

Curcumin inhibits *Diaporthe phaseolorum* and reduces postharvest decay in kiwifruit

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Abstract

Curcumin is a promising antifungal agent because of its wide range of antifungal activities. In the present study, the effect of curcumin on postharvest decay of kiwifruit, caused by *Diaporthe phaseolorum*, was evaluated. We found that spore germination, germ tube elongation, and mycelial growth of *D. phaseolorum* were all significantly inhibited by curcumin. Cell viability and ATP content were also reduced by the addition of curcumin. Curcumin induced the production of reactive oxygen species in *D. phaseolorum* hyphae, resulting in apoptosis and accelerated rate of cell death. The activities of antioxidant enzymes, including catalase, peroxidase, superoxide dismutase and glutathione peroxidase, increased upon curcumin treatment. Mycelia exposed to curcumin exhibited a greater sensitivity to osmotic and oxidative stresses than untreated mycelia, and they lost their ability to penetrate plant cell walls. Application of curcumin effectively inhibited disease development in kiwifruit in a dose dependent manner. Collectively, the results indicated that curcumin can effectively inhibit postharvest decay of kiwifruit caused by *D. phaseolorum* by inhibiting the vegetative growth and cell viability, promoting apoptosis and cell death, and decreasing pathogenicity of the pathogen.