Early season ‘Wonhwang’ pear fruit quality following international transport and storage is negatively impacted by fruitlet stage gibberellic acid$_{4+7}$ (GA_{4+7}) application but improved by postharvest 1-methylcyclopropene (1-MCP)

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Scientia Horticulturae 256: 108549. (2019)

Abstract

The popularity and demand of early season ‘Wonhwang’ pear fruit are getting increased due to premium fruit quality. However, numerous physiological disorders can be developed after harvest and during short-term storage. The objective of the study was aimed to evaluate the effectiveness of gibberellic acid$_{4+7}$ (GA_{4+7}) at fruitlet stage, 1-methylcylcopropene (1-MCP), pre-conditioning, or 1-MCP + pre-conditioning on fruit quality attributes and incidence of physiological disorders in ‘Wonhwang’ pears stored at commercial storage facility and then shipped to Taiwan from South Korea. GA_{4+7} treatment reduced fresh weight loss but was lowered flesh firmness compared with the other treatments. 1-MCP treatment maintained superior fruit firmness during shelf life relative to other treatments. Soluble solids concentration (SSC) did not differ among treatments. Titratable acidity (TA) was lowest in GA_{4+7} treatment but relatively retained in 1-MCP treatment, compared with the other treatments. Lightness (L^*) was not affected by treatments among tissues during shelf life but was higher in 1-MCP treatment than in pre-conditioning or GA_{4+7} treatments. Peel staining was only detected in GA_{4+7} treated fruit. 1-MCP treatment reduced the severity of flesh browning, core browning, water soaking and cavity, compared with the other treatments. Overall, the results suggested that 1-MCP treatment to early season ‘Wonhwang’ Asian pears enables the retention of fruit firmness and reduces the severity of physiological disorders for international trading, compared with GA_{4+7} or pre-conditioning treatments.