

**Title** Integrated management of postharvest *Fusarium* rot of gladiolus corms using hot water, UV-C and *Hyptis suaveolens* (L.) Poit. essential oil

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### Abstract

Gladiolus corms artificially inoculated with the pathogen *Fusarium oxysporum* f. sp. *gladioli* were treated with hot water, UV-C or essential oil of *Hyptis suaveolens* (L.) Poit., alone and in combinations, to control the population growth of the pathogen after storage of 4 and 12 weeks. *In vitro* efficacy of hot water, UV-C or essential oil was tested and it was observed that a hot water treatment at 55 °C for 25 min or a UV-C treatment with a dose of 3.63 kJ m<sup>-2</sup> were sufficient to inhibit germination of conidia. *In vitro* fungitoxic efficacy of the essential oil also clearly showed that 0.6 µL cm<sup>-3</sup> of oil was sufficient to completely inhibit the fungal growth and 0.4 µL cm<sup>-3</sup> oil completely inhibited conidial germination. *In vivo* efficacy of hot water, UV-C or essential oil was determined by calculating the log<sub>10</sub> transformation of CFU g<sup>-1</sup> corm after storage periods of 4 and 12 weeks. Hot water alone at 55 °C for 30 min significantly reduced the CFU as compared with the control. UV-C treatment (dose 4.98 kJ m<sup>-2</sup>) was sufficient to reduce the population of the fungus. An essential oil treatment of 0.8 µL cm<sup>-3</sup> for 2 weeks was significantly effective in reducing the pathogen population during storage. Integrated treatments of hot water (55 °C for 30 min), UV-C (dose 4.98 kJ m<sup>-2</sup>) and essential oil (0.8 µL cm<sup>-3</sup>) for 2 weeks were more promising than their treatments alone, after storage for 4 and 12 weeks. GC–MS analysis of the *H. suaveolens* essential oil, showed that 24 compounds were present, the main ones being 1,8-cineole (44.4%), β-pinene (11.7%), β-caryophyllene (10.0%), camphene (5.7%) and β-myrcene (5.3%).