Polyamine treatment ameliorates pericarp browning in cold-stored ‘Nanguo’ pears by protecting mitochondrial structure and function

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Abstract

Refrigeration is the most common way to store ‘Nanguo’ pears. However, their pericarps are prone to browning during the shelf life after refrigeration. In this study, we examined the effects of polyamines (PAs) on pericarp browning and analyzed their impact on mitochondrial morphology and function. Exogenous PAs substantially alleviated the onset and development of pericarp browning in pear fruit treated with them. PA content and the expression and activity of anabolic enzymes related to PAs increased, whereas the reactive oxygen species levels decreased. Moreover, the PA treatment preserved pericarp mitochondrial structure. Exogenous PA diminished the rate of increase and amplitude of mitochondrial membrane permeability transition pore opening and mitochondrial membrane permeability. To a certain extent, the PA treatment maintained mitochondrial energy levels. These results imply that exogenous PA treatment may be a strategy for ameliorating the browning of cold stored ‘Nanguo’ pears.