PpWRKY45 is involved in methyl jasmonate primed disease resistance by enhancing the expression of jasmonate acid biosynthetic and pathogenesis-related genes of peach fruit

Nana Ji, Jing Wang, Xiaoxia Zuo, Yanfei Li, Meilin Li, Kaituo Wang, Peng Jin and Yonghua Zheng

Postharvest Biology and Technology, Volume 172, February 2021, 111390

Abstract

Methyl jasmonate (MeJA) and WRKY transcription factors (TFs) are documented to exert vital defensive functions. Research concerning WRKY TFs together with MeJA-primed defense against *Rhizopus stolonifer* in peach fruit is still in its infancy. In the present study, the mode of MeJA on inducing resistance against soft rot caused by *Rhizopus stolonifer* in peaches during the postharvest storage and the involvement of WRKY TFs were investigated, and the results manifested that MeJA at 10 μM significantly reduced disease occurrence and lesion diameter after *R. stolonifera* infection during 60 h of storage at 20 °C. Moreover, the MeJA treatment promoted the activity of CHI and GLU and elevated the expression levels of *PpLOX*, *PpAOS* and *PpOPR3*. More importantly, the expression of *PpCHI*, *PpGLU*, *PpPR-like*, *PpLOX*, *PpAOS* and *PpOPR3* were substantially and rapidly elevated in the peach fruit that pretreated with MeJA and inoculated with *R .stolonifer*, indicating that MeJA stimulated a specific priming defense against *Rhizopus* rot in peaches. Furthermore, a MeJA-related transcription factor *PpWRKY45* was identified and characterized as a nucleus-localized protein that could activate the expression of *PpCHI, PpGLU, PpPR-like, PpLOX, PpAOS and PpOPR3* by binding to W-box elements in their promoters. These results indicate that *PpWRKY45* is involved in MeJA-primed defense against *R. stolonifer* by activating JA biosynthetic and PR genes of peach fruit.