

# Efficacy of pterostilbene suppression of postharvest gray mold in table grapes and potential mechanisms

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## Abstract

*Botrytis cinerea* is an economically devastating necrotrophic fungus that is responsible for gray mold infection of table grapes. Fungicides application remains the most common approach in its control. However, in consideration of food and environmental safety, safe and eco-friendly alternatives are desirable to manage gray mold. Pterostilbene is a natural antimicrobial metabolite that inhibits growth of several phytopathogenic fungi. Moreover, pterostilbene has been widely used as a food additive on the basis of its safety and oxidation properties. However, the specific inhibitory effects of pterostilbene for pathogen control of postharvest fruit and its precise mechanism of action remain to be defined. Here, 0.25g L<sup>-1</sup> pterostilbene could suppress the development of gray mold in table grapes. Fluorescent staining indicated that pterostilbene-mediated disease suppression is mediated through loss of plasma membrane integrity. Electron microscopy revealed that pterostilbene inhibits *B. cinerea* by altering the morphology of the hyphae and conidiophores, with destruction of the plasma membrane and organelles. Furthermore, quantitative real-time PCR highlighted pterostilbene-mediated gene modulation and overexpression of genes associated with laccase production and cellular damage on *B. cinerea*, together with increased laccase activity. These data better define the mechanisms through which pterostilbene inhibits *B. cinerea* growth, thus making pterostilbene an attractive candidate in postharvest fruit disease management strategies.