

Title A comparative study of cultivar differences in sucrose phosphate synthase gene expression and sucrose formation during banana fruit ripening

Author Swarup Roy Choudhury, Sujit Roy and Dibyendu N. Sengupta

Citation Postharvest Biology and Technology, Volume 54, Issue 1, October 2009, Pages 15-24

Keywords Ethylene; Ethylene responsive element; Promoter; Sucrose; Sucrose phosphate synthase

Abstract

Sucrose phosphate synthase (SPS) (E.C.2.4.1.14) is the key enzyme for sucrose formation in banana. A comparative analysis of expression profiles of *SPS* was carried out in association with sucrose metabolism patterns during fruit ripening in three banana cultivars, Cavendish (AAA), Kanthali (AB) and Monthan (AAB). Analysis of the transcript and protein accumulation patterns of the *SPS* gene during ripening revealed differential timing in expression of the gene which correlated well with variation in sucrose metabolism patterns in the three cultivars. The expression levels of *SPS* increased considerably during early ripening in Cavendish after exogenous application of ethylene, while in Kanthali ethylene treatment only moderately increased *SPS* expression during postharvest ripening. In Monthan, expression of *SPS* was very low throughout ripening and ethylene treatment did not stimulate the expression of the gene in this cultivar. Analysis of a promoter fragment of *SPS* in the three cultivars revealed a putative reverse GCC-box ERE motif. DNA-protein interaction studies demonstrated the role of this regulatory element in differential transcriptional regulation of *SPS*. Overall our results provide information about sucrose metabolism patterns at the physiological and molecular levels during fruit ripening in three natural banana cultivars.