

**Title** Farnesol induces apoptosis in the citrus fungal pathogen *Penicillium expansum*  
**Author** Liu P, Guo JH, Wang BQ, Yu H, Zhang L and Deng BX  
**Citation** Program and Abstracts, 11<sup>th</sup> International Citrus Congress (ISC Congress), 26-20 October 2008, Wuhan, China. 333 pages.  
**Keywords** blue mould rot; citrus; farnesol

### **Abstract**

The fungal pathogen *Penicillium expansum* is the causative agent of the blue mold, one of the major diseases of Citrus fruits. Farnesol secreted by *Candida albicans* blocks the yeast-to-filamentous growth transition. Meanwhile, farnesol has been reported to induce *Aspergillus niger* apoptosis. This study demonstrated that farnesol also triggered apoptosis in the citrus pathogenic fungus *P. expansum*. Exposure of *P. expansum* hyphae to farnesol produced cellular morphological features characteristic of apoptosis. The detection of DNA strand breaks by TUNEL (terminal deoxynucleotidyltransferase-mediated dUTP-FITC nick end labeling) and the exposure of phosphatidylserine on the surface of protoplasts by Annexin V FITC staining gave evidence for a farnesol-induced apoptosis-like mechanism in *P. expansum*. The produced reactive oxygen species (ROS) by dichlorodihydrofluorescein diacetate (carboxy -H<sub>2</sub>DCFDA) and the induced hyphal ultrastructure analyzed by transmission electron microscope (TEM) suggested that ROS increased and the disintegration of mitochondria played a major role in the farnesol induced apoptosis. Taken together, our data suggest that farnesol as an antifungal compound effectively induces Citrus pathogen *P. expansum* apoptosis, which been found in fungal pathogen provided new ideas for the bio-control.