



Agilent 6400 Series Triple Quadrupole LC/MS Systems

**SUPERIOR SENSITIVITY  
WITH EASY UPGRADEABILITY**

The Measure of Confidence



**Agilent Technologies**

## THE AGILENT 6400 SERIES TRIPLE QUADRUPOLE SYSTEMS – AN UPGRADEABLE PATH TO HIGH SENSITIVITY

Choose an Agilent 6420, 6430, 6460, or 6490 Triple Quadrupole LC/MS System to achieve unmatched productivity, performance, and value for all your quantitative analysis needs.

### Agilent 6400 Series Triple Quadrupole Systems

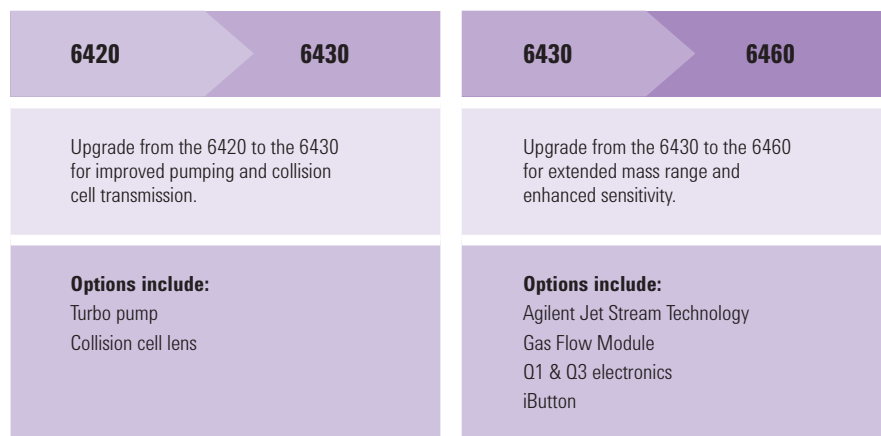
### Highlights

<b>6420</b>	Economical and easy to use; with Agilent 1260 Infinity LC system, this option is a perfect workhorse instrument for laboratories requiring standard quantitative capabilities.
<b>6430</b>	Offers improved sensitivity to yield more precise quantitation for most assays.
<b>6460</b>	Adds Agilent Jet Stream Technology to dramatically increase sensitivity for a wide range of demanding quantitative applications.
<b>6490</b>	Includes novel iFunnel technology for ultra trace quantitation to address your most demanding quantitative applications.

### Future proof your tandem LC/MS investment with unique upgrade options

Maximize your return while protecting your investment. As performance demands on your laboratory increase, you can stay ahead of the curve by upgrading your Agilent Triple Quadrupole LC/MS Systems, rather than replacing them.

Enter the world of triple quadrupole analysis with the affordable and easy-to-use 6420. Upgrade to the 6430 for enhanced sensitivity, and then add Agilent Jet Stream Technology to achieve the higher performance of the 6460.



## Innovative mass spectrometry technology delivers superior performance

Agilent 6400 Series Triple Quadrupoles are designed and constructed using the latest electronics and hardware manufacturing techniques. This state-of-the-art technology includes orthogonal ionization technology, a hyperbolic quadrupole design, a high-pressure hexapole collision cell with linear acceleration, and an off-axis high energy dynode detector. When integrated with the Autotune algorithm, MassHunter software, and processing tools, this technology delivers the highest quantitative performance available.



