

A new desiccation-related protein identified by proteomics in the phylloplane of *Theobroma cacao*

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Currently, 20 millions of people from producing countries, such as Brazil, depend directly on cacao (*Theobroma cacao* L.) for their survival. The witches' broom disease caused by the fungus *Moniliophthora perniciosa* had drastic consequences on the socio-economic and environmental development of the affected regions, such as the Bahia State. The disease begins with the germination of the basidiospores on the leaf surface (or phylloplane), followed by the penetration of the germination tube into the intercellular space and the colonization of the plant tissues by the mycelium (biotrophic phase). It has been suggested that the phylloplane is one of the first battlefield of the host and pathogen, and the first interface between plant and environment. Here, we identify by SDS-PAGE/MS/MS, the cacao phylloplane proteins, using two different cacao varieties, one susceptible (Catongo) and one resistant (CCN51) to *M. perniciosa*. One of our objectives was to quantify the small glandular trichomes (SGTs) in relation with the plant resistance/susceptibility to *M. perniciosa*. Six hundred resistant cacao leaves were collected and washed in distilled water for 30 seconds. Proteins were extracted from filtered and dried washing, and analyzed on SDS-PAGE. The bands were excised from the gel, subjected to reduction/alkylation and tryptic digestion, and then the peptides were analyzed by mass spectrometry on Micromass ESI-Q-ToF Micro (Waters). The more abundant band (25-35 kDa) was sequenced by MS/MS and resulted in eight peptides, corresponding to a new basic protein of 310 amino acids, with a molecular mass of 33.7 kDa and a theoretical pI of 10.25. This protein contains a probable signal peptide cleavage site between the amino acids 24 and 25. The amino acid sequence revealed similarity to a protein related to desiccation tolerance characterized in pollen-grain of *Medicago*. Histology was performed on CCN51 and Catongo leaves, to obtain the rate of occurrence of SGTs. CCN51 and Catongo presented an average of 1500 and 700 SGTs/cm², respectively. The role of the proteins involved in tolerance to desiccation or present in the phylloplane of *T. cacao* are discussed.

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