

# Efficacy and potential mechanisms of benzothiadiazole inhibition on postharvest litchi downy blight

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## Abstract

Benzothiadiazole (BTH) is a functional analog of salicylic acid (SA), and has been applied to delay postharvest decay in several fruit. However, the efficacy of BTH on delaying postharvest decay of litchi fruit and involved regulatory mechanisms remained unknown. Physiological, microbiological, and metabolomic analyses were applied in this study to reveal efficacy and potential mechanism of BTH on the control of postharvest litchi downy blight. Our results showed that BTH enhanced the disease resistance of litchi fruit against downy blight *in vivo*. The *in vitro* test indicated that BTH treatment markedly inhibited the mycelial growth and sporangia germination of *Peronophythora litchii*. Enzyme activity assay revealed that BTH treatment enhanced the activities of CAT, SOD, PPO and PAL in litchi fruit. Moreover, the expression levels of senescence-related genes were down-regulated by BTH treatment. A comparative metabolomic analysis showed that metabolites accumulation significantly affected by BTH treatment, especially amino acids contents of arginine, phenylalanine and glutamic acid increased in comparison with control group. In all, the inhibitory effect on pathogen, the blocked transcription of senescence-related genes, and the activation of defense enzymes and amino acid metabolism induced by BTH treatment might be attributed to the alleviation effect of BTH on postharvest litchi downy blight. These findings indicated that BTH might be a potential agrochemical to control postharvest litchi downy blight and extend shelf life of litchi fruit.