Inhibition on anthracnose and induction of defense response by nitric oxide in pitaya fruit

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Abstract

The effect of nitric oxide (NO) on resistance of pitaya fruit against anthracnose caused by *Colletotrichum gloeosporioides* and its related mechanisms were investigated in this study. 'Baiyulong' pitaya fruit were immersed in 0.1 mM sodium nitroprusside (a NO donor) for 8 min, inoculated with spore suspension of *C. gloeosporioides* after 24 h of NO treatment, and then stored at 25 °C for up to 8 days. NO treatment markedly inhibited the lesion expansion on pathogen-inoculated pitaya fruit during storage. NO treatment also reduced the natural disease incidence and index of pitaya fruit stored at 25 °C. Furthermore, NO treatment increased the activities of defense-related enzymes including phenylalanine ammonia-lyase (PAL), CoA ligase (4CL), peroxidase (POD), polyphenol oxidase (PPO), chitinase (CHI) and β-1,3-glucanase (GLU), as well as elevated the contents of antifungal compounds including total phenolics, flavonoids and lignin. In addition, NO treatment reduced respiration rate and weight loss, while delayed the declines of firmness and soluble solids content (SSC). These results indicate that NO could effectively enhance the resistance of pitaya fruit to anthracnose, which might be ascribed to activation of defense responses and retardation of senescence.