resulted in the shortest sprout length and 0% visible sprouting in bulbs stored for 6 months at ambient. The same preharvest treatment coupled with 10 or 20 ppm ethylene+72 h exposure resulted in 0% sprouting in bulbs stored for 3 months in cold storage.

Sprout inhibition exhibited by bulbs exposed to pre- and postharvest ethylene was accompanied by higher levels of total, reducing and non-reducing sugars. With these increased levels was the concomitant reduction of respiration rate. Sprout inhibition in these treatments was also accompanied by reduced rate of ethylene production and lower pungency levels apparently due to reduced activities of ACC synthase and alliinase, respectively.