

Antifungal effect and possible mechanism of curcumin mediated photodynamic technology against *Penicillium expansum*

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Abstract

Contamination of *Penicillium expansum* has dramatic impacts on the development of the fruit and vegetable industry. In this study, the antifungal effect and its mechanism of curcumin mediated photodynamic technology (PDT) against *P. expansum* spores was investigated. Results indicated that PDT inactivated 99.7 % spores and inhibited spore germination, mycelial growth and disease severity of the blue mold rot on apple fruit. PDT induced the generation of reactive oxygen species (ROS), which caused oxidative damage of spores and further disrupted cellular structure. In addition, excessive ROS triggered the antioxidant defense systems of spores. Moreover, ultimate result of cell death induced by PDT was apoptosis for short time illumination, and necrosis for long time. These results can be an asset to exploit PDT for further application in controlling harvest diseases of the fruit and vegetable.