

Title Effect of calcium treatment on the post-harvest peel pitting and fruit quality of ‘Fengyuan 72-1’ navel orange

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Abstract

‘Fengyuan 72-1’ navel orange (*Citrus sinensis* Osbeck) is welcomed by consumers for its good taste and beautiful color. But it is prone to develop peel pitting, which has been described as a severe disorder with characteristics of the extensive collapsed areas of the flavedo (outer colored part of the peel) and part of the albedo (inner part of the peel) that becomes brown with time. The external quality and consequently the market value of the fruit were decreased by peel pitting. The navel orange fruits were obtained from local orchards, and treated with different concentrations of CaCl_2 and $\text{Ca}(\text{NO}_3)_2$ in this study. Six sets of fruits, each had three replications of 30 fruits, were dipped in water (the control), 250 mg.L^{-1} Sporgon + 100 mg.L^{-1} 2,4-D, 1% CaCl_2 + 250 mg.L^{-1} Sporgon + 100 mg.L^{-1} 2,4-D, 2% CaCl_2 + 250 mg.L^{-1} Sporgon + 100 mg.L^{-1} 2,4-D, 1% $\text{Ca}(\text{NO}_3)_2$ + 250 mg.L^{-1} Sporgon + 100 mg.L^{-1} 2,4-D, 2% $\text{Ca}(\text{NO}_3)_2$ + 250 mg.L^{-1} Sporgon + 100 mg.L^{-1} 2,4-D for 5 min respectively. After drying in air, the fruits were bagged and stored at 15°C , and 85% relative humidity (RH). Physiological and biochemical indicators correlated with the incidence of peel pitting including pitting index, relative electric conductivity, malondialdehyde (MDA) content, activities of Polyphenol Oxidase (POD), Polyphenol Oxidase (PPO) were measured every ten days. The fruit quality such as Vc contents, soluble solid, titratable acidity, weight loss were also determined. The results showed that extraneous calcium could effectively decrease the development of peel pitting of fruit without changing the fruit quality significantly. Among these treatments, 1% CaCl_2 treatment was the most efficient. After 110 days storage, the pitting index of navel orange treated with 1% CaCl_2 was 27.5%, which was 20% lower than that of the control. Accordingly, relative electric conductivity, MDA content and average activities of PPO and POD during storage of fruits treated with 1% CaCl_2 were significantly lower compared to the control. Thus, the postharvest calcium treatment could be used as a simple and efficient approach to reduce the development of peel pitting of ‘Fengyuan 72-1’ navel orange fruits.