

SSX

SUPER SESI - X



Secondary Electro-Spray Ionization
Biologically relevant metabolites in vapors and nano-aerosols

 FOSSILIONTECH



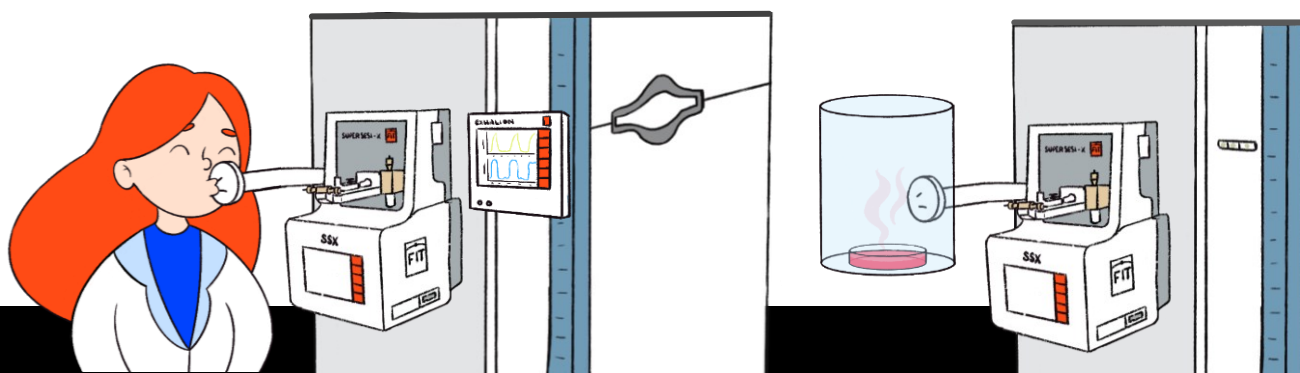
Biologically relevant vapor and nano-aerosol detection in real time

SSX ionizes vapors and nano-aerosols for MS analysis and **Biologically relevant metabolites** with very low vapor pressure

- High ionization efficiency
- Extremely soft ionization
- Atmospheric pressure operation
- Seamless sample flow introduction
- Compatible with Thermo Exploris™, Tribrid™ and TSQ™ MS series
- Real-time detection
- Molecular masses up to 600 Da

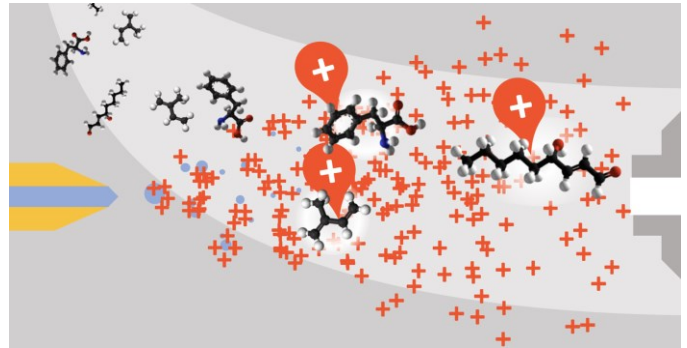
High Quality Data for:

- Breath analysis
- Food and aroma
- Headspace analysis
- Cell culture volatilomics
- Bioreactor volatilomics
- Plant volatilomics
- Trace detection
- Environmental monitoring



Secondary ElectroSpray Ionization (SESI), first principles in simple terms

- A nano-electrospray produces charging agents at high concentration.
- Charge is transferred from protonated clusters to the vapors and nano-aerosols via Charge Transfer Reactions and Field Charging Effects.
- Charged vapors and nano-aerosols are desolvated, transferred into the vacuum side of the MS, and analyzed.



Why SESI is ideal for large vapor molecules?

1- The advantages of ionizing at atmospheric pressure:

- **Turbulent losses** and **condensation losses** due to adiabatic cooling, which are typical of ionization systems operating at low pressure, **are eliminated** because the vapor inlet flow path is laminar, with very low pressure drop.
- The **velocity of the charge transfer reaction is much faster**. It scales with the concentration of the vapors and the charging ions, which go with the pressure in the ionizer. At room pressure (10³mBar), the velocity of the charge reaction is 10⁶ times higher than at 1 mBar.
- High performance Electrospray-MS systems are optimized to transfer and desolvate heavy ions from atmospheric pressure into their vacuum side. Super SESI X is designed to seamlessly substitute regular ESI ion sources and to **harness the power of advanced MS**.

