

Title UV-C irradiation induces defence responses and improves vase-life of cut gerbera flowers
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Abstract

UV-C ($\lambda = 254$ nm) irradiation was effective in reducing *Botrytis cinerea* floret specking (i.e., lesion development) and maintaining a better postharvest quality of cut gerbera flowers. A range of UV-C doses (0.5–10.0 kJ m⁻²) was tested on ‘Ice cream’ and ‘Ecco’ gerbera flowers to activate germicidal and inducible defence mechanisms. Irradiation of *B. cinerea* cultures with 0.5, 1.0, 2.5 and 5.0 kJ m⁻² UV-C resulted in up to a 10-fold reduction of conidial germination percentages and significant ($P < 0.05$) delay of mycelium growth, compared to the non-irradiated control cultures. Moreover, lesion diameters on gerbera florets inoculated with UV-C irradiated *B. cinerea* cultures were reduced by up to 70%, suggesting that UV-C had a negative effect on the pathogenic strength of the fungi. Lesion diameters on florets of UV-C irradiated gerberas were reduced by up to 55% giving evidence that defence responses in the host tissue were induced. Concentration of total phenolics seemed to be unaffected by 0.5 kJ m⁻² UV-C treatment in both cultivars, but polyphenol oxidase (PPO) activity increased and remained higher compared to the non-irradiated control flowers throughout the 48 h storage period at 20 °C. The increase of PPO suggests that this enzyme might play an important role in host defence mechanisms that suppressed *B. cinerea* floret specking. Gerbera flowers irradiated with 1.0 or 10.0 kJ m⁻² UV-C showed improvement in vase-life by 1.8 and 2.4 d, decrease in stem break percentages by 43 and 29% and delay in stem break incidence by 3.3 and 1.3 d, respectively.