

# Application and mechanism of benzyl-isothiocyanate, a natural antimicrobial agent from cruciferous vegetables, in controlling postharvest decay of strawberry

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Postharvest Biology and Technology, Volume 180, October 2021, 111604

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## Abstract

Gray mold, caused by *Botrytis cinerea*, is an important cause of postharvest loss of strawberry fruit. In the present study, we found that benzyl-isothiocyanate (BITC), a natural compound widely existing in cruciferous vegetables with anti-cancer effect, was effective in controlling postharvest gray mold of strawberry fruit, and also strongly inhibited the natural decay of strawberry. The mode of action of BITC against *B. cinerea* was mainly attributed to its direct inhibition on spore germination. BITC application could disrupt the plasma membrane integrity and induce ROS accumulation in the spores of *B. cinerea*, eventually leading to cell death. To further investigate the inhibitory mechanisms of BITC against *B. cinerea*, we conducted a comparative transcriptome analysis. Most of the differentially expressed genes (DEGs) participated in the metabolism of carbohydrate, lipid and amino acid, the genetic information processing, as well as the biosynthesis of other secondary metabolites. This study provides a safe and promising method to control strawberry postharvest diseases based on BITC, and gets insight into the antimicrobial mechanism of BITC.