Title Efficacy of the antagonist *Aureobasidium pullulans* PL5 against postharvest pathogens of peach, apple and plum and its modes of action

Author Dianpeng Zhang, Davide Spadaro, Angelo Garibaldi and Maria Lodovica Gullino

Citation Biological Control,Volume 54, Issue 3, September 2010, Pages 172-180

Keywords Apple; *Aureobasidium pullulans*; β-1,3-Glucanase; Biological control; *Botrytis cinerea*; Chitinase; *Monilinia laxa*; Peach; *Penicillium expansum*; Plum

Abstract

The efficacy of *Aureobasidium pullulans* PL5 against different postharvest pathogens of fruits (*Monilinia laxa* on plums and peaches, *Botrytis cinerea* and *Penicillium expansum* on apples) were evaluated under storage conditions when applied at 10^8 cells ml^{-1} and their interactions were studied *in vitro* and *in vivo* to discover the possible modes of action. Under 1.2 °C and 95% relative humidity (RH) for 28 days, the efficacy of PL5 against *M. laxa* on plums was 45%, reducing disease incidence from 78% to 43%. Under 1 °C and 95% RH for 21 days, the efficacy against *M. laxa* on peaches was 63%, reducing disease incidence from 79% to 29%. Under 4 °C and 95% RH for 45 days, the efficacy against *B. cinerea* and *P. expansum* on apples was 56% and 46%, respectively. In Lilly–Barnett minimal salt medium with the fungal cell walls of pathogens as sole carbon source, PL5 produced β-1,3-glucanase, exo-chitinase and endo-chitinase. Nutrient concentrations had significant effect on pathogen growth reduction by PL5. No attachment was observed in antagonist–pathogen interactions *in vitro* or *in vivo*. PL5 completely inhibited pathogen spore germination in PDB at 10^8 cells ml^{-1}, whereas at 10^6 cells ml^{-1} the efficacy was significantly decreased. However, inactivated cells and culture filtrate of PL5 had no effect on pathogen spore germination and germ tube elongation. Our results showed that *A. pullulans* PL5 could be introduced in commercial formulations to control postharvest pathogens on fruits and its activity was based on secretion of lytic enzymes and competition for nutrients.