
# LDTD® Ion Source

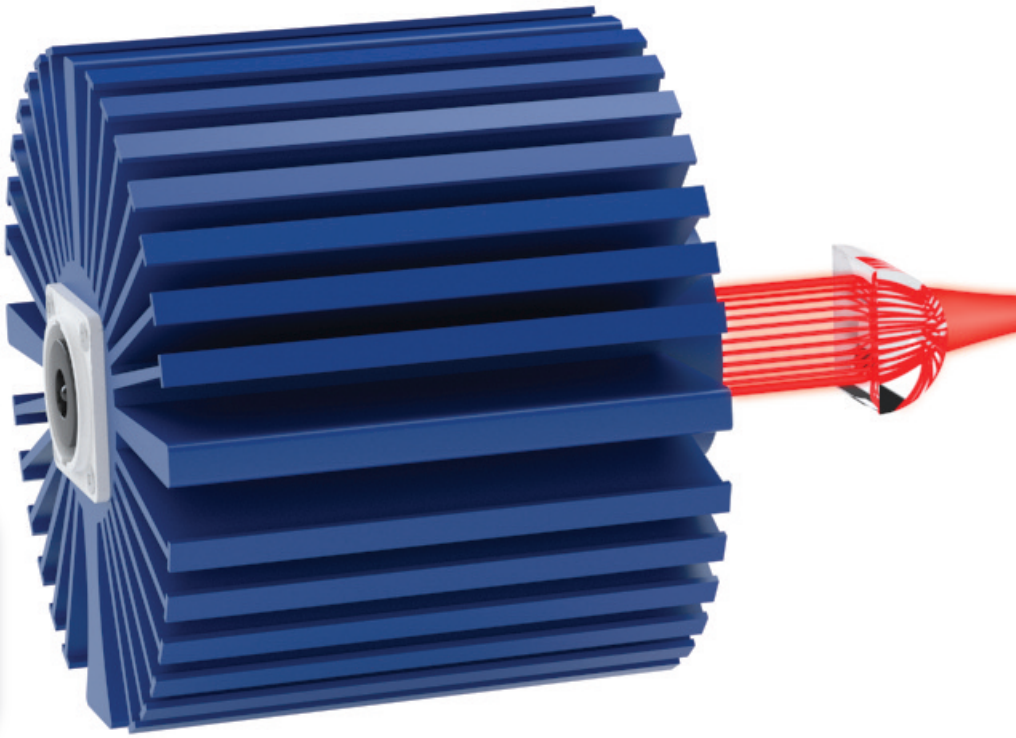
Phytronix

Technology at the speed of light

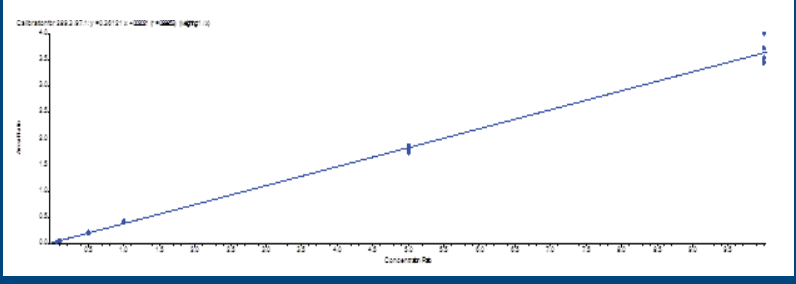
# The Future Starts with the LDTD® Ion Source

## Laser Diode Thermal Desorption (LDTD®)

Couple the Laser Diode Thermal Desorption (LDTD®) Ion Source to your AB SCIEX mass spectrometer and change your analysis time from minutes to seconds! This revolutionary technology makes use of a laser diode to thermally desorb dried sample into gas phase. By transporting the neutral species through Atmospheric Pressure Chemical Ionization (APCI) using compressed air, the LDTD® consequently removes the need for solvent and achieves a very fast efficient sample introduction into a mass spectrometer in mere seconds!



