Abstract

Exogenous and endogenous ethylene-induced petal senescence and flower abscission are the main constraints that limit the commercial potential of *Lupinus havardii* Wats. cut racemes. In one experiment, greenhouse-grown *L. havardii* plants were supplemented with Ca in a nutrient culture solution (0, 2.5, 5.0, and 10.0 MM Ca using CaCl 2), and in another experiment, five Ca concentrations (0, 0.1, 0.2, 0.3, and 0.4 M Ca using CaCl 2) were sprayed at three periods of different raceme maturities. Finally, a series of experiments was performed involving single or repeated 1-methylcyclopropene (MCP) applications to *L. havardii* cut racemes. The CaCl2 culture solution and MCP experiments involved daily monitoring of the raceme postharvest performance, assessed as fresh weight (FW), flower retention (FR), the number of newly opened flowers (NF), and the evaluation of cell permeability. Raceme Ca concentration increased with increasing Ca addition to the culture solution, ranging from a low of 5300 mg per kg dry weight (0 mM supplemental Ca) to a high of 7500 mg per kg: (10.0 mM supplemental Ca). However, analysis of variance revealed that the increase in raceme Ca concentration did not improve the 10-day postharvest performance of racemes. Spray applications of CaCl 2 also offered no postharvest improvement over controls. Single postharvest addition of MCP increased FW retention by 5 to 11% and increased FR by 24% above the control racemes. In the absence of ethephon pretreatment, MCP-treated racemes exhibited an average of 7.8 days vaselife (defined as the time required for 50% abscission or visible desiccation of mature flowers), which was nearly 2 days greater than in controls. Racemes receiving four repeated MCP applications and no ethephon exhibited the greatest vaselife extension of all postharvest treatments (average of 9.2 days). Similar relative leakage ratio (RLR) was found for flowers from the control and single MCP addition. Lower RLR was recorded on the youngest most recently expanded flowers as compared with older flowers. Multiple MCP application delayed cell permeability change in youngest flowers with or without an exogenous ethylene source, but did not reduce RLR in the more mature flowers. Results suggest that the senescence-delaying influence of postharvest MCP treatment is of finite duration, although this compound appears to be effective in delaying raceme senescence. This information will be helpful in optimizing MCP use and in understanding the postharvest biology of the *L. havardii* raceme.