

HILIC MS metabolic fingerprint changes in Jasmine and Bianca vine leaves induced by downy mildew

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Contribution

Downy mildew is a significant limitation for grape production in the absence of chemical protection of vineyards. To reduce sprayings, the selection of resistant varieties can be an alternative. Anyway, the mechanisms underlying the resistant phenotypes are for now poorly understood. Naturally, plants have to live with a multitude of stress conditions and the biosynthesis of protective chemicals is one of the major strategies. Vine resistance is a result of multiple mechanisms, such as the regulation of processes associated with primary metabolism [1]. The role of primary metabolism during plant-pathogen interactions is to support cellular energy requirements for plant defense responses [2].

The aim of this project was to develop a mass spectrometry based untargeted method able to analyze polar primary metabolite fingerprint but also some secondary metabolites by using hydrophilic interaction liquid chromatography (HILIC) coupled to a QToF MS instrument. This method was applied to study the metabolic changes in vine leaves of two resistant varieties, Jasmine and Bianca, induced by the infection with downy mildew in the first 96 hours after pathogen inoculation (with sampling at time 0, 12, 24, 48 and 96 hours).

The method was able to measure the behavior of a big number of known polar primary and secondary metabolites (including sugars, amino acids, organic acids, phenolics, etc) and different unknowns. The results pointed out various tentative marker metabolites of the plant defense mechanism.

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Reference

1. Rojas, C.M.; Senthil-Kumar, M.; Tzin, V.; Mysore, K.S. *Front. Plant Sci.* 5 (2014).
2. Bolton, M.D. *Mol. Plant. Microbe Interact.* 22 (2009) 487–497.