

Preharvest multiple sprays with sodium nitroprusside promote wound healing of harvested muskmelons by activation of phenylpropanoid metabolism

Bin Wang, Hong Jiang, Yang Bi, Xingfen He, Yi Wang, Yongcai Li, Xiaoyuan Zheng and Dov Prusky

Postharvest Biology and Technology, Volume 158, December 2019, 110988

Abstract

Muskmelons are susceptible to mechanical damage at harvest and subsequent postharvest handling before storage. The wounds provide an easy pathway for fungi to infect, leading to postharvest decay of fruit during storage. Wound healing is considered as a positive defense process, which can restrict the invasion of pathogens. In this study, muskmelon fruit (*Cucumis melo* cv. Manao) during growth were repeatedly sprayed with 0.5 mM sodium nitroprusside (SNP, a exogenous donor of nitric oxide (NO)) or 0.1 mM 2-(4-carboxyphenyl)-4,4,5,5-tetramethylimidazoline-1-oxyl-3-oxide (c-PTIO, a scavenger of NO), to test the effect of these preharvest treatments on wound healing of harvested muskmelon fruit. The results showed that SNP sprays reduced decay incidence and disease severity of harvested muskmelons inoculated with *Trichothecium roseum*. SNP also promoted the accumulation of suberin and lignin at wound sites through increasing phenylalanine ammonia lyase (PAL) activity and stimulating the accumulation in total phenolics, flavonoids and lignin. On the contrary, c-PTIO sprays enhanced decay incidence and disease severity of wounded inoculated fruit, while decreasing PAL activity, the content of total phenolics, flavonoids and lignin and reduced the accumulation of suberin and lignin at wound sites. The present results suggest that NO released by SNP sprays promote the wound healing and prevent disease development in harvested muskmelons by inducing increase in PAL activity, the contents of phenolics, flavonoids, suberin and lignin accumulation at wound sites.