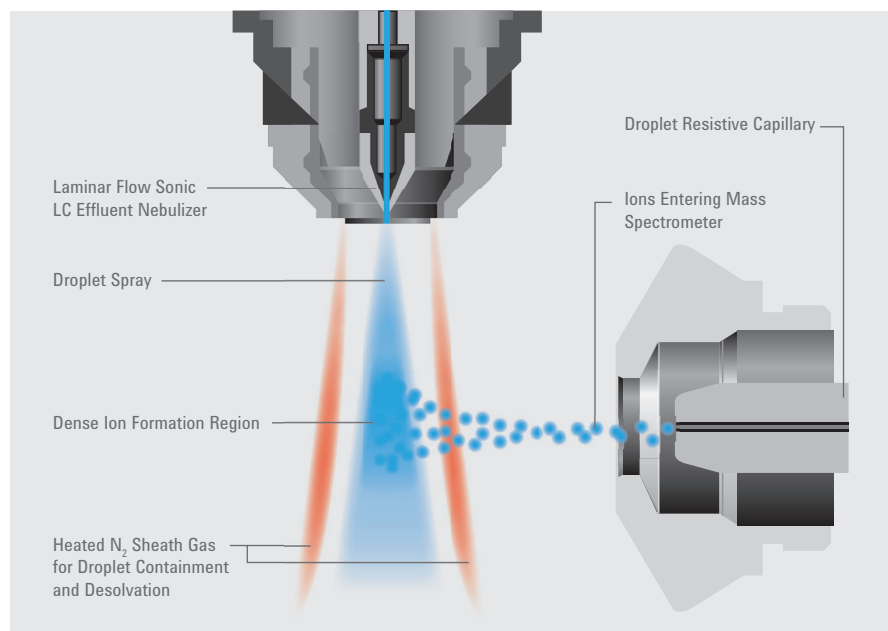
**Hyperbolic quadrupole** for unrivaled ion transmission and spectral resolution.

**Proven orthogonal ionization sources** include Agilent Jet Stream Technology which delivers the highest sensitivity and robustness for all sample matrices.

**High-pressure hexapole collision cell** with linear acceleration for optimized MS/MS fragmentation without cross-talk effects.

**Off-axis, high-energy dynode detector** with rapid polarity switching, long life, and low noise, delivers the widest dynamic range.

## ROBUST ION SOURCES FOR A WIDE RANGE OF APPLICATIONS



### Agilent Jet Stream II

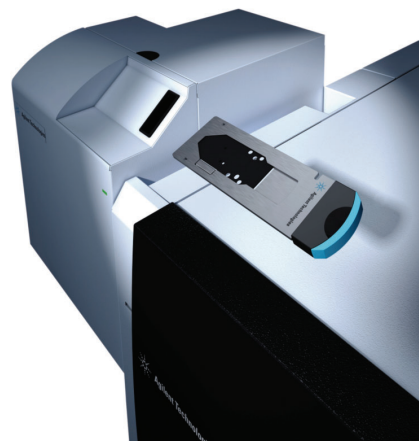
- Uniformly supports flow rates from 20  $\mu\text{L}/\text{min}$  to 2  $\text{mL}/\text{min}$
- Dramatically enhances sensitivity with thermal gradient focusing technology
- Improves ion transmission and enables rapid polarity switching with a resistively-coated sampling capillary

### HPLC-Chip/MS technology

HPLC-Chip/MS technology is available with all Agilent 6400 Series Triple Quadrupoles to achieve robust analysis of large sample sets at nano flow rates. Precision laser etching of the column, connections, and nebulizer tip leads to the most reproducible, quantitative turn-key results available.

### Commercially available Agilent chip solutions

Application	Chip
Peptide/Protein ID	ProtID-Chip
Intact Protein Analysis	Protein Chip
Glycan Analysis	PGC-Chip
Phosphopeptide Analysis	Phosphochip
Small Molecule Analysis	SmlMol-Chip
Monoclonal Antibody Glycan Analysis	mAb-Glyco Chip
Custom User Desired Analysis	Custom Chip



