

Delay of ripening and softening in ‘Guifei’ mango fruit by postharvest application of melatonin

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Abstract

Melatonin (MT) functions as an important bio-active molecule in diverse physiological processes in higher plants. In the present study the role of MT in modulating ripening and softening in relation to ethylene and abscisic acid (ABA) biosyntheses in stored mango fruit was evaluated. The results showed that application of MT (0.5 mM, immersion for 1 h) to ‘Guifei’ mangoes effectively delayed the changes in ripening parameters including firmness, pulp color, β -carotene levels, soluble solids content (SSC), titratable acidity (TA) and respiration rate. MT markedly delayed climacteric ethylene production and 1-aminocyclopropane-1-carboxylic acid (ACC) levels in mango fruit during storage, likely a consequence of reduced activities of ACC synthase (ACS) and ACC oxidase (ACO). MT treatment resulted in delayed accumulation of ABA through reducing activity of a key ABA biosynthetic enzyme (9-cis-epoxycarotenoid dioxygenase, NCED). MT treatment suppressed the changes in activities of pectin-modifying enzymes including polygalacturonase (PG), β -galactosidase (β -Gal) and pectin methylesterase (PME), and limited the solubilization and depolymerization of pectin polysaccharides. The results indicate that MT could be involved in modulation of ripening and softening in mango fruit through inhibiting the biosyntheses of ethylene and ABA.