In vitro monitoring of *Artemisia* culture through a non-invasive phenotyping system based on VOCs tracking.

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Keywords: volatile organic compounds, phenotyping, high-throughput, *Artemisa afra*

Secondary metabolites such as volatile organic compounds (VOCs) can be emitted by plants constitutively, with differentiation among and within species, or after *de novo* synthesis induced by different stresses. VOC emissions could therefore represent an innovative tool as non-invasive marker of abiotic stress and, in particular to monitor phenotypic dynamics.[1] We have compared the blend of volatiles emitted by several accessions of 21-day old *Artemisia afra* plantlets thanks to a laboratory, high-throughput and homemade glass chambers system.[2] *A. afra* is one of the most widely used herbs in traditional medicines in the Asian and African region especially and, has attracted worldwide attention for its possible use in modern diseases in developed countries. The plantlets were propagated *in vitro* using axillary branching and cultivated under sterile and controlled conditions in a growth chamber equipped with new technology of LED lighting. The VOCs were trapped during 24 hours on Tenax® TA absorbent cartridges with a dynamic headspace sampling method and, were analysed using a thermal desorption unit and using gas chromatography-mass spectrometry (TD-GC/MS). Finally, the VOC detection was performed using a quadrupole-type mass spectrometer (Agilent Technologies). We found very interesting results showing qualitative differences in VOC profiles among the several accessions of *A. Afra*. Monoterpenoids, sesquiterpenes and artemisia ketone were the major components analysed from chromatograms. In conclusion, this non-invasive system has a wide potential to detect small amounts of emitted VOCs with variation between plant origins and can serve to monitor plant fitness under both biotic and abiotic stress. Moreover, the volatiles profiling could be also interesting in agricultural research related to other vegetable crops.

[1] doi:10.1093/jxb/erv219.
[2] doi:10.1002/pca.2750.