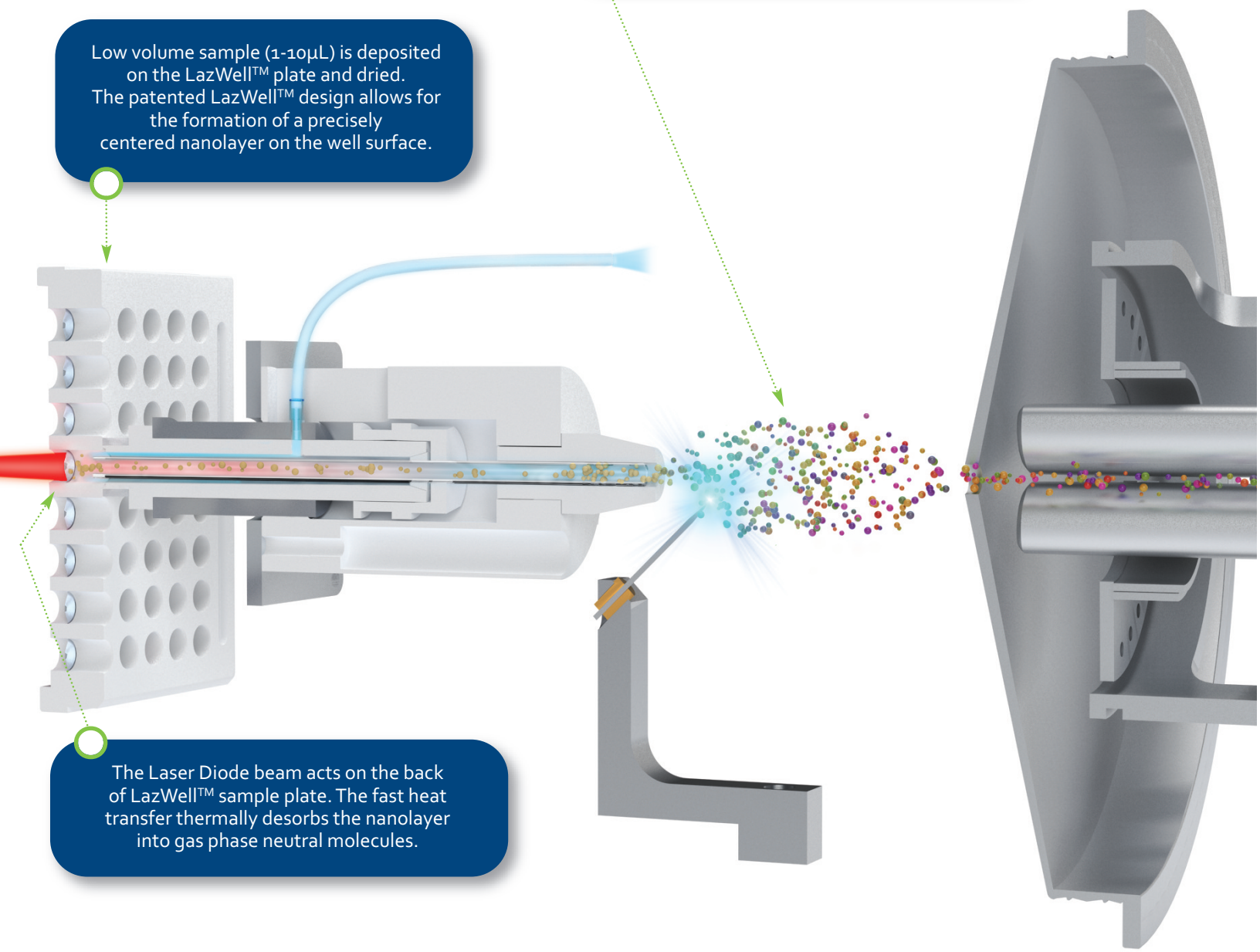
Diode Laser Array provides a controllable continuous infrared beam that is optically focused on the back of the LazWell™ plate without directly interacting with the sample.