## Quantitative and qualitative analysis in a single run using triggered MRMs

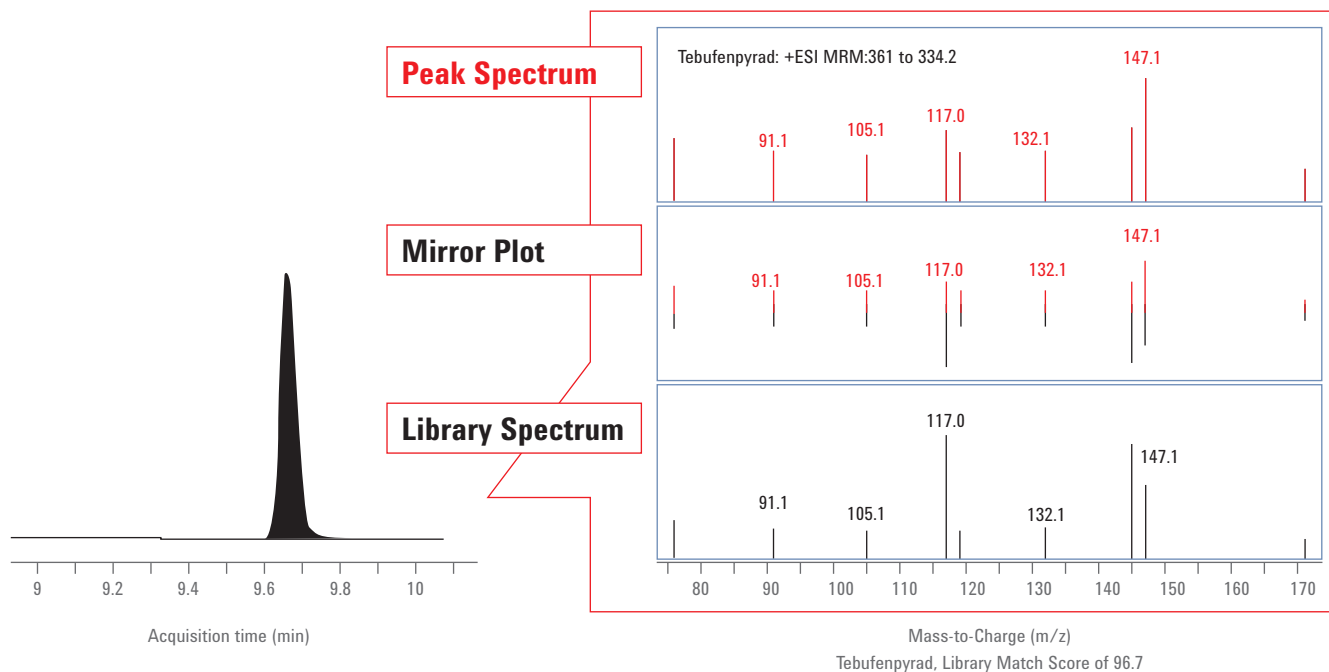
Triggered MRM (tMRM) acquisition is available on all Agilent Triple Quadrupole LC/MS Systems. It effectively combines MRM quantitative analysis with data dependent acquisition of a product ion spectrum for use in library search, identification, and confirmation. tMRM product ion spectra can be searched against application-specific libraries, such as the Agilent Personal Compound Database and Library (PCDL), or large public spectral libraries.

### Confirmation of compound identity

The figure below, generated with data gathered using an Agilent 6460 Triple Quadrupole, shows how the acquired mass spectrum (upper window) can be compared to a stored library spectrum (bottom window). The mirror plot in the central window simplifies the comparison between the sample and library spectra. An excellent library match score of 96.75 confirms the identity of the compound.

