

Title Sugar metabolism and involvement of enzymes in sugarcane (*Saccharum officinarum* L.) stems during storage

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Abstract

Sugarcane (*Saccharum officinarum* L. cv. Badila) was harvested at the mature stage and stored at 2, 10, and 20 °C for 30, 90, and 120 days, respectively. Metabolic changes in the contents of sucrose and reducing sugar in relation to the activities of soluble acid invertase (SAI), neutral invertase (NI) and sucrose-phosphate synthase (SPS), in sugarcane juice, were studied. Extractable juice, sucrose and vitamin C declined significantly with increasing storage temperatures, while respiration rate increased. There was a rapid increase in titratable acidity during storage, with a more rapid rate at higher temperatures. A sharp increase in reducing sugar was observed within 20 days at 20 °C and 70 days at 10 °C, followed by a rapid decrease. Both SAI and NI activities showed a sharp increase within 15 days at 20 °C, followed by a rapid decrease, while a moderate increase occurred within 40–60 days at 10 °C. Slight increases were observed in SPS activity within 20 days at 20 °C and 50 days at 10 °C. Enzyme activities remained steady or underwent a small change in canes stored at 2 °C. Enzyme activities were significantly correlated with reducing sugar content.