Title *Penicillium digitatum* activity suppress defense-related hydrogen peroxide burst during infection of citrus fruit

Author Droby S, Macarisin D, Cohen L and Wisniewske M

Citation Program and Abstracts, 11th International Citrus Congress (ISC Congress), 26-20 October 2008, Wuhan, China. 333 pages.

Keyword citrus; green mould; *Penicillium digitatum*

Abstract

Current knowledge of plant-fungal interactions postulates that a plant's basal immune system can detect microbe-associated-molecular patterns (MAMP) which then activates a strong defense response. Pathogenic fungi, however, can counteract these defenses by suppressing signal transduction or gene expression in plant cells, or by producing enzymes that neutralize antifungal compounds. The present research demonstrates that the postharvest pathogen, *Penicillium digitatum*, the causal agent of green mold, actively suppresses a defense-related hydrogen peroxide (H_2O_2) burst in citrus fruit. In contrast, inoculation of citrus fruit with a non-pathogenic fungus, *Penicillium expansum*, triggers massive production of H_2O_2 by flavedo tissue. Both fungi induce an elevation in H_2O_2 levels in citrus fruit exocarp from 8 to 17 h after inoculation. Thereafter, *P. digitatum* suppresses H_2O_2 production by host cells and by 66 h the H_2O_2 level was three-fold below that in non-innoculated controls. In wound sites inoculated with *P. expansum*, the level of H_2O_2 was 11-fold above the control value at this time point. Enzymatic removal of H_2O_2 by exogenous catalase, or specific suppression of H_2O_2 production in flavedo tissue by exogenous citric acid, significantly ($P \leq 0.05$) enhanced pathogenicity of *P. digitatum* and even allowed non-pathogenic *P. expansum* to develop lesions on lemon, orange and grapefruit. Our results, together with recent reports suggesting the potential involvement of citric acid and catalase in green mold pathogenesis, indicate that suppression of the defense-related hydrogen peroxide burst in citrus fruit by these compounds could act as pathogenicity factors for *P. digitatum*.