

Epsilon-poly-L-lysine (ϵ -PL) exhibits antifungal activity *in vivo* and *in vitro* against *Botrytis cinerea* and mechanism involved

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Abstract

ϵ -Poly-L-lysine (ϵ -PL) is a non-toxic food preservative, but the antifungal effect of ϵ -PL against postharvest pathogenic fungi has rarely been reported. Grey mold caused by *Botrytis cinerea* is one of the main postharvest diseases on fruit and vegetables. The objective of this study was to investigate the antifungal activity of ϵ -PL against *B. cinerea* *in vivo* and *in vitro*, and elucidate the underlying mechanism involved. ϵ -PL treatment significantly inhibited the incidence of grey mold rot on cherry tomato, strawberry, grape, and green pepper caused by *B. cinerea*. Moreover, *in vitro* assay showed that ϵ -PL exerted strongly antifungal activity against mycelial growth, spore germination, and germ tube elongation of *B. cinerea*, with the increase of the concentration of ϵ -PL. Furthermore, significant leakages of intercellular electrolytes and protein suggested that ϵ -PL treatment increased the membrane permeability of *B. cinerea*. Malondialdehyde (MDA) content and Annexin V-FITC/propidium iodide (PI) double staining assay confirmed that ϵ -PL treatment induced membrane disruption of the test pathogen. Morphological alterations after ϵ -PL treatment revealed severe damage to *B. cinerea* mycelia, which resulted in distortion and shriveling of mycelial surface. The results indicated that ϵ -PL exerted antifungal activity by inducing the membrane damage of *B.*