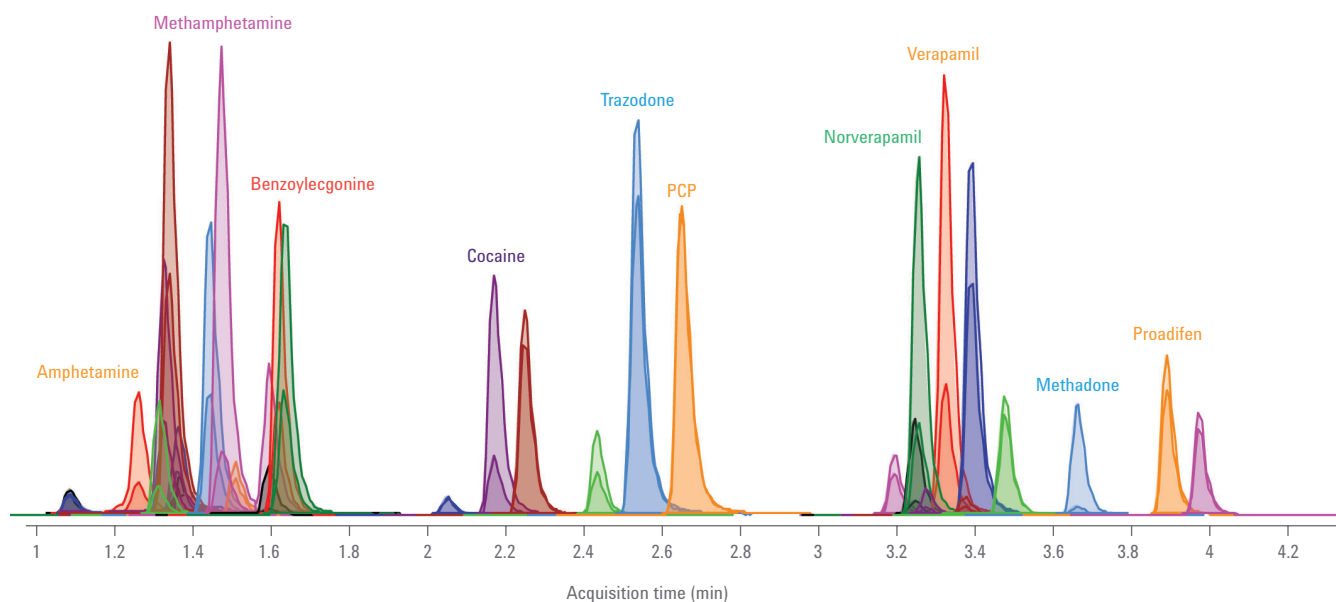
### Advantages of tMRM

- Faster and more sensitive than conventional product ion scanning
- Simultaneous compound quantitation and confirmation
- Superior sensitivity at ppt level surpasses trapping technology
- Compatibility with multi-residue analysis of hundreds of compounds



## FAST AND ROBUST FORENSIC SCREENING

Be more productive when analyzing Drugs of Abuse with LC/MS. Streamline sample preparation and analysis by eliminating the need for chemical derivatization, and using easy-to-update methods that can readily be adapted for new analytes. The 6420 Triple Quadrupole LC/MS system enables simultaneous quantitation, screening and confirmation of forensic compounds with the lowest overall cost of ownership.



Forensics test mixture results acquired using 25 pg of each compound injected on-column to the new 6420 Triple Quadrupole LC/MS System.

