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METABOLIC CHARACTERIZATION OF *IN VITRO* GRAPEVINE PLANTS OVEREXPRESSING THE ETHYLENE RESPONSIVE FACTOR *VvERF045*

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Among other hormones, also ethylene seems to play a role in the ripening process of the grape berry. The Ethylene Responsive Factors (ERFs) belong to a large family of transcription factors transducing the ethylene signal in the regulation of the transcription of several target genes and as for other species, the grapevine genome contains more than hundred ERFs. Among them we have selected *VvERF045* as a putative regulator during berry ripening, because of its berry specific expression which peaks after véraison time. To characterize the function of *VvERF045* we have overexpressed this gene in the *Vitis vinifera* cv'Brachetto' by *Agrobacterium*-mediated transformation. Five positive transgenic lines have been obtained, maintained by *in vitro* culturing and further phenotyped at the metabolic level. The emission of Volatile Organic Compounds (VOCs) has been monitored by PTR-TOF-MS, a non-destructive mass spectrometry technique capable of measuring a wide spectrum of volatile molecules in real time. Phenolic profile was determined by UPLC chromatography after methanol extraction from powdered leaves, while chlorophylls and carotenoids were measured via spectrophotometer after acetone extraction.

These analyses have shown significant differences in VOCs emission and in the content of other secondary metabolites, among transgenic lines and in comparison to the wild type plants. Although at different extent, the *VvERF045* overexpressing lines, showed significant higher methanol, jasmonic acid (JA), salicylic acid (SA) and sesquiterpens production on one side, and lower chlorophyll a, b and total carotenoids on the other side. These results mimic the activation of a systemic acquired resistance (SAR) response in these transgenic plants.