

Improvement of fruit quality and pedicel color of cold stored sweet cherry in response to pre-storage 1-methylcyclopropene and chlorine dioxide treatments: Combination treatment of 1-MCP plus ClO₂ improves post-harvest quality of sweet cherry fruit

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Abstract

Sweet cherry fruit is perishable which quality loss greatly influences consumers preference. To improve postharvest quality of sweet cherry, the effect of the combination of 1-methylcyclopropene (1-MCP) plus chlorine dioxide (ClO₂) was estimated by analyses of postharvest characteristics, bioactive compounds, antioxidant capacity and pedicel quality changing. The fruit was treated separately or in combination with 1-MCP and ClO₂, which were stored at 4 °C for 25 d. In comparison with individual treatment, the combination treatment of 1-MCP and ClO₂ delayed senescence by suppressing decay incidence, softening and the reduction of ascorbic acid, total phenolic as well as titratable acid. In addition, combination of 1-MCP + ClO₂ inhibited the decreasing of pedicel browning and pedicel force, maintained the higher content of chlorophyll more effectively. Moreover, 1-MCP or ClO₂ individual treatment remarkably inhibited the expression of genes, including pheophytin pheophorbide hydrolase, chlorophyllase, pheophorbide a oxygenase and red chlorophyll catabolite reductase, associated to chlorophyll catabolism in cherry pedicel. Additionally, compared to the individual treatment, the combination of 1-MCP + ClO₂ contributed the maximum efficacy, especially in the middle duration of storage. Overall, our preliminary study suggested that the combined treatment of 1-MCP + ClO₂ might be a promising method to preserve postharvest quality in sweet cherry fruit.