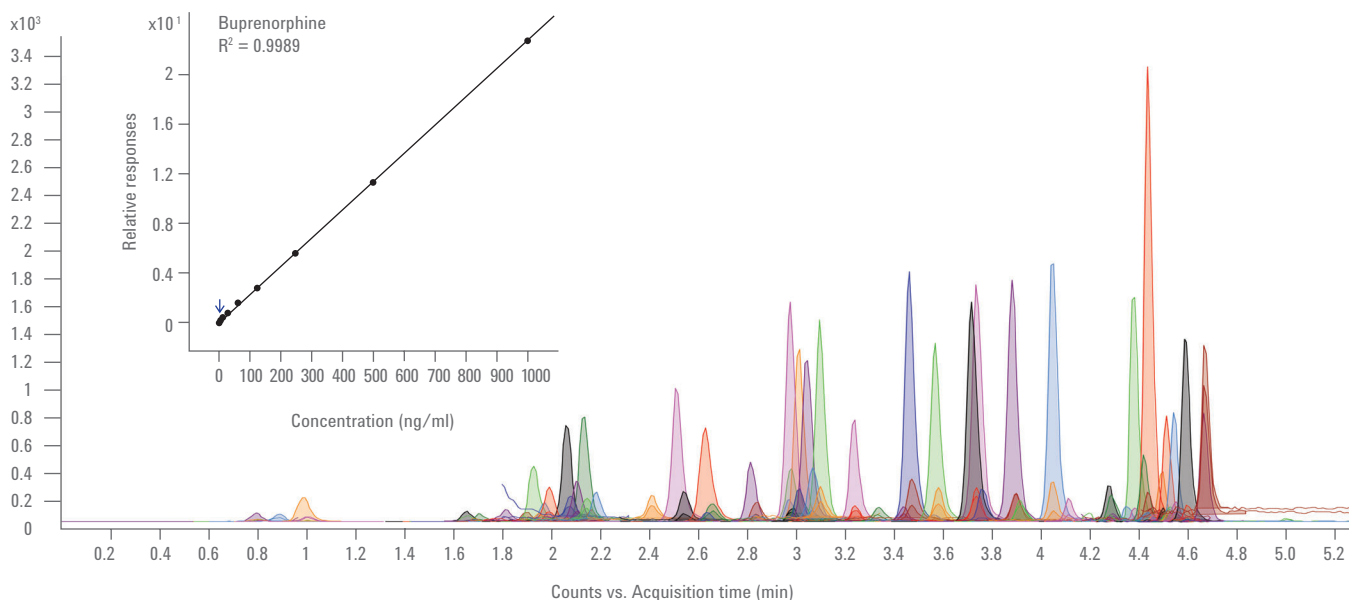
### Simplify analytical method startup and reduce your time to technical mastery

Agilent's Forensic/Toxicology Screening Dynamic MRM Application Kit features easy-to-use examples that show you how to set up screening methods and quickly adapt them to your specific needs.

- **Forensic/Toxicology Dynamic MRM database with over 200 compound names and retention times**, plus optimal MRM transitions, fragmentor voltages, and collision energies to allow you to rapidly screen forensic analytes.
- **Pretested analytical methods**, using the Dynamic MRM database, facilitate your screening of forensic analytes routinely monitored around the world.

## A SIMPLE AND ACCURATE APPROACH TO CLINICAL RESEARCH

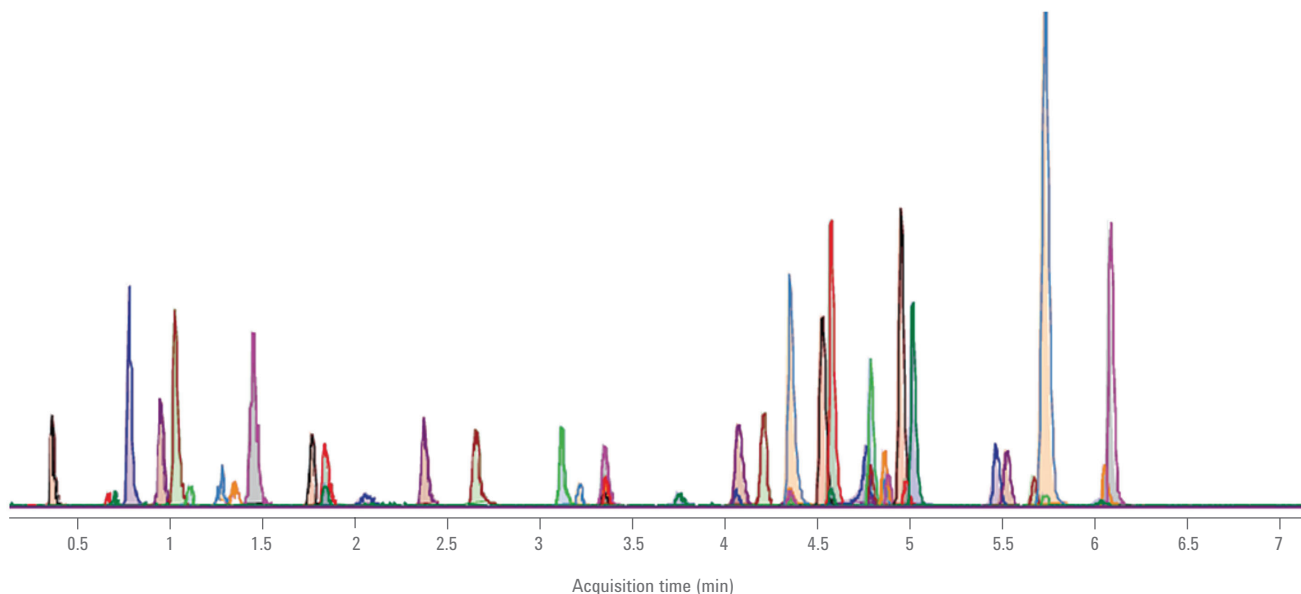
Expand your analytical capabilities by adding LC/MS to your laboratory. Agilent 6400 Series Triple Quadrupole Systems provide a simple and reliable approach for rapidly analyzing more samples. Eliminate laborious derivatization steps typically required for GC/MS analysis to increase throughput and productivity. Take advantage of MRM specificity to monitor more compounds of interests with exceptionally high sensitivity.



