

Efficacy of *Wickerhamomyces anomalus* yeast in the biocontrol of blue mold decay in apples and investigation of the mechanisms involved

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Abstract

Blue mold decay is the one of most important postharvest disease of apples caused by the fungus, *Penicillium expansum*. This study aimed to investigate the biocontrol efficacy of the yeast, *Wickerhamomyces anomalus*, on postharvest blue mold decay of apples and the relative defense mechanisms. The results indicated that *W. anomalus* could significantly reduce the blue mold decay of apples, and the maximum inhibition was obtained when the concentration of *W. anomalus* was 1×10^8 cells ml^{-1} . Furthermore, *W. anomalus* significantly reduced the fruit decay under ambient conditions, without generating any change in fruit quality. *In vitro* experiments showed that *W. anomalus* greatly inhibited the spore germination and germ tube elongation of *P. expansum*. Besides, its ease of adaptation, stable growth and potential colonization of in apple wounds or surfaces indicated that *W. anomalus* could compete with *P. expansum* for nutrients and space, leading to considerable inhibition blue mold decay. *W. anomalus* significantly induced the activities of polyphenol oxidase (PPO), peroxidase (POD), catalase (CAT), phenylalanine ammonia-lyase (PAL), and ascorbate peroxidase (APX) in apples. Moreover, *W. anomalus* increased the contents of flavonoid and total phenols. All these results suggested that *W. anomalus* has potential biocontrol efficacy to control the postharvest blue mold decay of apples