Title Physiological basis of UV-C-induced resistance to *Botrytis cinerea* in tomato fruit I. Role of pre- and post-challenge accumulation of the phytoalexin-rishitin

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Abstract

The induction and maintenance of resistance to gray mold rot (*Botrytis cinerea*) in tomato fruit during storage, exposed to hormic dose of UV-C (3.7 kJ/m^2) was studied. Treated fruit were more susceptible to disease immediately after treatment, but thereafter, they became gradually resistant and the resistance was maintained until the end of the storage period of 35 d. Pre-storage treatment of tomato with the hormic UV dose-induced synthesis and accumulation of rishitin. This accumulation was gradual and reached a maximum level (46.23 mg/kg) by 15 d after treatment before the rishitin level declined to 3.5 mg/kg at the end of storage. Inoculation of untreated fruit also induced rishitin accumulation but this response was much higher in UV-treated fruit. In both control and UV-treated fruit, the capacity to accumulate rishitin declined with ripening. There was a significant correlation between rishitin accumulation in UV-treated fruit both before and after inoculation and disease resistance. The enhanced disease susceptibility immediately after treatment is likely the result of transient but severe oxidative stress-induced by both UV and inoculation. Subsequent gradual resistance observed in treated fruit during the early period of storage could be attributed to the accumulation of rishitin both before and after inoculation. The level of rishitin present at the time of inoculation appears to be the primary factor in the expression of resistance while its accumulation after inoculation appears to play a reinforcing role in resistance. However, rishitin level cannot account for the observed prolonged resistance of UV-treated tomato to gray mold rot, and it is suggested that other induced defenses might also be involved.