

Cuticular wax of mandarin fruit promotes conidial germination and germ tube elongation, and impairs colony expansion of the green mold pathogen, *Penicillium digitatum*

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Abstract

The cuticle of citrus is known to modulate fruit postharvest quality and is hypothesized to be involved in resistance against the fungal pathogen, *Penicillium digitatum*. However, only scarce information is available on the effect of cuticular wax on the conidial germination, germ tube elongation, and colony development of *P. digitatum*. Utilizing a versatile Formvar®-based *in vitro* system, we were able to assess the development of *P. digitatum* in the absence of secondary effects of its host. *In vivo* and *in vitro*, we found that the cuticular wax of mandarin (*Citrus reticulata*) fruit impaired *P. digitatum* colony expansion. Compared with the colony size of *P. digitatum* on intact fruit, the area of colonies on fruit supplemented with mandarin cuticular wax decreased significantly by 1.7 times, whereas it increased 1.6 times on dewaxed fruit 72 h post inoculation. Similar results were observed at 96 h post inoculation. Thus, the cuticular wax of mandarin fruit, acting as a physical barrier, impairs the colony expansion of *P. digitatum*, making it a viable alternative for citrus fruit coating that effectively controls green mold colony formation during postharvest storage. Interestingly, *in vitro* cuticular wax of mandarin fruit dramatically stimulated conidial germination and germ tube elongation of this pathogen. These results suggest that the cuticular wax might be the chemical cue for *P. digitatum* during host-recognition processes. Overall, our results suggest that the cuticular wax of mandarin fruit plays meaningful roles in the interaction between the citrus fruit and *P. digitatum*, and hence, can be considered for postharvest disease management.