Linear dynamic range: Testosterone standard curve extracted from human plasma ranging from 0.1 ng/mL to 10 ng/mL.

A constant stream of air carries the desorbed neutral molecules through a corona discharge region to undergo ionization. The formed ions enter the mass spectrometer for analysis. The entire process takes a few seconds.

Low volume sample (1-10µL) is deposited on the LazWell™ plate and dried. The patented LazWell™ design allows for the formation of a precisely centered nanolayer on the well surface.

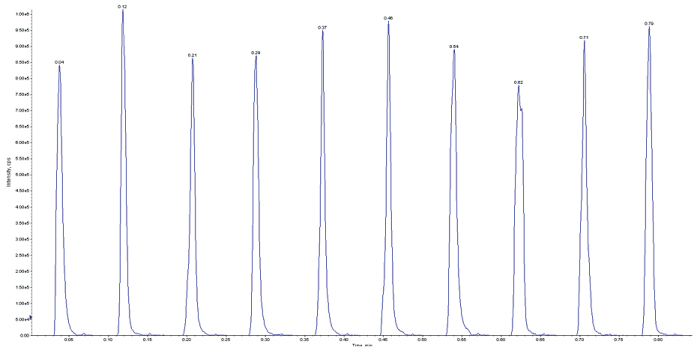


The Laser Diode beam acts on the back of LazWell™ sample plate. The fast heat transfer thermally desorbs the nanolayer into gas phase neutral molecules.

"The high-throughput nature of LDTD/APCI-MS/MS method alleviates the clinical sample analysis and therefore speeds up the clinical trials process."

*Heudi et al., Journal of Pharmaceutical and Biomedical Analysis, 2011 vol. 54, p. 1088-1095.*

# LDTD® Principle of Operation



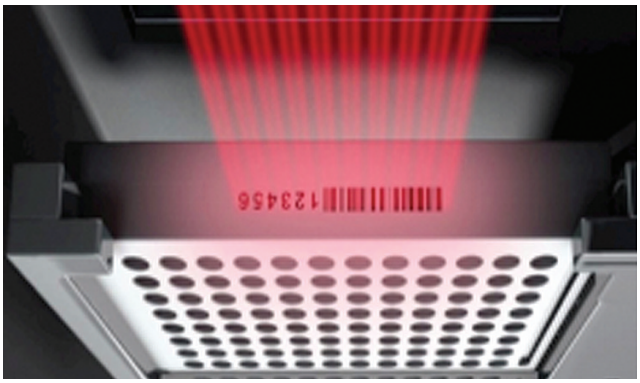
Clomiphene (10 ng/mL) reproducibility (CV 4.7%);
Runtime: 4.8 seconds sample-to-sample

## Easy and Intuitive Operation:

- Designed for Plug and Play installation.
- Change from LDTD® to LC in less than 3 minutes.
- Low maintenance system.
- Requires only compressed air.
- No solvent involved.
- No additional software required.

## LazWell™ Plate:

- 10 LazWell™ plates loading autonomy.
- Barcoded plates for traceability.
- Clean room manufacturing; sealed packaging.



