Title Selection and evaluation of new antagonists for their efficacy against postharvest brown rot of peaches

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Abstract

During the growing seasons 2007 and 2008, 210 isolates of yeasts or yeast-like fungi were obtained from the carposphere of temperate fruit collected from organic orchards in Northern Italy. Through six rounds of *in vivo* screening, three isolates showing the highest biocontrol efficacy against *Monilinia laxa* on peaches were selected. By using molecular and morphological tools, the strain AP6 was identified as *Pseudozyma fusiformata*, the strain AP47 as *Metschnikowia* sp., and the strain PL5 as *Aureobasidium pullulans*. This research represents the first evidence about the potential use of *P. fusiformata* to control postharvest diseases of fruit. By co-culturing *in vitro M. laxa* in the presence of the three antagonists, neither the inactivated cells nor the culture filtrate of the three isolates had any significant effect on spore germination or germ tube elongation, allowing exclusion of the production of secreted toxic metabolites. The antagonistic activity of *A. pullulans* PL5 and *P. fusiformata* AP6 was dependent on the cell concentration. *Metschnikowia* sp. AP47 significantly inhibited spore germination at the three concentrations tested (10^6 cells/mL, 10^7 cells/mL, and 10^8 cells/mL). The efficacy of the three strains was tested on peaches stored at three different temperatures, and their effectiveness was higher at 1 °C than at 8 °C or 20 °C. In trials carried out in semi-commercial conditions with peaches inoculated by spraying 10^5 spores/mL of *M. laxa* and stored for 21 d at 1 °C and 96% RH, a cell concentration effect on the control of brown rot incidence was observed. AP6 and PL5 showed no significant differences in efficacy when applied at 1×10^8 cells/mL or at 1×10^7 cells/mL, indicating that they could be used at a lower concentration in potential biofungicide formulations. Finally, in an experiment in semi-commercial conditions on fruit not inoculated with the pathogen with 21 d storage at 1 °C and 96% RH, the evaluation of postharvest quality parameters, including firmness, total soluble solids, ascorbic acid content, and titratable acidity, showed that none of the three screened antagonists impaired peach quality, when applied before storage. The present study identified three antagonistic microorganisms with potential exploitation as active ingredients for the development of products for postharvest control of brown rot on peaches.