Postharvest ethylene treatment reduces quality loss of stored mature sweet orange 'Navelate'

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Abstract

Ethylene is usually associated with senescence but it may also play a role protecting fruit from stress conditions causing tissue damage. Its effect may be influenced by the concentration applied, the fruit physiological stage or the specific susceptibility of the cultivar to develop physiological disorders. However, the industry only applies this hormone to citrus fruit for degreening purposes and there is no information on the effect of ethylene on the quality of fruit harvested after color break and stored under commercial conditions to extend its postharvest life. We have examined the effect of treating mature 'Navelate' orange (*Citrus sinensis* L. Osbeck) for 4 days with 2 µl/L ethylene at 90-95% relative humidity (RH) on the quality of fruits stored at 2 or 12°C and 90-95% RH. Exposure to ethylene had little effect on increasing fruit color but considerably reduced the incidence of calyx abscission, of non-chilling peel pitting at 12°C and of chilling injury after 40 days storage at 2°C. Ethylene had no deleterious effect on fruit firmness, weight loss, calyx senescence or acidity and reduced soluble solids by only 4%. Furthermore, ethylene did not enhance off-flavor perception and increased the content of bioactive flavonoids in the pulp by about 18% in fruit stored for up to 40 days at 2 or 12°C. Therefore, treating the fruits with 2 µl/L ethylene may constitute a useful tool to extend postharvest life of mature citrus fruits since it reduces postharvest physiological disorders and has no negative effect on external or internal fruit quality.