

The inhibitory effect of nitric oxide on enzymatic browning reactions of in-package fresh pistachios (*Pistacia vera* L.)

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Abstract

Hull browning decreases the postharvest-life and marketability window of fresh pistachio fruit in which to the current study aims to evaluate the inhibitory effect of nitric oxide (NO), as an anti-browning chemical substance, on controlling enzymatic browning of harvested fresh pistachio cv. 'Ahmad Aghaei'. Fruit were sprayed with sodium nitroprusside (nitric oxide donor) with 0 (control), 15, 30, 45 and 60 μM for 30 s and thereafter packed in plastic tray wrapped with low density polyethylene (LDPE) then stored at 2 ± 1 °C with $93 \pm 2\%$ relative humidity for 60 d. The nitric oxide treated fruit showed lower browning index and ΔE and higher normalized L^* value than control. Nitric oxide also could prevent the activity of polyphenol oxidase enzyme (PPO), phenylalanine ammonialyase (PAL) and peroxidase (POD), and keep the highest activity of superoxide dismutase (SOD). Total phenolic, flavonoids content and antioxidant activity of fresh pistachio hull were maintained by nitric oxide treatments. Our results demonstrated that the concentration of 15 and 30 μM sodium nitroprusside (SNP) were most effective on reducing of hull browning and extending postharvest life as compared to the control treatment. From these results, it can be concluded that the percentage of acceptable fruit treated with 15 μM of SNP was higher than 30 μM , respectively. Overall, the application of SNP can be considered as an alternative approach for decreasing the hull browning and maintaining the quality of harvested fresh pistachio fruit.