Metabolic fingerprint of sugarcane leaves during development

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INTRODUCTION

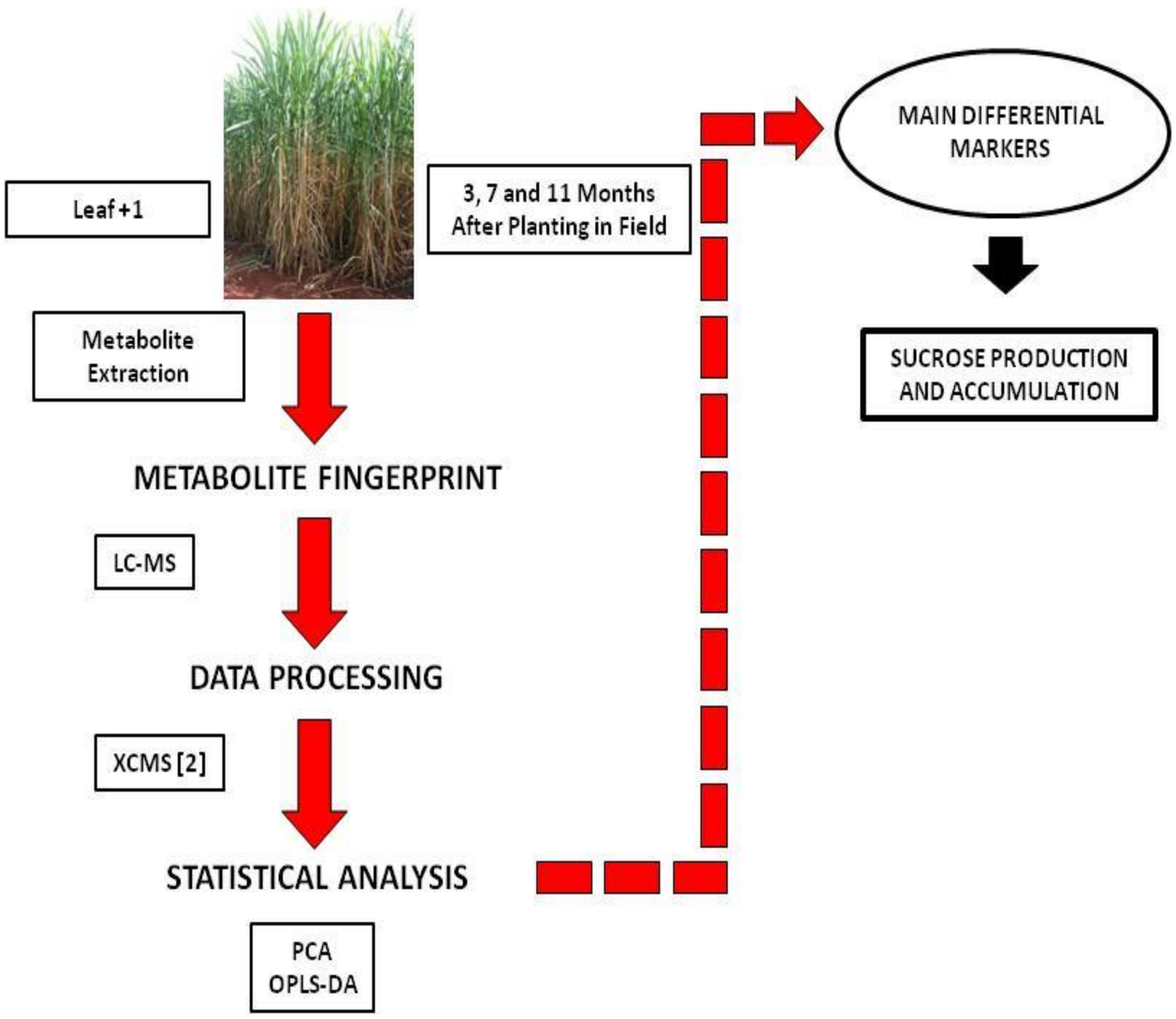
Sugarcane (*Saccharum* spp.) is one of the most important cultivated grasses of the world due the high carbon assimilation that allows the synthesis of large amounts of sucrose in the leaves, which it is transported and stored in the stem [1]. Brazil is the largest producer, with the São Paulo state concentrating more than half area for this crop. The genetic mechanisms that control sugarcane sucrose production have been studied at various levels, such as gene identification and localization, identification of quantitative trait locus controlling, transcriptome and proteome. Thus, an understanding of the mechanisms that regulate the sucrose production and accumulation is an interesting approach to target higher sugar yield in this plant.

OBJECTIVES

We aimed to identify the metabolite fingerprint in sugarcane leaves using LC-MS during plant development, and correlate it with sucrose production and accumulation.

MATERIAL AND METHODS

Experimental Flow



RESULTS

A multivariate statistical analysis was performed by Principal Component Analysis (PCA) (**Figure 1**). The sum of the two main components of the PCA (55.48%) ensured a reliable analysis. PCA highlighted groups of samples related to the sampling time, mainly at 3 and 11 month-old.

