

Melatonin enhances the resistance of ginger rhizomes to postharvest fungal decay

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Abstract

Significant losses in harvested ginger can be directly attributed to decay fungi, including *Fusarium oxysporum* and *Penicillium brevicompactum*. Eco-friendly treatments, utilizing non-conventional chemical methods to manage postharvest decay on ginger rhizome are being actively investigated. In the current study, the application of melatonin (*N*-acetyl-5-methoxytryptamine) was evaluated for controlling postharvest decay of ginger rhizomes, artificially-inoculated with *F. oxysporum* or *P. brevicompactum*. Results showed that the melatonin treatment (0.1 mM, 15-min immersion) reduced *F. oxysporum* and *P. brevicompactum* rots on rhizomes. Melatonin induced the expression of defense-related genes, including β -1,3-glucanase (*GLU*), phenylalanine ammonia-lyase (*PAL*), and coiled-coil nucleotide-binding site leucine-rich repeat (*CC-NBS-LRR*). *GLU* and *PAL* enzyme activity was also induced in ginger rhizomes, and the level of total phenols in rhizomes was elevated. Importantly, melatonin did not have a negative impact on rhizome quality. The ability of melatonin to enhance disease resistance may be partially attributed to the induction of defense response in ginger rhizomes. The findings of the present study have practical implications for the use of melatonin to reduce postharvest decays in ginger rhizomes.