

**Title** Advanced maturity at harvest enhances oxidative stress of 'Blanquilla' pears during cold storage

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### Abstract

Changes in antioxidant metabolism of fruits are common features in response to changing environmental conditions including low-temperature stress. In the present study, 'Blanquilla' pears were harvested at three different maturities within their commercial window (optimum harvest date (OHD), OHD -14 days and OHD +7 days) and stored at regular cold temperature (0.5°C) for four months. Changes in fruit quality, H<sub>2</sub>O<sub>2</sub> levels, antioxidants and key enzymes involved in oxidative metabolism (viz. CAT, APX and POX) were monitored at regular time intervals during cold storage and shelf-life. In comparison to fruits harvested at earlier stages, more mature fruits had lower H<sub>2</sub>O<sub>2</sub> levels during storage resulting from greater APX activities (3-fold). In consequence, late harvested fruit also exhibited lower levels of ascorbate (AsA) and higher levels of dehydroascorbate (ca. 1.5-fold). Similarly to AsA concentrations, the antioxidant capacity of late harvested fruits, as determined by different *in vitro* assays, tended to be lower throughout storage. In contrast, no clear patterns were found for CAT and POX between fruits from different maturities. Collectively, these results showed that an advanced maturity at harvest enhances the oxidative processes during cold storage, mainly H<sub>2</sub>O<sub>2</sub> scavenging via electron transfer from AsA to APX. Resulting decrease in endogenous antioxidant capacity may be associated to reduced storage potential and higher sensitivity to physiological disorders.