

Title Use of 1-methylcyclopropene in cyclodextrin-based nanosponges to control grey mould caused by *Botrytis cinerea* on *Dianthus caryophyllus* cut flowers

Author Ludovica Seglie, Davide Spadaro, Francesco Trotta, Marco Devecchi, Maria Lodovica Gullino and Valentina Scariot

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Abstract

Botrytis cinerea is one of the pathogens resulting in the heaviest commercial losses in ornamental cut flowers, and the severity of grey mould disease partly depends on the presence of ethylene in the storage environment. The efficacy of a β -cyclodextrin-based nanosponge 1:8 (CD-NS) – 1-methylcyclopropene (1-MCP) complex was evaluated as a novel control agent in protecting carnation (*Dianthus caryophyllus* L. ‘Idra di Muraglia’) cut flowers against *B. cinerea* infection. Two concentrations of this non-volatile 1-MCP formulation (CD-NS complex, 0.25 and 0.5 $\mu\text{L L}^{-1}$, a.i.) were compared with commercial gaseous 1-MCP (0.25 $\mu\text{L L}^{-1}$, a.i.), and an inoculated control. A non-inoculated control was also used to assess the natural infection level. Eleven days after inoculation, the development of grey mould on carnation was significantly reduced (59.9% of flower surface) in cut stems treated with the CD-NS complex at low dosage, compared to the high dosage of the CD-NS complex (91.5%), the commercial gaseous 1-MCP formulation (76.2%) and the inoculated control (100.0%). Endogenous ethylene production was associated with symptom development. Results showed a reduced ethylene production in 1-MCP treated flowers (0.25 $\mu\text{L L}^{-1}$, a.i., both suspended and gaseous formulation). The CD-NS complex could therefore be an effective alternative to conventional chemicals to protect ornamental cut flowers.