

Title Integration of pre- and postharvest treatments for the control of black spot caused by *Alternaria alternata* in stored persimmon fruit

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Abstract

In Israel, black spot caused by *Alternaria alternata* is the main postharvest factor that impairs the quality and reduces the storability of persimmon fruit (*Diospyros kaki* cv. Triumph). The fungus infects the fruit in the orchard and remains quiescent until harvest. After harvest, the pathogen slowly colonizes the fruit during storage at 0 °C, which elicits black spot symptom development 2–3 months after storage entry. A commercial postharvest dip treatment in chlorine at 500 mg L⁻¹, released from sodium troclosene tablets, effectively controlled black spot in fruit stored for up to 2 months. However, decay incidence increased as the length of storage was extended beyond 2.5 months. The long incubation period that precedes black spot symptom development after harvest enabled the development of a series of integrative approaches for application at the pre- and postharvest stages, in combination with the commercial chlorine dip treatment, to improve the control of black spot disease. Preharvest treatments included treatment with the cytokinin-like N₁-(2-chloro-4-pyridyl)-N₃-phenylurea (CPPU) 30 d after fruit set, or a single spray with the curative fungicide polyoxin B 14 d before harvest, and when one of these was applied in combination with the postharvest chlorine dip treatment, the black spot infected area was reduced by 3 and 60%, respectively, compared with the chlorine dip alone. At the postharvest stage, fogging during storage, or post-storage on-line spraying with sodium troclosene, when applied in combination with the postharvest chlorine dip, improved the percentage of marketable fruit by 2 or 10%, respectively, compared with the chlorine dip alone. The results indicate that postharvest pathogens that show a slow colonization pattern might enable the integration of pre- and postharvest disease control methods to improve quality and reduce postharvest disease development.