Induction of defense response against *Alternaria* rot in Zaosu pear fruit by exogenous L-lysine through regulating ROS metabolism and activating defense-related proteins

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Abstract

L-lysine, an important basic amino acid, its catabolic pathway is activated upon microbial pathogen attack in plants and has a central role in plant immunity. The control effects of exogenous L-lysine treatment on *Alternaria* rot in postharvest 'Zaosu' pear fruit and possible mechanisms involved were studied. The results showed that L-lysine treatment inhibited *Alternaria* rot development and the effect was negatively correlated with the treatment concentration, lesion diameter of 0.1mM L-lysine treated fruit was 43.7 % lower than that of the control 15 d after treatment. Further studies showed that L-lysine treatment significantly suppressed O_2^-, H_2O_2, Malondialdehyde (MDA) content, and enhanced catalase (CAT), peroxidase (POD), and superoxide dismutase (SOD) activities and gene expression in pear fruit. β-1,3-glucanase (GLU), and chitinase (CHI) activities and *PbrGLU*, *PbrCHI*, and *PbrPR-1* gene expression were also induced by exogenous L-lysine. The findings suggest that postharvest L-lysine treatment effectively enhanced disease resistance through inhibiting reactive oxygen species (ROS) production and activating defense-related protein in pear fruit.