Biochemical and transcriptional characterization of genes related to diterpene biosynthesis in Coffea eugenioides

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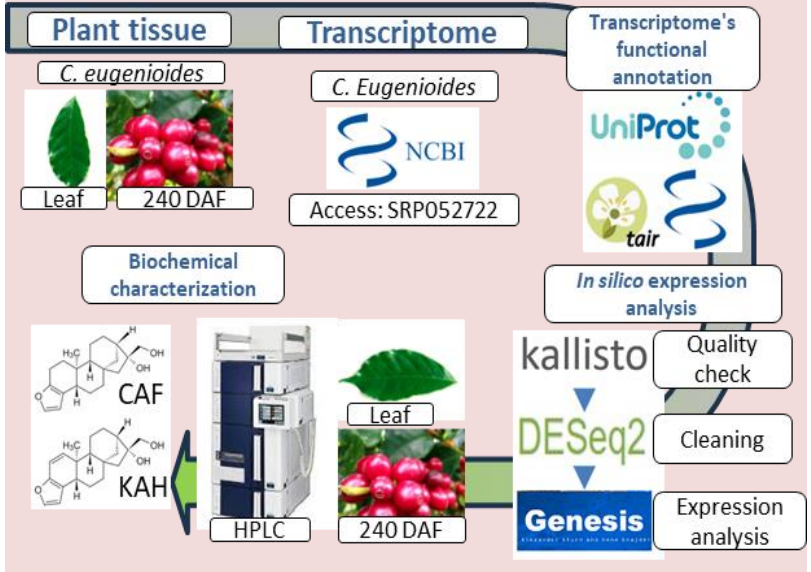
Suzana T. IVAMOTO-SUZUKI, Nícollas G. O. APRÍGIO, Gustavo O. ZAMBRANA, Danilo R. de BRITO, Luiz F. P. PEREIRA (filipe.pereira@embrapa.br)

Introduction: Diterpene lipids, such as cafestol (CAF) and kahweol (KAH), play a pivotal role in flavor characteristics of coffee beans. The genes related to their biosynthesis in coffee plants are still unknown. This study aimed to identify and analyze the enzymes involved in the production of these lipids, as well as to characterize the biochemical profiles of CAF and KAH in leaves and fruits of *Coffea eugenioides*.

Materials/Methods



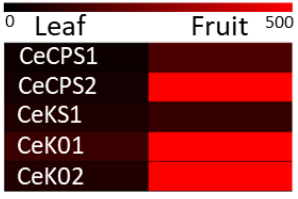


Figure 1: Heatmap of expression of genes related to diTPS biosynthesis in *C. eugenioides.*

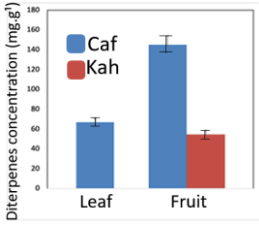


Figure 2: Biochemical quantification of Cafestol and Kahweol in *C. eugenioides.*

Results/Discussion:

Five diTPS were identified and were selected for expression analysis (Fig. 1). The transcriptional activity were higher in fruits than in leaves. Furthermore, the quantification of diterpenes indicated the presence of KAH only in fruits, while CAF was observed in leaves and fruits (Fig. 2).

Conclusion/Perspectives: Our hypothesis is that the diterpene concentration for each tissue is probably modulated by the expression of these diTPS genes. The results of this study can be used to guide coffee genetic breeding programs, focusing in plants that produce desirable levels of CAF and/or KAH.

References:
1. Ivamoto et al. (2017). Plant Physiology and Biochemistry, 111, 340-347.
2. Yuyama et al. (2016). Molecular Genetics and Genomics, 291, 323-336.