# Tolerance of ‘Baladi’ mandarin fruits to cold storage by postharvest pectin/PVA blend with ascorbic acid treatment

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## Abstract

Postharvest chilling injury (CI) of 'Baladi' mandarin is related to the activity of antioxidant enzyme activities (AEAs) during cold storage. The performance of pectin/polyvinyl-alcohol (PC/PVA) blending in ascorbic acid (AA) to increase storability tolerance of mandarin fruit under cold otherwise the impacts of PC/PVP-AA on antioxidant enzymes were assessed. The mandarins were harvested manually from trees aged-8-years on April 15th when the fruits reached commercial maturity stage. Fruit were coated with PC/PVA biopolymer with AA at the different concentration (0, 3, 6 and 9 mM). The experiment was conducted during two growth seasons (2017–2018). Fruits coated by PC/PVA-AA for 20 min and stored at low temperature (4 ± 1 °C and 95 ± 1% RH) for 60 days. The studies were distinguished within a pair of groups: physical and chemical assessments. The physical measurements chilling injury index (CI-index), weight loss%, and mandarin peel color profile (lightness, Chroma, Hue) were monitored. However, the chemical analysis for instance soluble solid content (SSC%), titratable acidity (TA%), SSC/TA-ratio, for evaluating mandarin fruit maturity were estimated. The AEAs were evaluated: ascorbate peroxidase (APX), catalase (CAT), granulation reductase (GR), and superoxide dismutase (SOD). Plus, malondialdehyde (MDA), and cell membrane ion leakage (IL%) were considered. Further, the $O_2$ and $H_2O_2$ production rate were measured beside the scavenging activity and inhibition (DPPH and ABTs). Results indicate that the coated mandarin by PC/PVA-AA $_{9\ mM}$ exhibited less CI. Also, it forced AEAs in activities much more compared to other treatments. Moreover, it reduced the formation of $O_2^{\bullet-}$ radical and $H_2O_2$ and more scavenging activities (DPPH and ABTs) during cold storage. Therefore, the coating treatment PC/PVA-AA $_{9\ mM}$ for mandarin fruits provided more tolerant to cold storage stress.