

Anthocyanins contribute to fruit defense against postharvest green mold

Yunlong Lin, Liqin Fan, Jiaxin He, Zhongkang Wang, Youping Yin, Yulin Cheng and Zhengguo Li

Postharvest Biology and Technology, Volume 181, November 2021, 111661

Abstract

Anthocyanins, an important class of pigmented and health-promoting plant secondary metabolites, are involved in protecting plants from stresses. However, the contribution of anthocyanins in plant resistance to biotic stresses is poorly understood compared with that in plant resistance to abiotic stresses. Here, we characterized the function of anthocyanins in protecting fruit from green mold, the major postharvest disease of citrus fruit. Compared with other oranges, ‘Tarocco’ orange, one of the most important blood oranges enriched in anthocyanins, showed reduced susceptibility to the necrotrophic fungus *Penicillium digitatum* (*Pd*) which causes citrus postharvest green mold. *Pd* infection induced the accumulation of anthocyanins in ‘Tarocco’ orange and exogenous treatment of anthocyanins significantly reduced the susceptibility of citrus fruit to *Pd*. The accumulation of reactive oxygen species (ROS), which was shown to contribute to plant infection of necrotrophic fungal pathogens, in ‘Tarocco’ orange was less than that in other oranges upon *Pd* infection. ROS content and associated gene expression in citrus fruit upon *Pd* infection were reduced after exogenous treatment of anthocyanins. Moreover, transcriptome analysis showed that a lot of genes probably participated in plant–pathogen interaction and anthocyanin biosynthesis were noticeably up-regulated in ‘Tarocco’ orange upon *Pd* infection. These findings highlight the contribution of anthocyanins to fruit disease resistance and provide significant insights into the control of citrus postharvest green mold.