

# DEVELOPMENTAL DYNAMICS OF ACTIVITY AND EXPRESSION OF SUCROSE-METABOLIZING ENZYMES IN *HEVEA BRASILIENSIS* LEAVES

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## **Abstract**

*Sucrose-metabolizing enzymes in plant leaves are mainly investigated in temperate species, and rarely along with expression and sugar analyses. Here, we investigated the activity and expression of sucrose-metabolizing enzymes as well as the sugars in the leaves of Hevea brasiliensis, a tropical tree species widely cultivated for natural rubber. Sucrose, fructose and glucose as the major and quebrachitol as the minor sugars were detected in Hevea leaves at its four developmental stages (I to IV). Fructose and glucose contents increased until stage III, and decreased strongly at maturation (IV). Sucrose contents increased continuously throughout the development. Alkaline/neutral invertase activity remained stable in developing leaves (I to III) with values comparable to those of vacuolar and cell wall invertases. Sucrose synthase (cleavage direction) activity was higher than the three invertases in developing leaves, corroborated by its high transcript levels. All sucrose-cleaving enzymes depressed their activities markedly at maturation, corresponded well to a transcript decline for most encoding genes. Sucrose phosphate synthase (SPS) and sucrose synthase (synthesis direction) activities were low in mature leaves, the former of which being contradictory to its high transcript levels at maturation. In conclusion, the sucrose-metabolizing enzymes contained in Hevea leaves exhibit discrepancies from those in other plants.*

**Keywords:** *Hevea brasiliensis, leaf development, sucrose-metabolizing enzymes, sugar content, enzyme activity, gene expression.*