

Role of sucrose phosphate synthase and vacuolar invertase in postharvest sweetening of immature sweetpotato tuberous roots (*Ipomoea batatas* (L.) Lam cv 'Xinxiang')

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Abstract

Postharvest sweetening can improve the eating quality of sweetpotato, particularly of immature sweetpotato. In this study, soluble sugar content, activities of sucrose phosphate synthase (SPS) and vacuolar invertase (VIN) enzymes and expression of three *IbSPSs*, five *IbVINs* and two vacuolar invertase inhibitory factor (*IbVIFs*) genes were examined in immature sweetpotato cv 'Xinxiang' during 30 days storage at 20, 13 and 4 °C. Results showed that sucrose content increased at all temperatures, while glucose and fructose mainly increased at 4 °C. However, chilling injury developed at 4 °C and postharvest sweetening at 20 °C is potentially a safer option. The sucrose level was correlated with SPS activity and SPS activity is not manipulated at transcriptional stage. Fructose/glucose content was correlated with VIN activity. Transcript level of *IbVIN1* was correlated with VIN activity and sweetness index in sweetpotato roots. Therefore, *IbVIN1* could be a candidate gene in cultivating variety high in sweetness.