

# Postharvest nitric oxide treatment delays the senescence of winter jujube (*Zizyphus jujuba* Mill. cv. Dongzao) fruit during cold storage by regulating reactive oxygen species metabolism

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## Abstract

Postharvest winter jujube (*Zizyphus jujuba* Mill. cv. Dongzao) were treated with 20  $\mu\text{L L}^{-1}$  nitric oxide (NO) for 3 h and then stored at  $0 \pm 1$  °C and 90–95% relative humidity for 75 d. The influences of NO treatment on senescence and reactive oxygen species (ROS) of harvested winter jujube were investigated during cold storage. Results indicated that NO treatment could markedly delay weight loss, the development of decay and occurrence of flesh browning of the jujube. Also, NO treatment retained higher firmness and caused lower respiration rates. The increase in total soluble solids (TSS) content and the decrease of titratable acidity (TA) in the jujube were significantly retarded by NO treatment. NO-treated jujube showed higher activities of superoxide dismutase (SOD), catalase (CAT), ascorbate peroxidase (APX), and glutathione reductase (GR) compared with the controls. Reductions of ascorbic acid (AsA) and glutathione (GSH) contents, and the increase of superoxide anion ( $\text{O}_2^{\cdot-}$ ) production and peroxide ( $\text{H}_2\text{O}_2$ ) contents were also delayed by NO treatment. These effects suppressed increases in malondialdehyde (MDA) contents and cell membrane permeability. The combined results suggested that NO treatment enhanced the ROS scavenging capacity diminishing ROS accumulation, which contributed to alleviation of the oxidative damage and the maintenance of the cellular membrane integrity, and thereby, delaying the senescence of winter jujube.