

Title Biocontrol of postharvest gray and blue mold decay of apples with *Rhodotorula mucilaginosa* and possible mechanisms of action

Author Renping Li, Hongyin Zhang, Weimin Liu and Xiaodong Zheng

Citation International Journal of Food Microbiology, Volume 146, Issue 2, 30 March 2011, Pages 151-156

Keywords Apples; Gray mold decay; Blue mold decay; Biocontrol; *Rhodotorula mucilaginosa*; Possible mechanisms

Abstract

The efficacy of *Rhodotorula mucilaginosa* against postharvest gray mold, blue mold and natural decay development of apples and the possible mechanisms involved were investigated. The decay incidence and lesion diameter of gray mold and blue mold of apples treated by *R. mucilaginosa* were significantly reduced compared with the control fruits, and the higher concentration of *R. mucilaginosa*, the better the efficacy of the biocontrol. *R. mucilaginosa* also significantly reduced the natural decay development of apples following storage at 20 °C for 35 days or at 4 °C for 45 days followed by 20 °C for 15 days. Germination and survival of spores of *Penicillium expansum* and *Botrytis cinerea* were markedly inhibited by *R. mucilaginosa* in an *in vitro* test. Rapid colonization of the yeast in apple wounds was observed whether stored at 20 °C or 4 °C. In apples, the activities of peroxidase (POD) and polyphenoloxidase (PPO) were significantly induced and lipid peroxidation (malondialdehyde (MDA) content) was highly inhibited by *R. mucilaginosa* treatment compared with those of the control fruits. All these results indicated that *R. mucilaginosa* has great potential for development of commercial formulations to control postharvest pathogens on fruits. Its modes of action were based on competition for space and nutrients with pathogens, inducement of activities of defense-related enzymes such as POD, PPO and inhibition of lipid peroxidation (MDA content) of apples, so as to enhance the resistance and delay the ripening and senescence of apples.