

**Title** Inhibiting *Penicillium expansum* infection on pear fruit by *Cryptococcus laurentii* and cytokinin

**Author** Xiaodong Zheng, Ting Yu, Rongle Chen, Bin Huang and Vivian Chi-Hua Wu

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#### Abstract

The effectiveness of the cytokinin *N*<sup>6</sup>-benzyladenine (6-BA), alone or in combination with the biocontrol yeast *Cryptococcus laurentii*, in controlling blue mold on pear fruit was assessed. The application of 6-BA (500–2000  $\mu\text{g mL}^{-1}$ ) or *C. laurentii* was effective in reducing *Penicillium expansum* infection in pear fruit wounds, but its efficacy declined rapidly as the incubation time increased. Integrated application of *C. laurentii* and 6-BA at 500–2000  $\mu\text{g mL}^{-1}$ , especially at the optimal concentration (1000  $\mu\text{g mL}^{-1}$ ), resulted in a more effective and stable inhibition of the mold rots than that of the 6-BA or *C. laurentii* alone. Treatments of pears with 6-BA at 1000  $\mu\text{g mL}^{-1}$ , alone or with *C. laurentii* also led to an increase in catalase activity and an inhibition of the activities of both peroxidase and lipoxygenase as well as ethylene production. In addition, 6-BA from 20 to 2000  $\mu\text{g mL}^{-1}$  did not influence the population growth of *C. laurentii* in pear fruit wounds. These data suggested that a combination of 6-BA and *C. laurentii* could integrate the dual biological activities from 6-BA and *C. laurentii* and might be developed into a novel protection strategy for reduction of the blue mold rot of pear fruit.