Title Defense responses of different fruits induced by biotic and abiotic factors based on proteomic approach

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Abstract

Plants protect themselves from disease-causing organisms by activating a broad array of defense responses that ultimately inhibit growth and spread of invading pathogens. The response involves the specific recognition of the pathogens and development of a resistance to protect the plant from further attacks by the pathogens. Here, we mainly introduce some novel results about defense response of peach, sweet cherry and jujube fruits treated by antagonist yeast and chemical compounds, such as salicylic acid (SA) and oxalic acid (OA), based on proteomic approach. These new findings include: (1) We determined the proteins induced by antagonist yeast *Pichia membranefaciens* and salicylic acid (SA) in peach fruit by proteomic analysis, and found that antioxidant and PR proteins, as well as enzymes associated with sugar metabolism were involved in resistance of peach fruit induced by *P. membranefaciens* and SA. These findings open out a mechanistic framework for the pathway of resistance response in fruit induced by antagonist yeast and SA. (2) We investigated a comparative analysis of sweet cherry fruits proteome induced by SA at different maturity stages, and found that younger sweet cherry fruits showed stronger resistance against pathogen invasion after SA treatment, it further indicated that antioxidant proteins were involved in the resistance response of fruits at every maturity stage, while heat shock proteins and dehydrogenases might potentially act as factors only at later maturity stages. (3) We used OA to treat jujube fruit, which consequently increasely fruit resistance against blue mold caused by *Penicillium expansum.* The mechanism by which OA delays senescence and increases disease resistance of jujube fruit was investigated by proteomic approach, and proved three proteins related to defense/stress response were up-regulated by OA, and contributed to establish systemic resistance induced by OA in jujube fruits, which indicated that OA treatment might affect ethanol and ethylene metabolism resulting in delaying senescence, and increase resistance of jujube fruits against fungal pathogen.