

**Title** Grafting effects on postharvest ripening and quality of 1-methylcyclopropene-treated muskmelon fruit

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### Abstract

In addition to managing soil-borne diseases in muskmelon (*Cucumis melo* L.) production, grafting with resistant rootstocks may impact fruit quality. The ethylene antagonist 1-methylcyclopropene (1-MCP) has been shown to extend shelf life of fresh muskmelon fruit. Postharvest characteristics of 1-MCP-treated melon fruit as affected by grafting, however, have not been well examined. This study was conducted to explore the influence of grafting with different rootstocks on ripening and quality attributes of 1-MCP-treated muskmelon fruit during postharvest storage. Grafted 'Athena' muskmelon with two commercial squash interspecific hybrid rootstocks including 'Strong Tosa' and 'Tetsukabuto' as well as non-grafted and self-grafted 'Athena' were grown in replicated field plots at the University of Florida Plant Science Research and Education Unit (Citra, FL, USA) during April–June 2010. Half-slip fruit from two harvests were treated with  $1.0 \mu\text{L L}^{-1}$  1-MCP (18 h, 20 °C) and analyzed during storage at 13 °C. For fruit from the 27 May harvest, whole fruit and mesocarp firmness, titratable acidity, soluble solids, and ascorbic acid content were measured, while production of ethylene and  $\text{CO}_2$  was determined on fruit from the 29 June harvest. Grafting did not show a significant impact on fruit yield but affected the fruit shelf life significantly. Fruit from non-grafted 'Athena' and 'Athena' grafted onto 'Strong Tosa' demonstrated a shelf life of 31 d for the first harvest and 22 d for the second harvest. Shelf life of fruit from self-grafted 'Athena' and 'Athena' grafted onto 'Tetsukabuto' declined by 6 d and 3 d for the first and second harvest, respectively. Whole fruit firmness decreased by approximately 15.5% on average from 13 to 31 d except day 19 as a result of grafting, but to a lesser extent with 'Strong Tosa' rootstock. Mesocarp firmness of grafted melon was reduced by about 30.2% at days 13 and 19 compared to non-grafted 'Athena' fruit. In contrast, titratable acidity, soluble solid content, and ascorbic acid concentration were less affected by grafting. All the measurements except for ethylene and  $\text{CO}_2$  production declined during storage regardless of the grafting treatment. Compared with 'Strong Tosa' rootstock, 'Tetsukabuto' resulted in a more rapid ripening under 1-MCP application, as reflected by earlier increase in ethylene production and higher respiratory rate. The study demonstrates that

grafting effects on postharvest ripening and quality of 'Athena' muskmelon can vary markedly with rootstocks used.