

Title Low temperature induced changes in activity and protein levels of the enzymes associated to conversion of starch to sucrose in banana fruit

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Abstract

Storage at low temperature is the most frequently used method to extend the shelf life of banana fruit, and is fundamental for extended storage and transport over long distances. However, storage and transport conditions must be carefully controlled because of the high susceptibility of many commercial cultivars to chilling injury. The physiological behavior of bananas at low temperatures has been studied to identify possible mechanisms of resistance to chilling injury. The aim of this work was to evaluate differences in the starch-to-sucrose metabolism of a less tolerant and susceptible (*Musa acuminata*, AAA cv. Nanicão) and a more tolerant (*M. acuminata* × *Musa balbusiana*, AAB, cv. Prata) banana cultivar to chilling injury. Fruits of these cultivars were stored in chambers at 13 °C for 15 d, at which point they were transferred to 19 °C, where they were left until complete ripening. The low temperature induced significant changes in the metabolism of starch and sucrose in comparison to fruit ripened only at 19 °C. The sucrose accumulation was slightly higher in cv. Prata, and different patterns of starch degradation, sucrose synthesis, activity and protein levels of the α - and β -amylases, starch phosphorylase, sucrose synthase and sucrose phosphate synthase were detected between the cultivars. Our results suggest that starch-to-sucrose metabolism is likely part of the mechanism for cold acclimation in banana fruit, and the cultivar-dependent differences contribute to their ability to tolerate cold temperatures.