

Title Role of citrus volatiles in host recognition, germination and growth of *Penicillium digitatum* and *Penicillium italicum*

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Citation Postharvest Biology and Technology, Volume 49, Issue 3, September 2008, Pages 386-396

Keywords Citrus; Volatiles; Limonene; Spore germination; Hyphal growth promotion

Abstract

Volatiles emitted from wounded peel tissue of various citrus cultivars had a pronounced stimulatory effect on germination and germ tube elongation of both *Penicillium digitatum* and *P. italicum*; however, *P. digitatum* appeared to be more sensitive to the stimulatory action of citrus peel volatiles. When exposed to volatiles from grapefruit peel discs, the percentage of germinated spores of *P. digitatum* and *P. italicum* was 75.1% and 37.5%, respectively, whereas germination of controls was 6.8% and 14.7%, respectively. In contrast, *Botrytis cinerea* and *P. expansum* were either not affected or inhibited by the peel volatiles. GS-MS analysis of volatiles present in the peel of various citrus fruit cultivars revealed that limonene is the major fruit peel volatile. Its percentage ranged from 89% to 95% at the early stages of fruit development throughout the harvest season. Myrcene and α -pinene made up the second and third greatest amounts among the volatiles found in these oils, ranging from 2.12% to 2.33% and from 0.71% to 1.25%, respectively. All four monoterpenes, limonene, α -pinene, β -pinene and myrcene were stimulatory to *P. digitatum* and *P. italicum* but inhibitory to or had no effect on *P. expansum* and *B. cinerea*. Germ tube elongation in *P. digitatum* responded most strongly to limonene and less strongly to α -pinene and β -pinene while myrcene had little effect. In contrast in *P. italicum*, myrcene stimulated germ tube elongation the most followed by limonene, with α -pinene, and β -pinene being about equal. Germination of *P. italicum* conidia was highest in response to myrcene with the effect of the other compounds being about equal at concentrations of 5 μ L or more per plate.