

Agilent 6100 Series Quadrupole LC/MS Systems

Unrivaled performance, robustness and ease-of-use

The Agilent 6100 Series Quadrupole LC/MS systems are the culmination of many generations of refinement in quadrupole LC/MS. They offer unrivaled performance combined with proven robustness and ease-of-use, and now feature a footprint barely half the size of previous models.

Performance levels to match your applications

You can choose from four models of the Agilent 6100 Series: the economical 6110 entry level system, the 6120 which adds polarity switching to the entry level system, or the 6130 and 6140 systems for the utmost in performance and flexibility. The 6110 and 6120 are outstanding for a wide range of applications and their reasonable price puts the power of mass spectrometry within reach of more laboratories than ever before. The 6130 offers an extended mass range, unrivaled sensitivity, and the ability to cycle through multiple acquisition modes on a scan-by-scan basis within a single analysis. The 6140 facilitates research-grade LC/MS with fast scanning capability, making it ideal for rapid-resolution and ultra-fast LC as well as high-throughput applications.

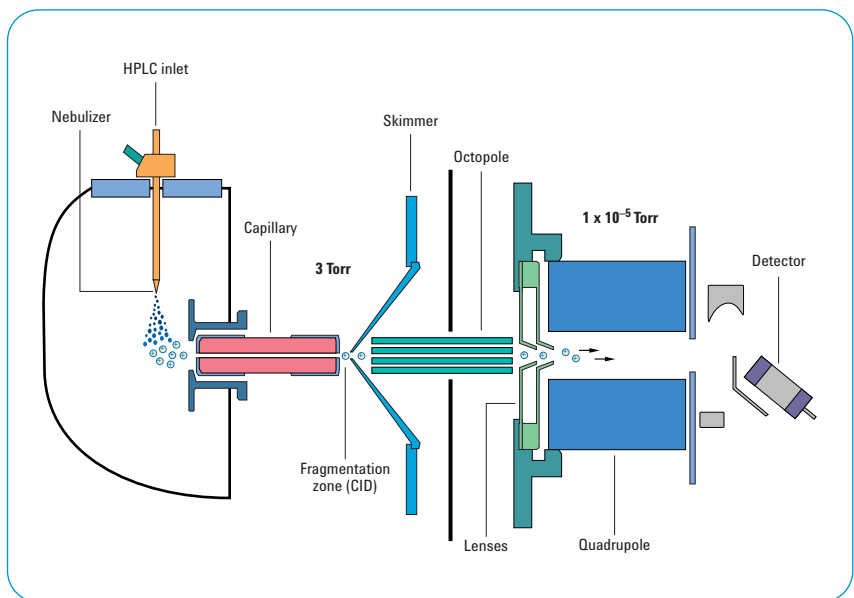


Complete systems for trouble-free, sophisticated analyses

All four models of the Agilent 6100 Series integrate seamlessly with Agilent 1200 Series LC modules. You control all modules with the Agilent ChemStation data system, providing unprecedented levels of automation for reliable, unattended operation and enhanced productivity.

The 6100 Series systems provide the cornerstone for complete LC/MS solutions. They are suitable for applications as diverse as identity confirmation for combinatorial libraries of drug candidates through quantification of insecticides and herbicides in water samples.





State-of-the-art performance

The Agilent 6100 Series Quadrupole LC/MS systems deliver outstanding sensitivity, reproducibility, and linearity, giving you complete confidence in your results.

