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*Fusarium tucumaniae* infection differentially affects the primary metabolism of soybean cultivars

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Sudden-death syndrome (SDS) of soybean can be caused by different *Fusarium* species, with *Fusarium tucumaniae* being the primary etiological agent in Argentina. In order to identify early specific responses of soybean leaves to *F. tucumaniae* infection, a metabolic profiling approach was used. The experimental design involved the use of a single strain of *F. tucumaniae*, two soybean cultivars (CV) with contrasting levels of resistance to SDS, and sampling at different stages of plant pathogenesis (7, 10, 14 and 25 d). Uninoculated controls were included for both genotypes. All plants were cultivated in parallel under equal growth conditions. Metabolic profiling was performed on two biological replicates; each consisted of a pot with 4–5 plants. We detected 50 metabolites including amino acids, organic acids, soluble sugars, alcohols, fatty acids, a miscellaneous group, seven unidentified analytes and three unidentified sugars. All data were subjected to statistical analysis. A two-factorial analysis of variance showed significant differences ( $p \leq 0.05$ ) in the accumulation of some metabolites. Then, a multivariate non-parametric statistical analysis was performed. Results of the principal component (PC) analysis showed that the first two PCs (PC1 and PC2) explained 69.84%, 73.94% or 64.50% of the metabolic profile variance of the susceptible, partially resistant or both CVs, respectively. Variables associated with PC1 were mainly amino acids or sugars for the susceptible or partially resistant CV. The plane defined by PC1 and PC2 showed that the metabolic profiles of leaves harvested at 14 and 25 dpi from the inoculated susceptible genotype were clearly differentiated from those of uninfected plants. Data from samples of infected and uninfected partially resistant plants harvested at each time point grouped together. Similar results were obtained when hierarchical cluster analysis with squared Euclidean distance was applied.