

The influence of ATP treatment on energy dissipation system in postharvest longan fruit during senescence

Meiling Li, Qiuping Zheng, Hetong Lin, Mengshi Lin, Yihui Chen, Yifen Lin, Zhongqi Fan and Hui Wang

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Abstract

The harvested longan fruit are prone to senescence, leading to a decline in fruit quality like pericarp browning. There are two energy dissipative proteins involving in fruit senescence: alternative oxidase (AOX) and plant uncoupling mitochondrial protein (PUMP). The purpose of this work was to elucidate the influence of adenosine triphosphate (ATP) treatment on energy dissipation system in postharvest longan fruit during senescence. The results showed that the ATP content in postharvest longan fruit exhibited negative correlations with the expressions of *DIAOX1*, *DIAOX2*, *DIPUMP3*, and *DIPUMP5*. Moreover, compared to the control longan fruit, the treatment of exogenous ATP prevented the increases in the expressions of *DIAOX1*, *DIAOX2*, *DIPUMP3*, and *DIPUMP5*, helped maintain higher contents of ATP, ADP and higher level of energy charge, but lower respiration rate, lower cell membrane permeability, and lower pericarp browning index in postharvest longan fruit. These data indicated that the supply of exogenous ATP could reduce the induction of the expressions of *DIAOX1*, *DIAOX2*, *DIPUMP3* and *DIPUMP5*, and consequently reduce the energy dissipation and retard the decline of energy level, which lead to the delayed senescence in postharvest longan fruit.