

Metabolism and cold chain performance of ‘Chuhwangbae’ Asian pears as impacted by 1-MCP treatment

Hnin Phyu Lwin, David R. Rudell and Jinwook Lee

Scientia Horticulturae 288: 110357. (2021)

Abstract

The ‘Chuhwangbae’ Asian pear, a late-season cultivar that has become popular in Korea, is susceptible to physiological disorders during cold storage. The objective of this study was to evaluate the effect of 1-methylcyclopropene (1-MCP) treatment on fruit quality, physiological disorders, and targeted metabolites of ‘Chuhwangbae’ Asian pear fruit during cold storage and at the post-storage ripening stage. ‘Chuhwangbae’ Asian pear fruit were treated with 1-MCP immediately following harvest, stored at 1 °C for up to 3 months, and subsequently stored at 25 °C for 14 d to ripen. Indicators of fruit quality, namely the incidence of browning disorder and the degree of water loss or “shriveling,” as well as levels of key metabolites, were repeatedly analyzed during the simulated cold chain. Fruit treated with 1-MCP lost more weight but slightly maintained firmness than did untreated fruit during the entire cold chain. Treatment with 1-MCP reduced the severity of flesh browning but enhanced the incidence and severity of shriveling during post-storage ripening after 3 months of cold storage. GABA, histidine, phenylalanine, and tyrosine levels were higher in the flesh of the 1-MCP-treated fruit than in untreated fruit. The results indicate that the overall changes in metabolite levels following 1-MCP treatment were less during cold storage than those during post-storage ripening. Therefore, postharvest 1-MCP treatment could be at least partially effective in retaining flesh firmness and reducing the severity of internal browning of ‘Chuhwangbae’ Asian pears during the entire cold chain.