Title Postharvest biochemical changes in 'Hort16A' kiwifruit: effects of fungal inoculation and storage environment

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Abstract

Cryptosporiopsis actinidiae causes storage rots of yellow-fleshed 'Hort16A' kiwifruit (*Actinidia chinensis*). The pathogen is present on the fruit surface before harvest but does not become symptomatic until after approximately 12 weeks in storage. Pre- and postharvest expression of putative defence proteins and volatiles were measured on fruit in order to identify possible biochemical markers of disease resistance. Developing fruit were inoculated with *C. actinidiae* on five occasions between bloom and mid season. Skin samples were taken from fruit at mid season, harvest and during C in air or controlled atmosphere (CA). After 18 weeks at 1.5 °C storage at 1.5 disease incidence was 25–35% on inoculated fruit and 9–13% on non-inoculated controls. Peroxidase and glucosidase activity increased during storage, irrespective of conditions or inoculation challenge, whilst β-1,3-glucanase activity was negligible. Chitinase and phenylalanine ammonia lyase (PAL) activity were significantly higher in inoculated fruit than in non-inoculated fruit suggesting a possible role for these enzymes in pathogen response. Induction of chitinase activity in inoculated fruit was greater in air than in CA. Conversely, PAL induction was greater in CA than in air, with activity increasing in both inoculated (14-fold increase) and non-inoculated fruit (3-fold increase). Volatile emissions from fruit at harvest and after 12 weeks in storage were also measured. Extremely low levels of volatiles were detected from intact fruit at harvest, but more than 44 different compounds were detected following storage. Growth of *C. actinidiae* on agar was completely inhibited in the presence of the fruit volatiles, ethyl hexanoate and (E)-2-hexenal at 75 µg/ml. However, fruit rot development was not inhibited in field- inoculated fruit that were stored in an atmosphere containing these compounds.