

Title Effects of s-carvone and nano-silver pulse treatments on inhibiting stem-end bacteria on 'Avalanche' and 'Fiesta' cut roses

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Abstract

Insufficient water uptake by cut flowers and foliage species is often due to stem end occlusion and poor stem hydraulic conductance that involve bacterial growth and/or wound healing. S-carvone has putative antibacterial and anti-wound healing activities. Nanometer-sized silver (Ag^+) particles (NS) are also used in various applications as anti-microbial agent. To achieve the best chemical treatments, S-carvone at concentrations of 0.25, 0.5 and 0.75 mgL^{-1} vase solution and NS (2-5 nm diam.) at concentration of 50, 100 and 200 mgL^{-1} pulse solution for 1 h were applied before transferring to deionized water (DI) vase solution of 'Avalanche' and 'Fiesta' cut roses. Bacterial counts were made on triplicate sub-samples every other day by excising 0.5 g segments from stem ends. Moreover, stomatal conductance and transpiration rate of the uppermost leaves were measured with a portable photosynthesis meter every other day of the vase life period. In vitro and microscopic assessments showed that, NS pulse treatment inhibited bacterial growth at cut stem ends during vase life period and resulted in maintaining water uptake rate and extending the vase-life of rose cut flowers. It also reduced stomatal conductance and inhibited leaf transpiration rate. NS pulse treatment at 200 mgL^{-1} produced the longest vase life which was almost twice that of the control. Observations indicated that not only S-carvone did not suppress vase solution bacterial populations but it was also phytotoxic and thereby resulted in shorter vase life than the control.