

Title Silver thiosulfate maintains floret quality of cut mini-gladiolus spikes by affecting sink-source relationships and modulating the sugar transport within the spike organs

Author S. Meir, S. Salim, Y. Huang and S. Philosoph-Hadas

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Abstract

Although insensitive to ethylene, pulsing of cut mini-gladiolus (*Gladiolus hybrid* cv. 'Adi') spikes with the ethylene action inhibitor, silver thiosulfate (STS), offers potential advantages, similar to their pulsing with 10% sucrose, in extending their vase life and maintaining florets quality. The improved flower quality was manifested in increased fresh weight (FW) of the spikes, increased FW and dry weight (DW) of the third and fifth florets, and opening of an additional floret during 10 days of vase life. STS-treated spikes had extended longevity than sucrose-treated ones. Similar to the sucrose pulsing, STS pulsing resulted in elevated levels of glucose and fructose in petals of the third and fifth florets during flower opening, which were further elevated by the combined treatment of STS and sucrose. The STS-induced increase in levels of reducing sugars of the third and fifth florets was accompanied by a concomitant decrease in total carbohydrate concentrations, mainly glucose and fructose, in the green vegetative organs. Thus, STS enhanced the reduction of carbohydrate concentrations in leaves, bracts and stems by 40, 50 and 75%, respectively, as compared with control. Indeed, removing the bracts and/or the lower stem part reduced floret opening, as well as floret FW, DW and color intensity. Pulsing the spikes, after removal of the bracts and lower stem, with 10% sucrose and 0.4 mM STS, or adding 2% sucrose to the vase solution, compensated for the removal of these green parts, and retained the full spike quality. The results suggest that the green vegetative tissues of the mini-gladiolus spike serve as possible sources for assimilate import to the floret sink, which is necessary for maintaining appropriate floret opening during vase life. It seems, therefore, that besides being an ethylene action inhibitor, STS may have also a possible role in modulating sugar transport within the organs of the mini-gladiolus spike.