

Title Effect of intermittent warming at chilling temperature and post-storage holding on the quality of mandarin fruits of various maturity stages

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Abstract

Influence of fruit maturity stages ('green' and 'orange' rind color), intermittent warming (IW) at chilling temperature (2 weeks at 3.5°C followed by 1 week at 12.5°C) and post-storage holding for 1 week (at 22±2°C and 70±5% RH) on fruit composition, decay, rind color and respiration of mandarins (*C. reticulata* Blanco) was investigated over a period of 75 days. There was no chilling injury to the fruit of both maturity stages either immediately after removal from storage or after 1-week holding. Weight loss was 4.8% in 'orange' as compared with 4.9% in 'green' fruit at 75d + 1 week. Decay was due to *Penicillium digitatum* Sacc. and *Alternaria alternata* Fr. (Keissler) pv. citri (externally apparent stem-end rot and internal core rot). Up to 30 days, decay (externally visible as well as internal) was negligible but increased to 19.83% and 22.26% in 'orange' fruit and 11.97% and 16.27% in 'green' fruit after 60d + 1-week and 75d + 1-week, respectively. Juice content, fruit firmness and titratable acidity were significantly higher in 'green' fruit while total soluble solids and ascorbic acid contents were significantly higher in 'orange' fruit. Titratable acidity and ascorbic acid contents declined during storage in both maturity stages. As the storage period was extended, visual color of peel gradually turned deeper orange in both maturity stages with increased in chroma and decrease in h°. Rind of 'green' fruit turned yellow-orange in color and appearance score was almost similar after 60d + 1-week and 75d + 1-week in fruits of both maturity stages. Chlorophyll 'b' content was higher than chlorophyll 'a' content as the loss in chlorophyll 'b' was slower. Total carotenoids increased significantly during storage. Fruit respiration rate was 5 mgCO₂ Kg⁻¹ at chilling temperature and increased by nearly 4fold during IW and 5-6 fold when removed to ambient conditions. During 1-week holding (shelf life) respiration gradually declined. 'Orange' fruits had slightly lower respiratory rate than 'green' fruit. Flavour score was initially higher in 'orange' fruit than in 'green' fruit, but at 75d + 1-week fruits of both stages had similar scores without any off-flavour.