

Nitric oxide regulates multiple defense signaling pathways in peach fruit response to *Monilinia fructicola* invasion

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Abstract

Nitric oxide (NO), as a small bioactive molecule, is involved in inducing plant resistance against various stresses. In this paper, the protective effects of exogenous NO on peach fruit (cv. 'Zhonghuashoutao') against *Monilinia fructicola* at physiological and proteomic levels were investigated. The application of 15 μ M NO solution effectively suppressed lesion development accompanied by an increase in the activities of defense enzymes including peroxidase (POD), polyphenol oxidase (PPO) and the contents of endogenous NO and jasmonic acid (JA) in peach fruit. A tandem mass tags (TMT)-based comparative proteomic approach was performed to further investigate NO-mediated protein profile changes during early defense response of peach fruit to *M. fructicola*. In total, 5779 proteins were successfully identified and 576 proteins were differentially expressed proteins (DEPs) with abundance changes at 12 h post inoculation (hpi). Moreover, qRT-PCR analysis revealed that the differential expression of 8 selected proteins were also regulated by NO at transcription level. Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) analysis, and manual searching conjunctively revealed that DEPs involved in signal perception and transduction, reactive oxygen species (ROS) homeostasis, defense-related proteins, transcription, posttranscriptional regulation, and carbohydrate, energy, lipid and amino acid metabolism were largely mediated by NO. Based on the above observations, we proposed that NO regulates multiple pathways coordinately to improve disease resistance to *M. fructicola* in peach fruit.