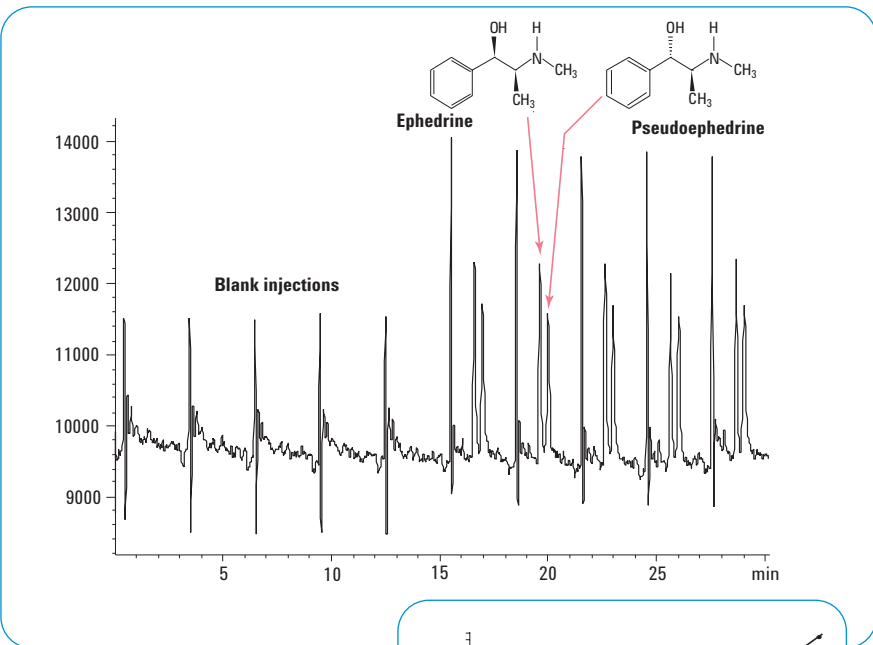
- Sensitivity in the low-picogram range for both electrospray ionization (ESI) and atmospheric pressure chemical ionization (APCI)
- Unsurpassed linearity ensures quantitative accuracy for the most demanding applications

The 6100 Series ion optics and vacuum system deliver superior sensitivity.

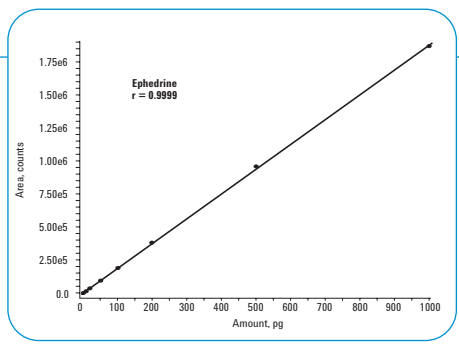
Carefully refined systems

The combination of ion sources, ion optics, and the single-turbo pump vacuum system of the Agilent 6100 Series Quadrupole LC/MS systems are precisely tuned and optimized for exceptional performance.

- Ion sources with orthogonal nebulization and high-capacity, counter-flow drying gas greatly reduce background from solvent clusters and mobile phase adducts
- Large-diameter skimmer orifice enables low limits of detection, especially for lower mass analytes that are often difficult to analyze
- Optimized ion optics yield broad ion transmission across the mass range and easier tuning
- Precision-fabricated quadrupole mass filter and fast, stable electronics furnish stable mass assignments and good mass resolution
- High-sensitivity detector provides excellent signal amplification, low noise, and predictable tuning



Replicate injections of 1 pg each of ephedrine and pseudoephedrine show excellent sensitivity and reproducibility. Linearity meets the most stringent analytical requirements.



Address more analytical challenges rapidly

The flexible Agilent 6100 Series Quadrupole LC/MS hardware and software help you address more analytical challenges more quickly. Interchangeable ion sources allow you to select the most appropriate ionization technique for your samples. Multiple-signal capabilities in the 6130, 6120 and 6140 increase the amount of information you can acquire from a single sample.

A wider range of ionization choices

Agilent offers a full complement of ion sources for the 6100 Series Quadrupole LC/MS systems, so you can choose the one that provides the best sensitivity for your application. Choose the ESI source for more polar compounds, or the APCI or atmospheric pressure photoionization (APPI) sources for less polar compounds. The sources share a common mounting system which makes source exchange fast and straightforward.

Unequaled ion source design

Agilent's patented orthogonal-nebulization ion source design was the first with a fixed position nebulizer placed at right angles to the ion optics. This design:

- Enhances sensitivity by allowing dissolution and ion transport conditions to be adjusted independently
- Reduces instrument background noise
- Keeps the capillary and source cleaner for longer
- Eliminates the need to adjust the nebulizer when changes occur in mobile phase flow and composition
- Improves tolerance for nonvolatile components
- Makes it easier to adapt existing LC methods to the 6100 Series systems



A Use the electrospray ionization (ESI) source to analyze large and small polar molecules.



B Use the atmospheric pressure chemical ionization (APCI) source to analyze a range of less polar and nonpolar molecules.



C Use the PhotoMate APPI source to ionize samples that respond poorly or not at all with APCI and ESI.



D Use the multimode source for simultaneous ESI and APCI ionization, providing maximum response coverage and higher throughput.