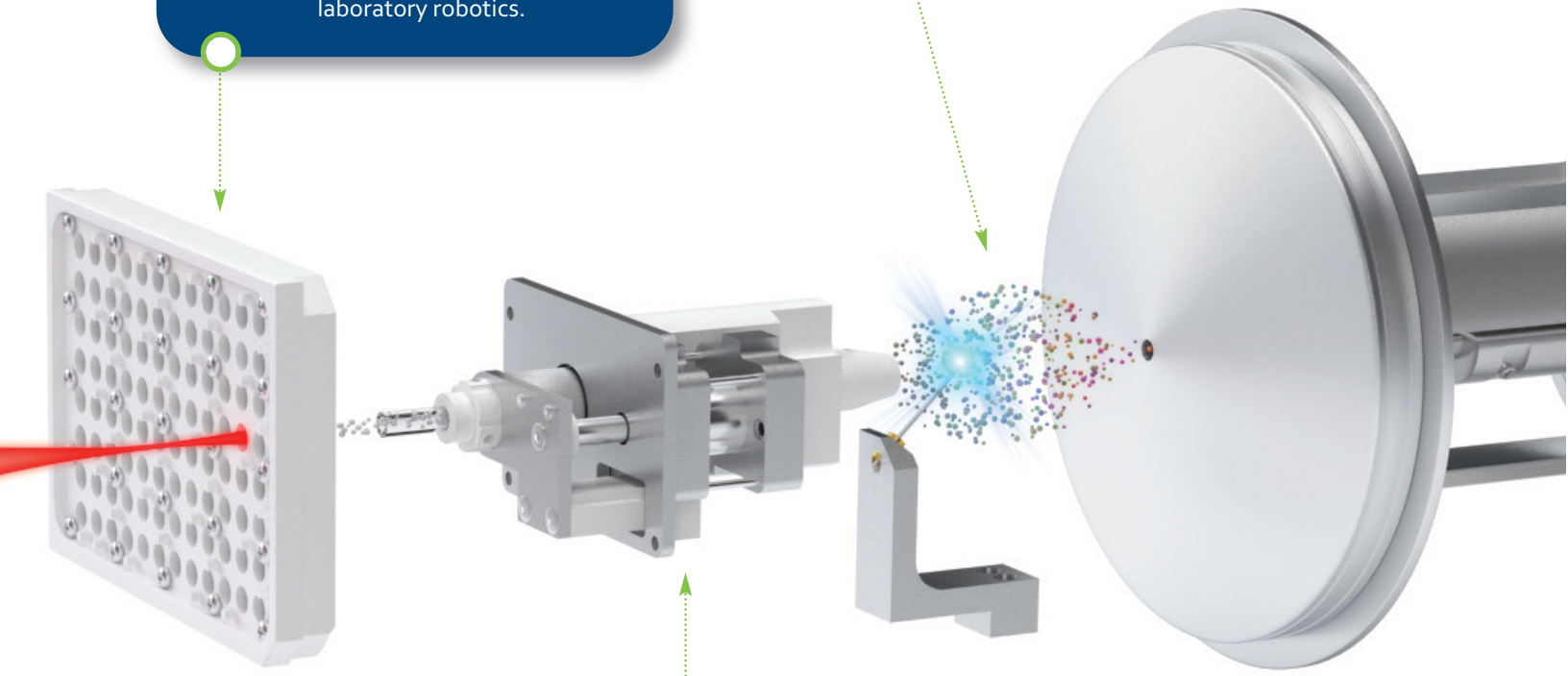


## Ultra-Fast High-Throughput front-end for your AB SCIEX instrument:

- 6 Seconds sample-to-sample analysis.
- Quantitative Analysis.
- 2 different LDTD® models: 96-well or 384-well formats.
- Full integration within Analyst® for quick and easy data processing

A highly efficient Solvent-free Atmospheric Pressure Chemical Ionization (APCI) reaction provides optimal ion production with no ion suppression compared to regular APCI and ESI under optimal sample conditions.

The 96-well or 384-well LazWell™ plates are barcoded for traceability and are compatible with all modern laboratory robotics.



Robust pneumatic design facilitates transfer tube movement to transport the gas phase molecules from the LazWell™ plate and aligns the carrier air flow towards the mass spectrometer inlet.

- High-Throughput Ion Source
- 4 - 6 seconds Sample-to-Sample
- Quantitative Analysis Solution
- No carryover
- High resistance to ionic suppression
- Simplicity: Plug and Play
- Solvent free system
- Barcode reader for Traceability

# LDTD® Integration with AB SCIEX platform

Laser Diode Thermal Desorption (LDTD®) Ion Source integrated with the AB SCIEX instrument platform becomes the ultimate solution for sensitivity and throughput analysis. The LDTD® source combines automated sample introduction and sample-to-sample quantitative MS results in as less as 4 seconds. Replace your LC and install the LDTD® Ion Source within minutes!
It is fully controlled by the Analyst® AAO driver providing a streamlined approach for your analytical workflow and easily adaptable to regulated environments.