Extracted ion chromatograms of 174 transitions used in the simultaneous quantitation of drug compounds (amphetamines, benzodiazepines and opiates) using an Agilent 6430 Triple Quadrupole LC/MS System. A wide linear dynamic range was achieved with routine precision of less than 10% RSD in urine samples. (Inset) Calibration curve for buprenorphine demonstrates linearity from 4 to 1000 ng/mL.

## SENSITIVE QUANTITATION OF EMERGING ENVIRONMENTAL POLLUTANTS

Pharmaceuticals and Personal Care Products (PPCPs), including drugs and their active metabolites, are an increasingly important water quality issue for the scientific community and public health authorities because they can have an adverse impact on marine life and humans. Sensitive and reliable analytical methods for water quality testing can be implemented using the Agilent 6430 Triple Quadrupole LC/MS System and following the guidelines in EPA method 1694. An updated version of EPA method 1694 that uses a ZORBAX Eclipse Plus-C18 column on an Agilent 1290 Infinity LC System provides a three-fold gain in throughput.

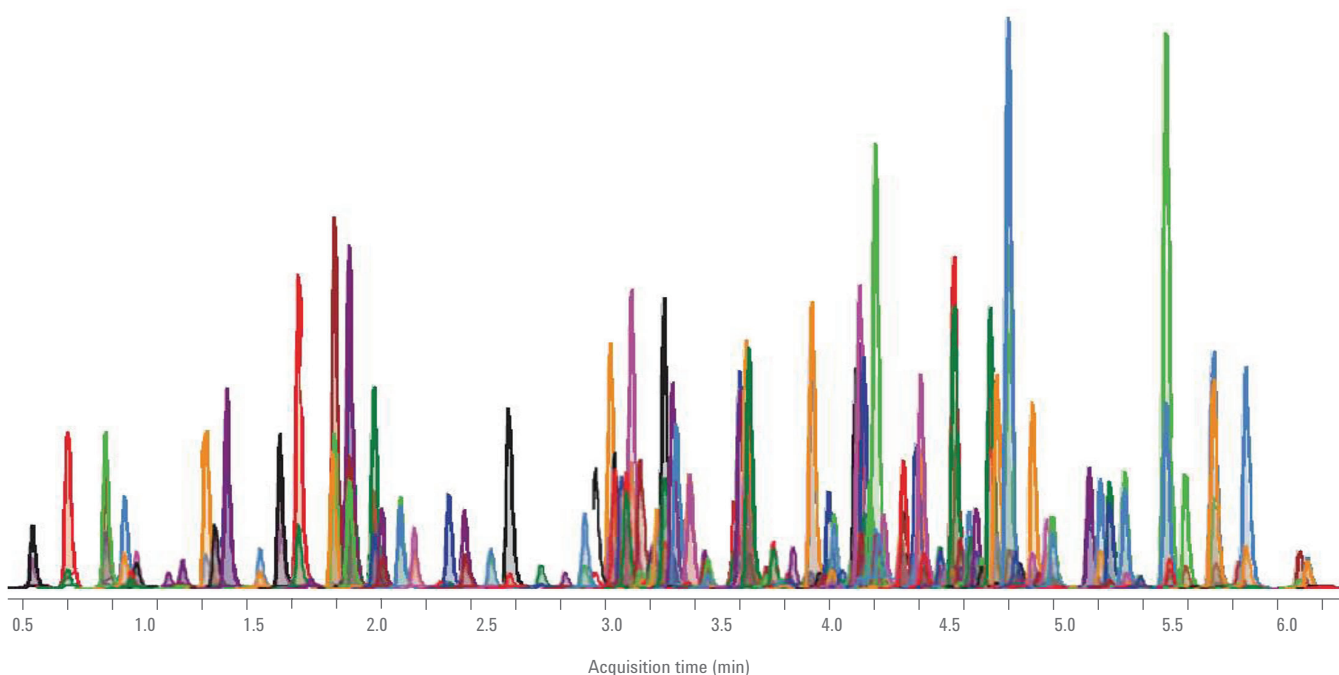


Analysis of 46 compounds with an improved version of EPA Method 1694 on the Agilent 6430 Triple Quadrupole LC/MS System demonstrates outstanding sensitivity and a three-fold reduction in assay time.



## RELIABLE, HIGH-THROUGHPUT QUANTITATION ENSURES FOOD SAFETY

Pesticide treatment is widely used in today's agricultural practices. Production agriculture comprises the main category of pesticide use and is subject to regulation. The number of pesticides and residues that must be monitored has continually increased over time. It is a common requirement that several hundred target compounds are screened in a single LC/MS experiment.



Eight-minute LC/MS analysis of 224 pesticides at 500 ppt using DMRM on the Agilent 6460 Triple Quadrupole LC/MS System.

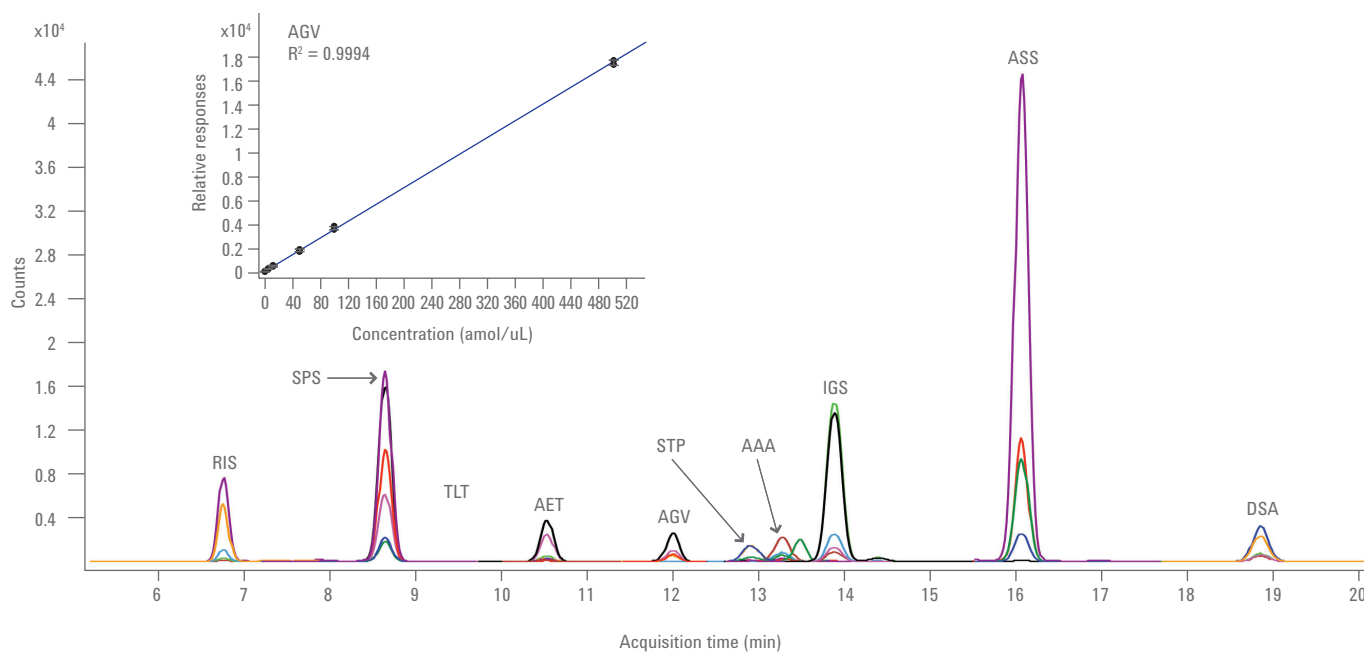
### A faster, easier way to develop customized screening methods

