

**Title** Involvement citrus fruit volatiles in germination and growth of *Penicillium digitatum* and *Penicillium italicum*.

**Author** A. Eick, D. Macarisin, L. Cohen, G. Rafael, M. Wisniewski and S. Droby.

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#### **Abstract**

Volatiles emitted from wounded peel tissue of various citrus cultivars stimulated germination and germ tube elongation of both *Penicillium digitatum* and *Penicillium italicum*, but the effect on *P. digitatum* appeared stronger. When exposed to volatiles from grapefruit, the percentage of germinated spores of *P. digitatum* and *P. italicum* was 10 and 5 fold, respectively as compared to the control. In contrast, *Botrytis cinerea* and *Penicillium expansum* were either not affected or were 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  $\alpha$ -pinene made up the second and third greatest amounts among the volatiles. All four monoterpenes, limonene  $\alpha$ -pinene,  $\beta$ -pinene and myrcene stimulated *P. digitatum* and *P. italicum* but inhibited 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  $\alpha$ -pinene and  $\beta$ -pinene while myrcene had little effect. In *P. italicum*, myrcene stimulated germ tube elongation the most followed by limonene, with  $\alpha$ -pinene, and  $\beta$ -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  $\mu$ l or more per plate.