**Benefits of Analyst® AAO Driver Integration:**

- Direct control and method optimization in Analyst®
- Prepare methods and run batch analysis as in LC-MS mode
- Peak integration and data processing in Analyst® or MultiQuant™

LDTD® integration in DiscoveryQuant™ workflow will improve efficiency, boost productivity, and allow full automation of the compound optimization and analysis processes.
By combining the LDTD® source with DiscoveryQuant™ software, you can automatically determine optimal ion path parameters for maximum sensitivity while populating a shared central database without any changes to your data analysis workflow or your LIMS software.

# LDTD® - High Resolution - MS/MS

Combine the LDTD® with the AB SCIEX TripleTOF® System and benefit from ultra-fast sample introduction on the industry's fastest and most sensitive high-resolution mass spectrometer for high-performance qualitative and quantitative analysis.


- No need to tune MRM transitions.
- AutoCalibrate feature is available with LDTD® to maintain mass accuracy throughout your analysis.
- AB SCIEX TripleTOF® 5600+ System offers optional addition of SelexION™ technology for separation of isobaric and endogenous compounds.

# Pharmaceutical Applications

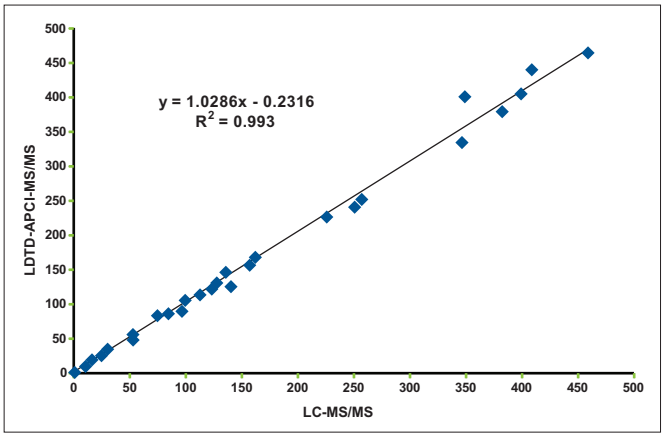
## Providing better analytical solutions for the future

## In Vitro ADME Assays

Perform In Vitro ADME assays with incredible speed and increase result turnaround time using the LDTD® Ion Source:

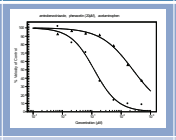
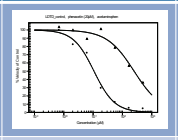
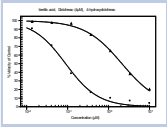
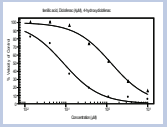
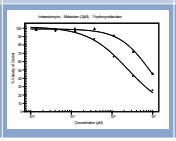
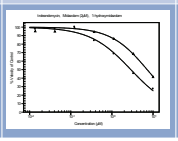
- Quantitative approach to monitor metabolites of specific probe substrates for Drug-Drug Interactions (DDI) and Time Dependent Inhibition (TDI) assays.
- Measure sets of chemically diverse compounds and run high-throughput screening for your Microsomal and Plasma Stability assays.

- CYP Inhibition Assays
- Permeability Assays
- Microsomal and Plasma Stability
- Plasma Protein Binding / Brain Binding
- Pharmacokinetic Studies
- Dried Blood Spot Analysis




Correlation between LDTD-MS/MS and LC-MS/MS measuring concentration of a new drug candidate (n=30) in clinical plasma samples. LDTD-MS/MS runtime of 9 seconds compared to 7 minute LC-MS/MS runtime.