Agilent's Pesticide Screening Dynamic MRM Application Kit is a unique tool featuring easy-to-use examples that can be quickly adapted to your specific needs.

- **Over 750 pesticide Dynamic MRM transitions** in a database that also includes compound names, voltages, collision energies, and retention times to facilitate reliable pesticide screening.
- **Pre-tested analytical methods**, using the Dynamic MRM database, are provided for target screening of pesticides that are routinely monitored around the world.

# HIGH SENSITIVITY PEPTIDE QUANTITATION WITH HPLC-CHIP/MS TECHNOLOGY

Detect and quantify extremely low level of peptides in complex samples using MRM acquisition on a triple quadrupole mass spectrometer. This approach provides superior sensitivity and selectivity for targeted compounds in the most challenging sample matrices. It also offers precise quantitation and fast scan speeds, making it an ideal technology for monitoring panels of peptides with high-throughput methodologies. Coupled with Agilent HPLC-Chip/MS technology, peptide quantitation using nano flow chromatography is a turn-key solution that delivers unmatched sensitivity and reproducibility. Software tools provide a complete workflow for quantitative proteomics research and biomarker validation.



MRM chromatograms for phosphopeptides (1 fmol) from trypsinized *E. coli* lysate (150 ng) using ProtID-Chip equipped with a 160 nL trap. (Inset) Calibration curve of the peptide AGVIQTSTEHS\*FSK illustrates excellent linearity, dynamic range, and reproducibility with an on-chip LOQ of 1 amol.

## MassHunter software simplifies and automates quantitative analysis

Agilent MassHunter Workstation software greatly simplifies sample management, mass spectrometer method optimization, data processing, and reporting for quantitative analyses. An impressive suite of tools enables key workflows, particularly for pharmaceutical and regulated laboratory environments.

- Study Manager delivers automated bioanalysis with LIMS connectivity and high-throughput *in vitro* screening for drug discovery applications
- Optimizer software enables automated determination of compound MRM parameters
- tMRM data-dependant acquisition yields fast, sensitive simultaneous compound quantitation and confirmation

## Improve efficiency for drug discovery compound screening and bioanalysis

### Study Manager enables automated high throughput screening

This software tool is designed for multi-user access instruments, allowing you to submit batches of samples and perform a series of tasks including optimization of parameters, data acquisition, quantitative analysis, and reporting. New Study Creators can import sample information from electronic files, schedule and run Optimizer, control acquisition and quantitation, and produce a spreadsheet containing your results. Users have the option to schedule Optimizer only studies for workflows where all compounds can be optimized at the beginning of the week while assays run subsequently over several days.

	Name	Path	Submitter	Plate Assignment	Est. Study Duration	Est. Start Time	Sample Count
1	Realting_2012011...	C:\MassHunterData	doug	P1	00:06:00		3
2	051211_doug.s	C:\MassHunter\studies		P1	00:00:00		3
3	051211_Custom...	C:\MassHunter\studies		None	00:03:00		14
4	india_20110620.s	C:\MassHunter\studies	doug	P1	00:00:00		3
5	082311_Custom...	C:\MassHunter\studies	Agilent\dougem	None	00:03:00		14
6	110211.s	C:\MassHunter\studies		None	00:03:00		1

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