Effects of Different 1-Methylcyclopropene (1-MCP) Application Methods on Fruit Quality Attributes in Cold-stored ‘Summer Prince’ and ‘Summer King’ Apples

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This study was to evaluate the changes on fruit quality attributes of cold-stored ‘Summer Prince’ and ‘Summer King’ apples by the different 1-MCP (SmartFresh™) concentrations treatments. This study was included 5 treatment groups (0, 0.5, 1, 0.5 + 0.5 and 1 + 1 µL·L⁻¹) and all groups were stored at 0°C for up to 6 month. 0.5 and 1 µL·L⁻¹ 1-MCP treatments were immediately applied for 18 hr at harvest as single treatment, and repeated 0.5 + 0.5 and 1 + 1 µL·L⁻¹ treatments were then applied at 2 month after storage. Untreated fruit produced higher internal ethylene concentrations (IEC) during storage in both apple cultivars. All of 1-MCP treated fruit greatly inhibited the production of IEC during storage. Especially in the ‘Summer Prince’ apple, IEC of untreated fruit increased up to 469.0 µL·L⁻¹ after 4 months of storage. Also, all of 1-MCP treated fruit retained the reduction of firmness and titratable acidity in both apple cultivars, compared with untreated fruit. At the measurement of weight loss during storage, non-significant results were found in all treatments of both apple cultivars, except 0.5 µL·L⁻¹ 1-MCP treated ‘Summer King’ apple. In addition, peel color variables (L*, a*, b*) and soluble solids content were not significantly different in all treatments of both apple cultivars during storage. In conclusion this study showed that 1-MCP is an effective postharvest treatment, but all 1-MCP application methods had the same results. Therefore, the application of 0.5 µL·L⁻¹ 1-MCP treatment is an adequate treatment for retaining the qualities of cold-stored ‘Summer Prince’ and ‘Summer King’ apples. (This research was supported by a grant from 2017 Research Fund (PJ01245502) of Rural Development Administration, Republic of Korea.)

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