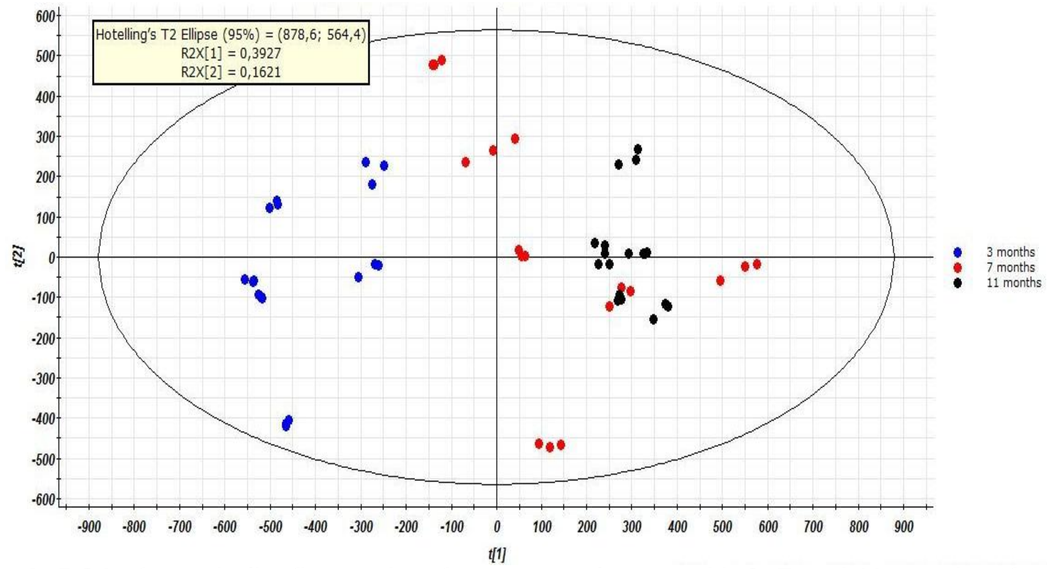


Figure 1: PCA of metabolite fingerprint of sugarcane leaves with 3, 7 and 11 months after planting.

To visualize the differences between 3 and 11 months, an OPLS-DA (**Figure 2**) was performed. The sum of the two components (61.22%) showed the existence of a difference in metabolite fingerprint between the 3 and 11 months, separating the sample groups mainly in the first component.

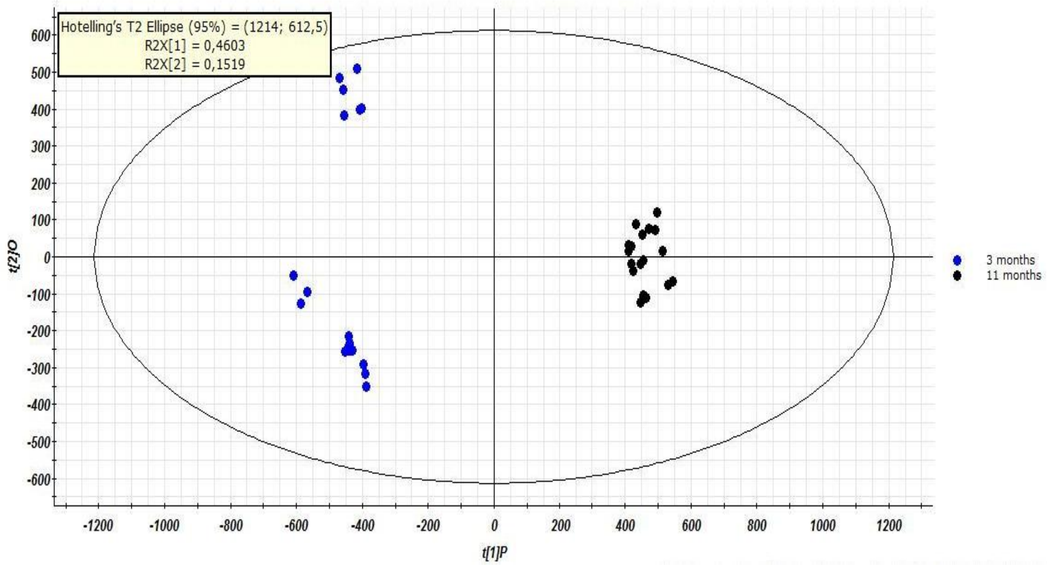


Figure 2: OPLS-DA of the metabolite fingerprint between 3 and 11 months.

The main markers responsible for this differentiation, and that are most abundant in the 11 months were m/z = 331.129 at 5.61 s, m/z = 689.3127 at 6.25 s, m/z = 689.3219 at 7.16 s, and m/z = 621.3145 at 4.37 respectively 3.8, 3.7, 6.1, and 2.9 times more abundant in 11 months. Thus these markers could be correlated with sucrose production and accumulation, which occurs between 3 and 11 months. The next steps aim to identify these markers and analyze their role in sucrose production and accumulation.

REFERENCES

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