

Artemisia annua L. leaves and flowers biomarkers mapping by DESI Imaging

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Purpose of study: Mass spectrometry imaging (MSI) has become an emerging area in the biological sciences. This technique is based on desorption and ionization of analytes from the surface followed by mass analysis of the resulting gas phase ions. The spatial distribution of chemical constituents of a sample and information about the relative intensities of the ions allow the creation of detailed 2D images specific to particular compounds.¹ MSI was applied to biomarkers mapping of *Artemisia annua* L. leaves and flowers.

Methods: The imprinting technique was performed using heating or solvent extraction on different surfaces (TLC plates, hydrophilic and hydrophobic membranes). Imprinted samples were placed in a lab-built 2D moving stage DESI source and analyzed.² All MS(/MS) experiments were performed using a Thermo Fisher Scientific LTQ mass spectrometer.

Results: Among the methods tested, only imprints produced by assistance by heating and/or heating assistance combined with solvent extraction on TLC plates were effective to transfer the *A. annua* analytes to the surface. The blotting assisted by heating and solvent extraction produced blurred images. The blotting assisted only by heating (Figure 1) produced clear images and allowed to verify the presence of the biomarkers, ions of m/z 305, 289 and 257 corresponding to adducts with sodium ($[M+Na]^+$) of artemisinin, deoxyartemisinin and di-hydroepideoxiartenuin respectively.

Conclusions: The mapping and identification of *Artemisia* biomarkers was performed by DESI Imaging.

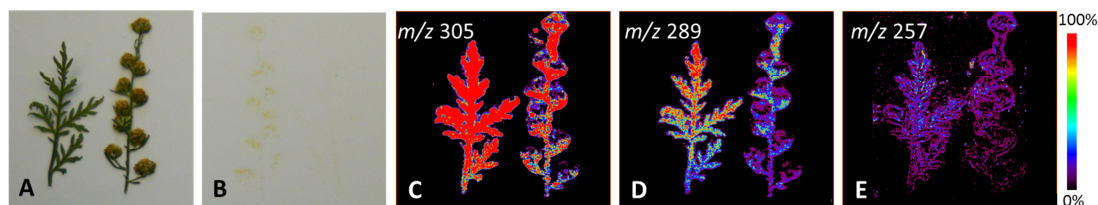


Figure 1: A) Leaves and flowers of *A. annua*. B) Blotting assisted by heating of leaves and flowers on TLC plate. Chemical images showing lactone sesquiterpenes distribution: C) artemisinin (m/z 305), D) deoxyartemisinin (m/z 289) e E) di-hydroepideoxiartenuin (m/z 257).

References:

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2. Cabral, E. C.; Mirabelli, M. F.; Perez, C. J.; Ifa, D. R., Blotting Assisted by Heating and Solvent Extraction for DESI-MS Imaging. *Journal of the American Society for Mass Spectrometry* **2013**, *24* (6), 956-965.