Sugarcane trehalose metabolism.

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Trehalose is a disaccharide involved in regulating stress responses and the partitioning of carbon in yeast and bacteria. In recent years it has been detected in low levels in plant tissues, however the role of trehalose metabolism in planta is still not clear. Sugarcane is a crop that accumulates large quantities of sucrose in its culm tissues. The isolation of ESTs with high homology to known trehalose metabolism genes from sugarcane sparked interest in the role of this pathway in plant-, and perhaps even sucrose metabolism.

Enzymes implicated in trehalose metabolism in plants include trehalose-6-phosphate synthase (TPS), trehalose-6-phosphate phosphatase (TPP), and trehalase. Here we report transcript levels of these three enzymes in sugarcane genotypes that accumulate different amounts of sucrose. Metabolites and enzyme activities involved in this pathway are also shown. The implications of the data are discussed in the context of known sugarcane physiology.