Title Enhancement of postharvest disease resistance in Ya Li pear (*Pyrus bretschneideri*) fruit by salicylic acid sprays on the trees during fruit growth

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Abstract

The *Ya Li* pear (*Pyrus bretschneideri*) trees were sprayed three times with 2.5 mM salicylic acid (SA) around 30, 60 and 90 days after full flowering. The fruit were harvested at commercial maturity (about 120 days after full flowering), inoculated with *Penicillium expansum*, and incubated at 20 °C, 95–100% RH. The results showed that resistance to the pathogen of the mature pear fruit was remarkably enhanced by the SA sprays. Disease incidence in the SA-treated fruit was 58.0% or 26.5%, and lesion diameter on SA-treated fruit was 58.4% or 29.0% lower than that in/on fruit without SA treatment (control) on day 12 or 17 after incubation, respectively. The SA spray applied to the trees around 30 days after full flowering notably enhanced accumulation of hydrogen peroxide in the young fruit. Meanwhile, activities of defense enzymes, including peroxidase, phenylalanine ammonia-lyase (PAL), chitinase or β-1,3-glucanase in the young fruit from SA-treated trees was 29.5%, 60.0%, 24.4% or 35.7% higher than that in the control fruit 4 days after the SA spraying. Furthermore, after harvest, activities of PAL, chitinase and β-1,3-glucanase were still significantly higher in the mature pear fruit from the trees sprayed three times with SA than those of the control fruit. Activities of the antioxidant enzymes including catalase and ascorbate peroxidase in the young fruit were significantly reduced by SA spraying. However, the activity of another antioxidant enzyme, glutathione reductase in the young fruit was significantly enhanced by SA spraying. These results suggest that enzymes exerting their functions in different ways may be coordinately regulated by SA in the pear fruit. Our study indicates that treatment of SA sprays on the trees may provide further protection against postharvest disease of *Ya Li* pear fruit in practice and could be used as an alternative and economical approach to reduce application of chemical fungicides.