2- Why using a nano-spray as a source of primary ions:

Nano-electrospray provides the best performance for ionization of biomolecules, but it comes with a price: stabilizing a water nano-electrospray can be tricky. So why bother?

- **SESI produces very clean spectra** because, there are **no high-energy ions at any point** that could cause fragmentation. This is important for **biomarker discovery**.
- **The ionization efficiency is very high** because the concentration of charging agents near the nano-jet is extremely high. This means **better Limits of Detection**.

Energy level ↑



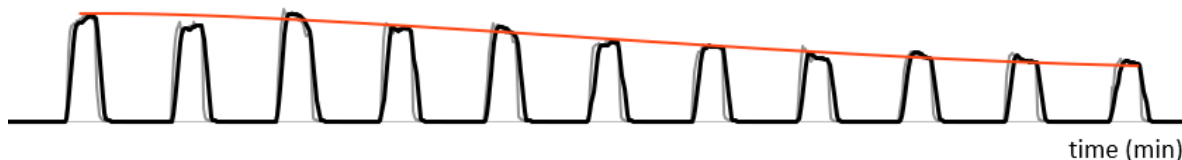
BREATH ANALYSIS

- Breath biomarker Discovery
- Real-time drug metabolism.
- Pharmaco-kinetics.
- Kinetics of inhaled drugs, exposure kinetics.

Breath is analyzed as produced in the lungs

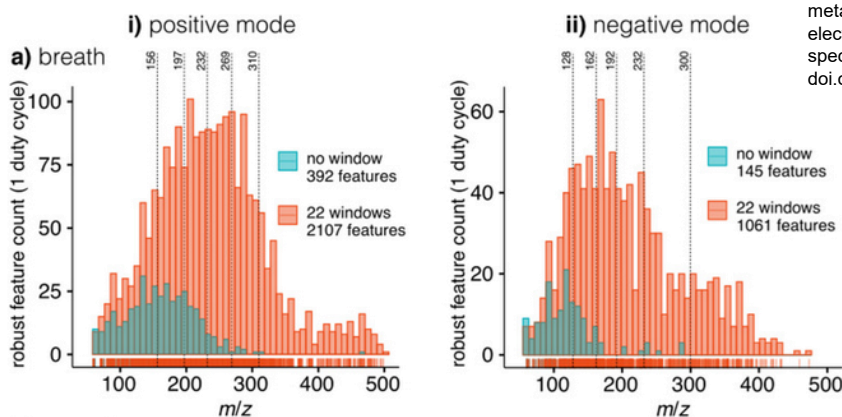
Time evolution of your study, as you go

Sensitivity advantage of direct breath analysis



- No. of **robust features** detected in one exhalation: >2000
- Resolving power: >120.000 (for a SS coupled with a QE-Plus)
- Response time: less than 2 seconds

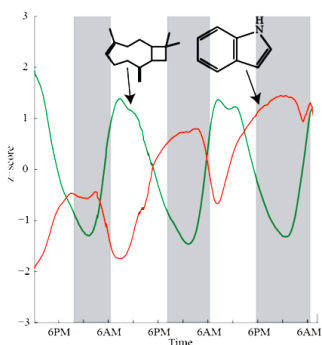
J.Lan, J. Kaeslin, G. Greter, & R. Zenobi; Minimizing ion competition boosts volatile metabolome coverage by secondary electrospray ionization orbitrap mass spectrometry *Analytica Chimica Acta*; doi.org/10.1016/j.aca.2021.338209.



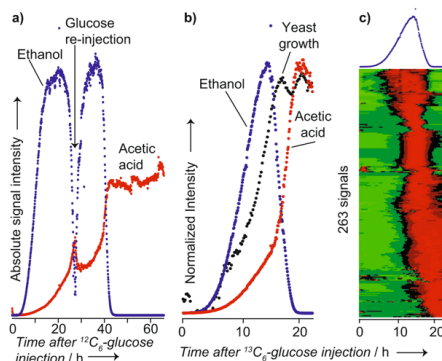
VOLATIL -OMICS

- Cell culture
- Food and aroma
- Plant metabolism
- Headspace & biorreactor analysis

Plant, circadian cycles



Yeast, real-time response to glucose injection



Mice, real-time ketamine pharmacokinetics