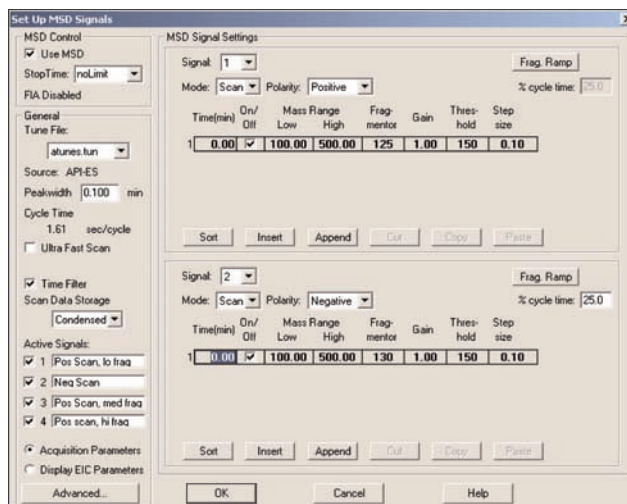
Compound	APCI Source		ESI Source		Multimode Source	
	Positive	Negative	Positive	Negative	Positive	Negative
Acetazolamide	–	D	–	D	–	D
Butyl-4-aminobenzoate	D	–	D	–	D	–
Cortisone	D	D	D	–	D	D
Gemfibrozil	–	D	–	D	–	D
Hexahydro-...-dione	D	–	D	–	D	–
Hydroflumethiazide	–	D	–	D	–	D
Indole	D	–	–	–	D	–
Iodipamide	–	–	–	D	D	D
Labetalol	D	D	D	D	D	D
Lidocaine	D	–	D	–	D	–
Morin	D	D	D	D	D	D
Paclitaxel	–	–	D	–	D	–
Phenylbutazone	D	D	D	D	D	D
Procainimide	D	–	D	–	D	–
Progesterone	D	–	D	–	D	–
Sulfamethoxazole	D	D	D	D	D	D
Tolazamide	D	D	D	D	D	D
Uracil	–	D	–	–	–	D
Detected by polarity	67%	56%	67%	50%	78%	61%
Detected by source	89%		89%		100%	

D = compound detected

The Agilent multimode source can switch ion polarities on a scan-to-scan basis. With this rapid polarity switching, you can acquire positive and negative ESI and APCI data in a single run, significantly increasing coverage over single-mode ion sources.

Multiple signals to analyze more compounds in a single run

Optimum mass spectrometer conditions often vary from compound to compound. Whether you develop methods or screen samples, the multi-signal capabilities of the 6130, 6120 and 6140 allow you to analyze more compounds in a single injection. Within a single analytical run you can choose alternating positive and negative ionization; alternating high- and low-energy, in-source, collision-induced dissociation (CID); and alternating selected ion monitoring (SIM) and scanning modes. Up to four different sets of acquisition conditions can be used in a single run.



Maximize the information from a single analysis by using up to four different acquisition modes.

Alternating positive and negative ionization modes for increased productivity

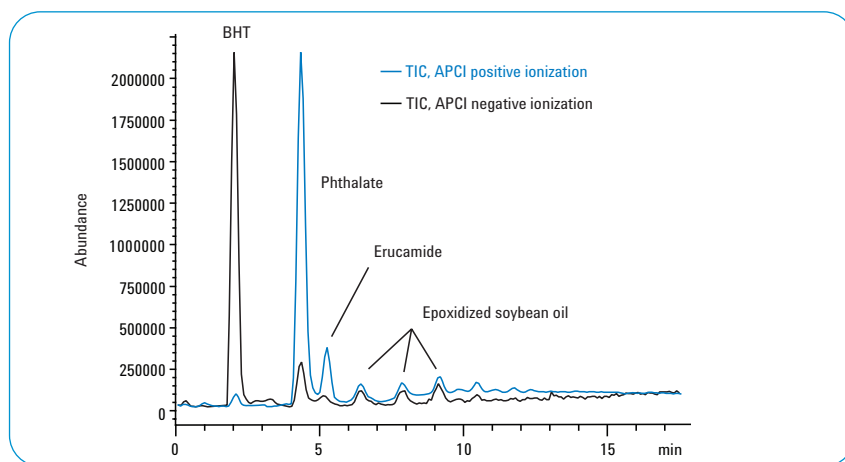
With the 6120, 6130 and 6140, you can switch between positive and negative ionization from one scan to the next. Switching is fast, without loss of chromatographic integrity. Unknown samples can be screened rapidly without having to determine the optimum ionization mode in advance. For compounds that ionize in either mode, you get both positive and negative ion spectra in a single injection, increasing confidence in results.