*Heudi et al. Journal of Pharmaceutical and Biomedical Analysis, 2011, Vol. 54, p.1088-1095*

| Probe | LC-MS/MS 4000 | LDTD-TripleTOF® | IC50 (SE) / Shift |
|---|---|---|---|
| Phenacetin |  |  | LC-MS/MS<br>12.1 (1.63) / 20.7<br><br>LDTD<br>10.7 (1.20) / 23.3 |
| Diclophenac |  |  | LC-MS/MS<br>0.089 (0.02) / 23.7<br><br>LDTD<br>0.0876 (0.01) / 17.5 |
| Midazolam |  |  | LC-MS/MS<br>2.43 (0.30) / 3.48<br><br>LDTD<br>2.89 (0.27) / 2.49 |

IC50 Shift Assay using different probes on LC -MS/MS AB SCIEX 4000 compared to LDTD®-TOF on AB SCIEX 5600 TripleTOF®. LDTD runtime of 8 seconds compared to LC runtime of 3 minutes.

*ASMS 2012 Oral Presentation Session, Vancouver, Canada. J. Laycock, Amgen Inc, Evaluation of Laser Diode Thermal Desorption MS for High Throughput ADME Quantitation*

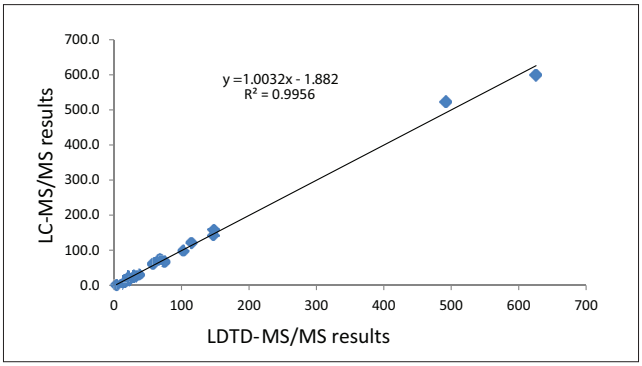
## In Vivo Applications

- Obtain accurate, precise and reproducible pharmacokinetic data from in vivo samples at unprecedented analysis speed using the LDTD® Ion Source.
- Benefit from the LDTD®-AB SCIEX TripleTOF® System combination to easily quantitate with high-resolution fullscan and accurate mass so you won't miss any circulating metabolites!
- Use LDTD® with High-Resolution AB SCIEX TripleTOF® System and accelerate the Drug Discovery process by eliminating the MRM optimization step.
- LDTD® integration with Analyst® AAO driver maintains validated process for data handling and can easily be adapted to regulated workflows.
- Use the LDTD® with AB SCIEX DiscoveryQuant™ software to streamline your compound optimization and data analysis in a few easy steps with no change to your existing workflow.

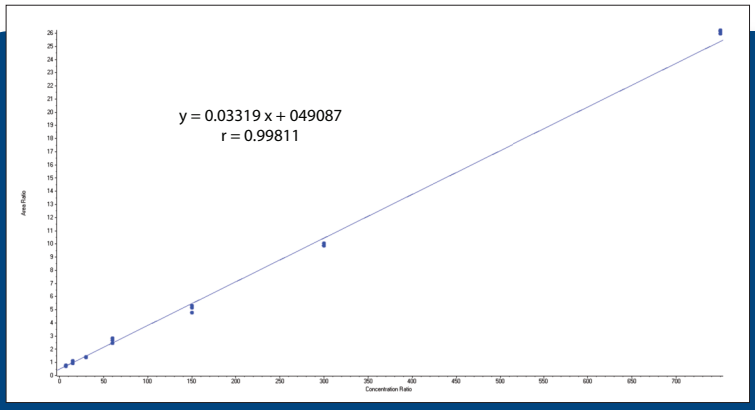
# Toxicology and Clinical Applications

## Quantitative - Drug Confirmation

Drugs of abuse analysis in different matrices has evolved with the arrival of the LDTD® Ion Source. Drug testing in urine, plasma, whole blood and even saliva are achieved using the LDTD® ionization source with up to 50X faster turnaround time compared to established LC-MS techniques. Ultra-fast quantitative results will allow your laboratory to increase analytical capacity and noticeably reduce your result turnaround time.



