# Exploring the role of sugars in the Kawisari coffee resistance to *Hemileia vastatrix*

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## Introduction

In plant-pathogen interactions, sugars could exert positive or negative roles in plant defence. This is of particular importance in biotrophic interactions, such as coffee-*H. vastatrix* once plants attempt to restrict pathogen access to resources such as sugars and sugar derivatives. RNAseq data from Kawisari leaves (resistance and susceptible) showed modulation of carbon metabolism as well as sugar transporter (ERDL6 like gene) along the infection process.

## Materials/Methods

Kawisari hybrid (*C. arabica* x *C. liberica)*, was inoculated with urediniospores of *H. vastatrix* race II and race XIII in order to have a resistance (R) and susceptible (S) reaction, respectively. The infection process was monitored by light microscopy. Invertases enzymatic activities were evaluated by spectrophotometry and gene expression characterization by RT-qPCR.

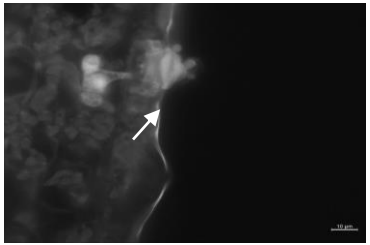

**Figure 1**: Light microscopy, blue light epifluorescence test. Hypersensitive-like cell death of stomatal cells. Resistance, 4dai.

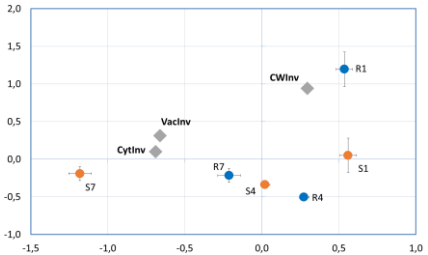


**Figure 2:** PCA of CW, Vac and Cyt invertase activities of R and S samples, at 1, 4 and 7 d.a.i.

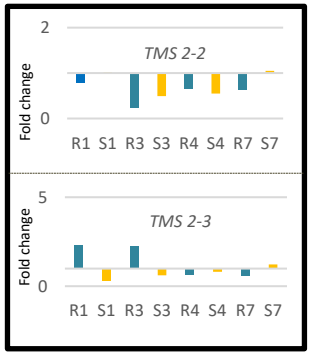


**Figure 3:** Expression profiles of TMS-2 gene isoform 2 and 3, of R and S samples, at 1, 4 and 7 d.a.i.

## Results/Discussion

The resistance was characterized by the restriction of fungal growth (post-haustorial resistance) associated with the hypersensitive response (Fig 1), accumulation of phenolic-like compounds in host cells and, haustoria encasement with callose. The PCA analyses showed the separation of cell wall (CWInv) from vacuolar (Vac) and cytoplasmatic (Cyt) invertase enzymatic activities. The split of samples per timepoint was also revealed (Fig 2). Our RT-qPCR results showed a gene differential expression between monosaccharide-sensing protein 2-like from tonoplast (TMS) isoforms (Fig 3). The upregulation of ERDL6 like gene could be directly related with sugar transport from vacuole or could regulate the activity of the TMS.

## Conclusion/Perspectives

Functional characterization of sugar transporters (using a heterologous system) and its subcellular localization in coffee leaf cells is under study. These results will shed light on the role of sugar metabolism in coffee-*H. vastatrix* interactions.