

Title Pre-harvest nickel application to the calyx of ‘Saijo’ persimmon fruit prolongs postharvest shelf-life

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Abstract

Since nickel ions (Ni^{2+}) have an inhibitory effect on 1-aminocyclopropane-1-carboxylic acid (ACC) oxidase by replacing iron (Fe^{2+}) and forming an enzyme-metal complex. 0.1% (w/v) NiCl_2 solution was sprayed onto the calyx of persimmon fruit (*Diospyros kaki* Thunb. cv Saijo) twice before harvest. Ni^{2+} -treatment effectively inhibited ‘Saijo’ fruit softening, and prolonged the fruit shelf-life for 2 days by delaying ACC accumulation and ethylene production. However, non-treated control fruit rapidly softened on the fifth day due to the immediate increase in ACC levels and ethylene production after the removal of astringency. Relatively firm Ni^{2+} -treated fruit were observed on day 7, at which point the control fruit had completely softened. Northern blots indicated that only slight *DK-ACSI* transcription could be observed on day 6 in Ni^{2+} -treated fruit, whereas abundant *DK-ACSI* mRNA was transcribed on day 5 in non-treated fruit. Correspondingly, ACC synthase activity was delayed with the Ni^{2+} -treatment, whereas it had little effect on ACC oxidase activity. We propose that Ni^{2+} could be exploited as an effective new reagent to prolong persimmon shelf-life via pre-harvest treatments.