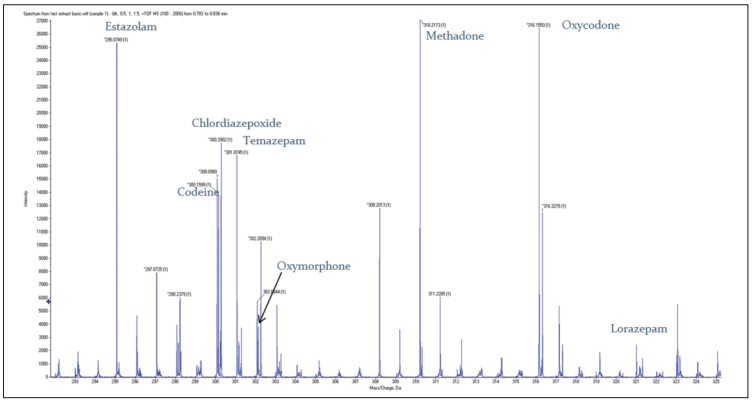

Correlation between LC-MS/MS vs LDTD-MS/MS for 11-Nor-9 Carboxy-THC (THCC) in real patient urine samples with a runtime of 2.3 min using LC and 9 seconds on LDTD®.




Standard Curve for 11-Nor-9-Carboxy-THC (THCC) in urine sample on LDTD®.

**From Toxicology to Forensic Analysis:**

- Cannabinoids (Natural and Synthetic)
- Street Drugs
- Pain Management Drugs
- Immunosuppressant Drugs
- And Much More...




High-Resolution fullscan quantitative sample acquisition of 34 various Drugs of Abuse spiked in a single urine specimen. Analysis runtime: 10 seconds.

## Drug Screening

Take advantage of the shotgun sample introduction approach of the LDTD® Ion source and combine it with a AB SCIEX TripleTOF® High Resolution MS for a powerful screening solution that will increase sample throughput and bring additional value to your laboratory.

Obtain a full data scan in mere seconds and use automated Information Dependent Acquisition (IDA) to trigger events such as MRM quantitative analysis of a positive drug sample for full confirmation in seconds.

## Food Analysis

Quality control and health issues are an important aspect of our society, this is why easy, reliable and fast analysis methods for testing food safety should be made readily available to private and government facilities. However, even advanced food testing laboratories can come across various challenges: complex food matrices and difficult ionizable compounds can become hurdles in the analytical process.

The robustness of the LDTD® and its speed are ready for this kind of challenge in allowing, for example, the analysis of antibiotic residues in dairy milk and honey without extensive sample preparation.

## Environmental Analysis

The LDTD® Ion Source is the best high-throughput solution for quantitative or qualitative screening analysis of environmental contaminants. Whether your application requires the quantitation of pesticides, pharmaceuticals, steroidal hormones in waste water or trace analysis of explosives in soil samples, the LDTD® can accurately and rapidly deliver results in seconds.

Even with challenging matrices, the LDTD® Ion Source will achieve ultrafast analysis of large datasets, thereby reducing the analytical bottleneck and increasing sample throughput.

## Evaluate the LDTD Today!

**The best way to discover the benefits of the LDTD® Ion Source is to contact Phytronix and let us conduct a personalized evaluation with your application(s) in mind:**

### → Step 1

Submit your samples at one of our worldwide demo-labs and we will perform a test analysis on the LDTD® platform. A detailed evaluation report of your samples will demonstrate how you can drastically increase your analysis throughput. Both 96-well and 384-well plate models are available for demo.

We also invite you to join us at any of our Demo Labs and let us demonstrate the incredible level of high-throughput analysis achieved by the LDTD® right in front of your eyes!

