

# Effect of $\beta$ -glucan on the biocontrol efficacy of *Cryptococcus podzolicus* against postharvest decay of pears and the possible mechanisms involved

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## Abstract

In this study, the effect of  $\beta$ -glucan on the biocontrol efficacy of *Cryptococcus podzolicus* against blue mold decay of pears as well as the physiological mechanism and related molecular mechanism through transcriptome technology was investigated. Our results revealed that  $\beta$ -glucan could enhance the biocontrol ability of *C. podzolicus* on blue mold decay of pears. Meanwhile,  $\beta$ -1,3-glucanase and catalase (CAT) activities of 0.5%  $\beta$ -glucan-induced *C. podzolicus* were significantly increased, though the malondialdehyde (MDA) content of 0.5%  $\beta$ -glucan-induced *C. podzolicus* was decreased. During the whole storage time, the polyphenol oxidase (PPO), peroxidase (POD) and CAT activities of pears treated with 0.5%  $\beta$ -glucan-induced *C. podzolicus* were significantly increased. In addition, the transcriptome analysis indicated that *C. podzolicus* induced by  $\beta$ -glucan was able to increase the rate of polysaccharide utilization, accelerate the synthesis of cell walls and energy, improve its antioxidant capacity, and enhance its ability to adapt to oxidative stress. The aging process of *C. podzolicus* cells was delayed, and could be related to the improvement of the biocontrol ability of *C. podzolicus*. Therefore,  $\beta$ -glucan treatment can be used as an effective method to improve the biocontrol ability of antagonistic yeasts on postharvest diseases of pear fruits.