Advion
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The TriVersa NanoMate is the latest in chip-based nano-electrospray ionization technology from Advion. It integrates the benefits of liquid chromatography, mass spectrometry, chip-based infusion, fraction collection, and direct surface analysis into one system. It allows researchers to obtain more information than with LC/MS alone.

Product Note

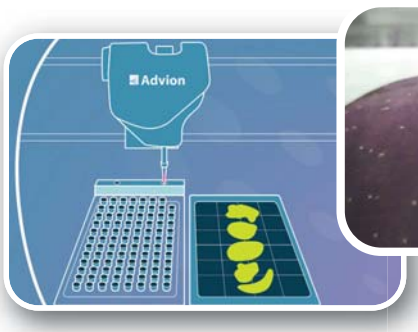
LESA® Analysis for Food Safety

Rapid, no sample preparation analysis with high-sensitivity

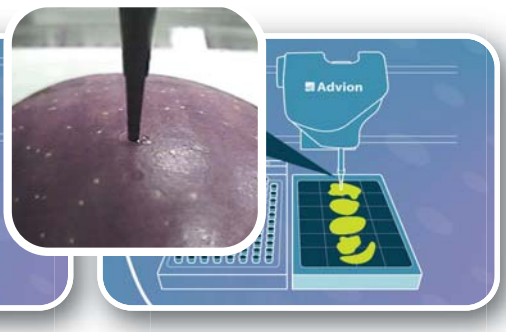
The liquid extraction surface analysis (LESA) capability of the TriVersa NanoMate® coupled with chip-based, infusion nano-electrospray (nanoESI), high-resolution mass spectrometry (HRMS) or tandem mass spectrometry (MS/MS) provides simple, direct, and highly sensitive, qualitative food toxicology screening. LESA has the following benefits when used to detect and potentially identify pesticides and other organic residues on the surface of fruits and vegetables and/or within whole-fruit slurry*:

- Simplicity: No conventional sample preparation (QuEChERS**) or liquid chromotagraphy (LC) required
- Speed: Qualitative screening at <2 min/sample with no chromotagraphic separation necessary; preliminary screening for traditional, quantitative and confirmatory methods
- Structural Information: Qualitative determination of pesticides and toxicants
- High-sensitivity: Analytes can be detected in the 100 ppb range. 20-fold below generally allowed EPA tolerance levels using MS/MS or HRMS
- Selectivity: Detection of unknown or unexpected chemical residues by HRMS or MS/MS aided by modern data-mining software

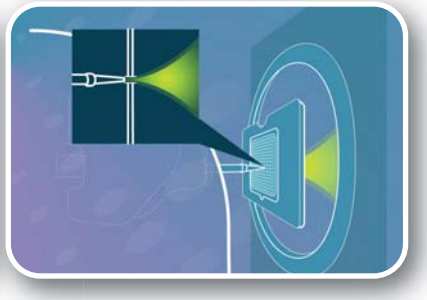
How LESA Works



The TriVersa NanoMate picks up a pipette tip from the tip rack, then aspirates extraction solvent from the reservoir.



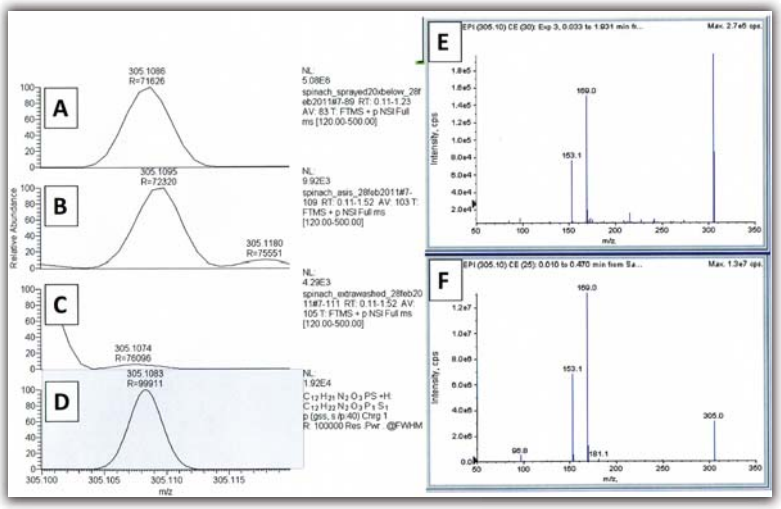
The robot brings the extraction solvent into contact with the surface of the sample. The analytes are extracted from the surface. (Example shown is apple skin.)



The extracted analytes are delivered to one of 400 nozzles on a nanoESI chip for analysis via chip-based infusion/MS.

Product Note

LESA HRMS and CID Determination of Diazinon from a Sprayed Spinach Leaf



(A) HRMS of the protonated molecule region at m/z 305 for diazinon extracted from the spinach leaf surface.

(B) The same m/z region acquired from a surface area of a different spinach leaf purchased from a local supermarket food store and analyzed as received.

(C) LESA-HRMS of a leaf following rinsing the leaf under hot, running tap water.

(D) Theoretical high resolution mass simulation for the protonated molecule of diazinon at m/z 305.1083.

(E) LESA MS/MS analysis of the protonated molecule of diazinon at m/z 305 from a spinach leaf (artificially sprayed with 20-fold below tolerance level) with a collision energy of 30 eV to produce a full scan CID mass spectrum from m/z 305 to 55.

(F) Full scan CID mass spectrum of m/z 305 for an authentic standard of 250nM diazinon in 80:20 methanol/water + 0.1 vol% formic acid at same MS/MS conditions.

- LESA-HRMS shows trace amounts of diazinon present on spinach bought from a supermarket can be washed off with hot tap water.
- LESA-MS/MS detects diazinon at 20-fold below tolerance level on artificially sprayed spinach.

Peer-reviewed Publications

*Liquid extraction surface analysis (LESA) of food surfaces employing chip-based nano-electrospray mass spectrometry
Eikel, D.; Henion, J.; Rapid Commun. Mass Spectrom. 2011 Aug30, 25(16):2345-54.

**Fast and easy multiresidue method employing acetonitrile extraction/partitioning and "dispersive solid-phase extraction" for the determination of pesticide residues in produce
Anastassiades, M.; Lehotay, S. J.; Stajnbaher, D.; Schenck, F.J.
J AOAC Int. 2003 Mar-Apr;86(2):412-31.

Fully automated liquid extraction-based surface sampling and ionization using a chip-based robotic nanoelectrospray platform
Kertesz, V.; Van Berkel, G.J.; J Mass Spectrom. 2010 Mar;45(3):252-60.

Acknowledgements

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