

Title Biocontrol of major postharvest pathogens on apple using *Rhodotorula glutinis* and its effects on postharvest quality parameters

Author Hongyin Zhang, Lei Wang, Longchuan Ma, Ying Dong, Song Jiang, Bin Xu and Xiaodong Zheng

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Abstract

The biocontrol activity of *Rhodotorula glutinis* on gray mold decay and blue mold decay of apple caused by *Botrytis cinerea* and *Penicillium expansum*, respectively, was investigated, as well as its effects on postharvest quality of apple fruits. The results show there was a significant negative correlation between concentrations of the yeast cells and the disease incidence of the pathogens. The higher concentration of the *R. glutinis*, the better effect of the biocontrol capacity. At concentrations of *R. glutinis* 1×10^8 CFU ml⁻¹, the amount of gray mold decay was completely inhibited after 5 days incubation at 20 °C, after challenge with *B. cinerea* spores suspension of 1×10^5 spores ml⁻¹; While the blue mold decay was completely inhibited at concentrations of 5×10^8 CFU ml⁻¹, at challenged with *P. expansum* spores suspension of 5×10^4 spores ml⁻¹. These results demonstrated that the efficacy of *R. glutinis* in controlling of gray mold decay of apples was better than the efficacy of controlling blue mold. *R. glutinis* within inoculated wounds on apples increased in numbers at 20 °C from an initial level of 9.5×10^5 CFU per wound to 2.24×10^7 CFU at 20 °C after 1 day. The highest population of the yeast was recovered 4 days after inoculation, the yeast population in wounds increased by 56.9 times. After that, the population of the yeast began to decline very slowly. *R. glutinis* significantly reduced the incidence of natural infections on intact fruit from 75% in the control fruit to 28.3% after 5 days at 20 °C, and from 58.3 to 6.7% after 30 days at 4 °C followed by 4 days at 20 °C. *R. glutinis* treatment had no deleterious effect on quality parameters after 5 days at 20 °C or after 30 days at 4 °C followed by 4 days at 20 °C.