

Title Effects of gamma and UV-C irradiation on the postharvest control of papaya anthracnose
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Abstract

Anthracnose is the main postharvest disease in papaya fruit. Today, there is considerable interest on alternative methods of control to promote resistance against pathogens and supplement or replace the use of fungicides. The goal of this work was to evaluate the effects of gamma and UV-C irradiation on *Colletotrichum gloeosporioides*, the causal agent of anthracnose. Mycelial growth, sporulation, and conidial germination were evaluated *in vitro* after fungal exposition to different irradiation doses. In the *in vivo* assays, 'Golden' papaya fruit were inoculated through subcuticular injections of a conidial suspension or mycelium discs. Next, fruit were submitted to different irradiation doses (0, 0.12, 0.25, 0.5, 0.75, and 1 kGy), using Co⁶⁰ as source, or UV-C (0, 0.2, 0.4, 0.84, 1.3, and 2.4 kJ m⁻²). To check the possibility of resistance induction by irradiation, papayas were also inoculated 24, 48, or 72 h after the treatments. The fruit were stored at 25 °C/80% RH for 7 days and evaluated for incidence and rot severity. The results showed that the 0.75 and 1 kGy doses inhibited conidial germination and mycelial growth *in vitro*. All doses increased fungal sporulation. The 0.75 and 1 kGy doses reduced anthracnose incidence and severity, but did not reduce them when the fruit were inoculated after irradiation. All UV-C doses inhibited conidial germination and those higher than 0.84 kJ m⁻² inhibited mycelial growth. The 0.4, 0.84, and 1.3 kJ m⁻² UV-C doses reduced fungal sporulation *in vitro*. There was no effect of UV-C doses and time intervals between treatment and inoculation on anthracnose control and fungal sporulation in fruit lesions. Moreover, all UV-C doses caused scald on the fruit. Thus, gamma irradiation can contribute for the reduction of postharvest losses caused by anthracnose and reduce the use or doses of fungicides on disease control.