

Title Chilling temperature storage changes the inorganic phosphate pool distribution in cherimoya (*Annona cherimola*) fruit.

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Abstract

Phosphorous nuclear magnetic resonance (^{31}P -NMR) spectroscopy was used to study the vacuolar and cytoplasmic pH and the inorganic phosphate (Pi) pool distribution in Fino de Jete cherimoya (*Annona cherimola*) fruits stored at a chilling temperature (6 deg C). Fruits stored at the ripening temperature (20 deg C) for 3 days were used as a control. ^{31}P -NMR results confirmed that 6 deg C storage caused cytoplasmic acidosis (a decrease of 0.72 plus or minus 0.08 pH units) and a notable increase in the amount of Pi in the cytoplasm. Spectra of perchloric acid extracts also revealed that storage at 6 deg C was associated with an increase in the total amount of Pi and phosphorylated metabolites. Moreover, perfusion experiments with a phosphate medium confirmed the preferential accumulation of Pi in the cytoplasm in chilled tissues. Specific activation of phosphoenolpyruvate carboxylase (PEPC) (32.1 plus or minus 1.7 micro mol.min⁻¹.mg⁻¹) was observed in these fruits. In chilled fruits the amount of ADP was held at steady-state levels and ATP levels increased, contrary to observations for ripe fruits, where the pool of total nucleotides decreased beyond the point of NMR detection. Fruits stored at 6 deg C exhibited a low respiration rate, but metabolism was not arrested and an increase in total soluble solid contents was also observed.