### → Step 2

We will ship a LDTD® to your site for an Onsite evaluation. A Phytronix demo specialist will be dispatched to your site for a duration of up to one (1) week to perform the system installation, provide LDTD® training, and assist you with developing methods for fast implementation and scale up for higher throughput. Following this initial week, the LDTD® ion source will be on consignment for up to three (3) weeks for evaluation at no charge.

# Discover the power of the LDTD®-SelexION™:

## Enhanced selectivity combined with ultra-fast analysis for even the most challenging compounds!

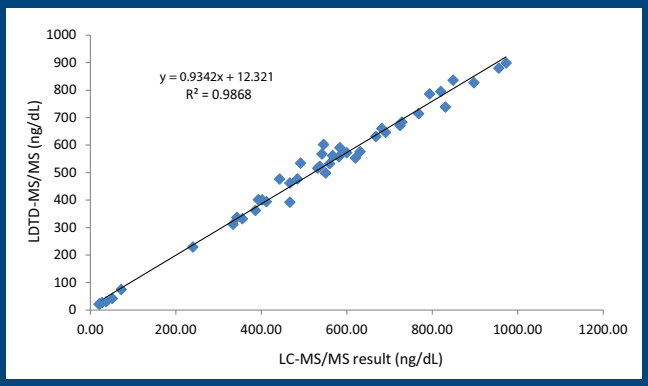
The combination of two advanced technologies, the LDTD® Ion Source and SelexION™, is revolutionizing MS analysis by enhancing selectivity and improving data quality for challenging samples that require advanced analytical separations, all the while maintaining high-throughput capability.

Our two new analytical methods are providing advanced possibilities for clinical analysis:

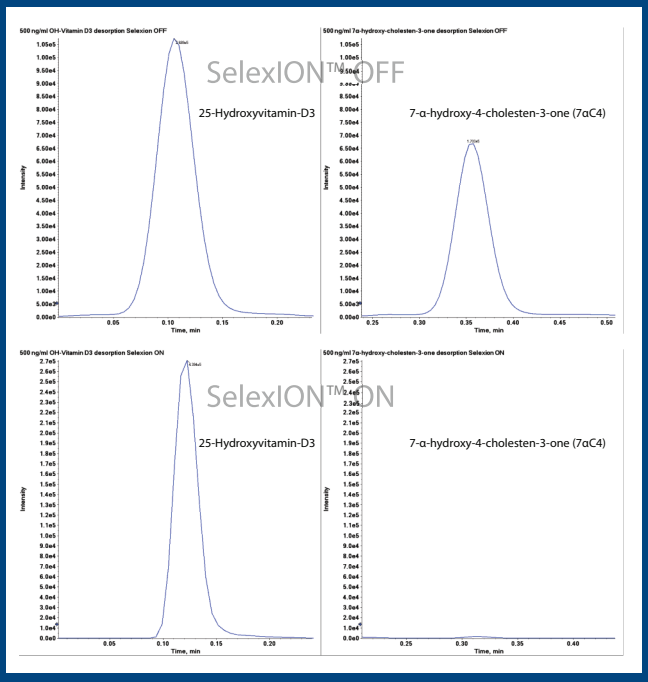
**Vitamin D Metabolites**
Selective method for the quantitation of 25 Hydroxy-vitamin-D2 and 25-Hydroxyvitamin-D3 analysis at **9 seconds** sample-to-sample using LDTD-SelexION™ on AB SCIEX platform.

**Testosterone**
A validated method for the quantitation of Testosterone with a runtime of **8 seconds** sample-to-sample providing excellent selectivity, sensitivity and reproducibility.

**Contact us to find out more!**


Cross-validation between LC-MS/MS vs LDTD-MS/MS of Testosterone in 45 Real Life Patient samples.




Enhanced selectivity using SelexION™ allows the separation of known isobaric molecule 7-α-hydroxy-4-cholesten-3-one (7αC4) from 25-hydroxyvitamin-D3 (25OHD3).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