

Title Development of biocontrol agents from food microbial isolates for controlling post-harvest peach brown rot caused by *Monilinia fructicola*

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Abstract

An unconventional strategy of screening food microbes for biocontrol activity was used to develop biocontrol agents for controlling post-harvest peach brown rot caused by *Monilinia fructicola*. Forty-four microbial isolates were first screened for their biocontrol activity on apple fruit. Compared with the pathogen-only check, seven of the 44 isolates reduced brown rot incidence by > 50%, including four bacteria: *Bacillus sp.* C06, *Lactobacillus sp.* C03-b and *Bacillus sp.* T03-c, *Lactobacillus sp.* P02 and three yeasts: *Saccharomyces delbrueckii* A50, *S. cerevisiae* YE-5 and *S. cerevisiae* A41. Eight microbial isolates were selected for testing on peaches by wound co-inoculation with mixtures of individual microbial cultures and conidial suspension of *M. fructicola*. Only two of them showed significant biocontrol activity after five days of incubation at 22 °C. *Bacillus sp.* C06 suppressed brown rot incidence by 92% and reduced lesion diameter by 88% compared to the pathogen-only check. *Bacillus sp.* T03-c reduced incidence and lesion diameter by 40% and 62%, respectively. The two isolates were compared with *Pseudomonas syringae* MA-4, a biocontrol agent for post-harvest peach diseases, by immersing peaches in an aliquot containing individual microbial isolates and the pathogen conidia. Treatments with isolates MA-4, C06 and T03-c significantly controlled brown rot by 91, 100, and 100% respectively. However, only isolates MA-4 and C06 significantly reduced brown rot by 80% and 15%, respectively when bacterial cells alone were applied. On naturally infected peaches, both the bacterial culture and its cell-free filtrate of the isolate C06 significantly controlled peach decay resulting in 77 and 90% reduction, respectively, whereas the treatment using only the bacterial cells generally had no effect. Isolate C06 is a single colony isolate obtained from a mesophilic cheese starter, and has been identified belonging to *Bacillus amyloliquefaciens*. The results have clearly demonstrated that isolate C06 has a great potential for being developed into a biocontrol agent.