Molecular weight and structural information in a single injection

Change CID energy from scan to scan to increase spectral information. Use low-energy CID (low fragmentor voltage) to maximize response of the molecular ion and high-energy CID (high fragmentor voltage) to provide more fragments and increased structural information.

Analyze both target compounds and unknowns in a single run

With Agilent 6100 Series Quadrupole LC/MS systems, you need only a single run to precisely quantitate target compounds using SIM mode and perform a survey analysis with scan mode. You can also analyze low-level compounds or poor responders in SIM mode and high-level compounds, or those that ionize well, in scan mode.



A single analysis using alternating positive and negative scans clearly identifies polymer additives that might not be identified using only a single ionization polarity.

User-friendly yet powerful software makes operation easier

Powerful LC/MS ChemStation software simplifies all phases of operation, from tuning and setup, through data acquisition to the processing of qualitative and quantitative data. Advanced networking capabilities allow you to control instruments and review results remotely.

Save time with automated tuning

The autotune automated tuning and calibration program, together with a built-in calibrant delivery system, make setting up the Agilent 6100 Series Quadrupole LC/MS systems fast and easy. Premixed calibrant compounds ensure consistency. To meet the needs of unusual analyses, user-controlled interactive tuning is also possible.



Built-in calibrant delivery system and premixed calibrants facilitate automated tuning.

Develop methods more quickly

You can use the 6100 Series flow injection capabilities to speed method development. Multi-signal acquisition in the 6130 Series simplifies method development even more.

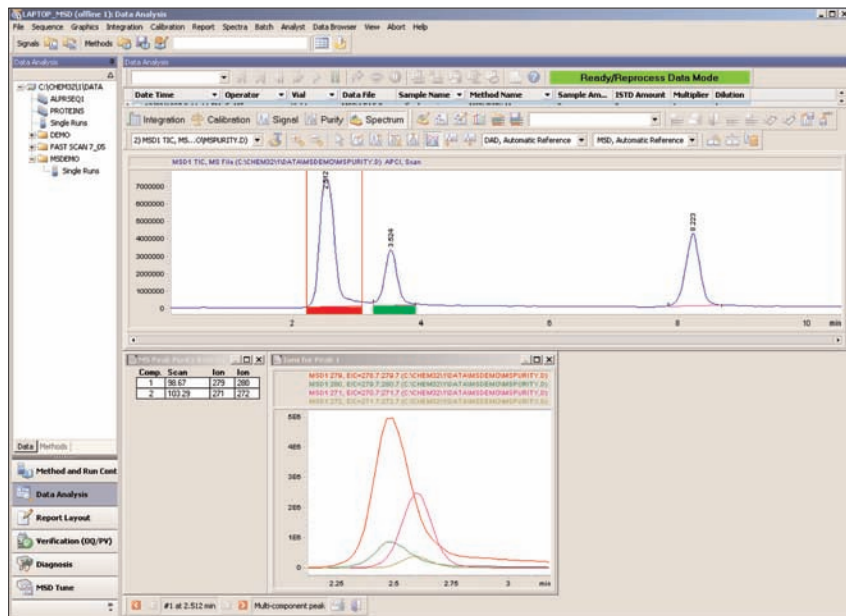
Set up sequences faster

The ChemStation software helps you create and modify sequences for unattended analyses quickly. The Sequence Import Wizard guides you as you import sequences from spreadsheets and text files. Hypersequence capabilities with the Agilent 6100 Series sample capacity extension permit you to set up sequences of sequences. Hypersequences allow you to add or change the order of plates or samples on the fly.

Locate coeluting compounds quickly

Peak purity software uses UV data, mass-spectral data, or both to identify chromatographic peaks containing incompletely resolved compounds. This is useful for developing separation methods or for choosing quantitation ions without further refinement of the separation.

- Toggle buttons make it possible to quickly move from one impure peak to the next across a chromatogram
- The peak purity report displays the retention time, number of possible peak components, and characteristic ions for each peak in a chromatogram



Peak purity software with multi-component peak in red. The software draws the extracted ion chromatograms below to identify components.

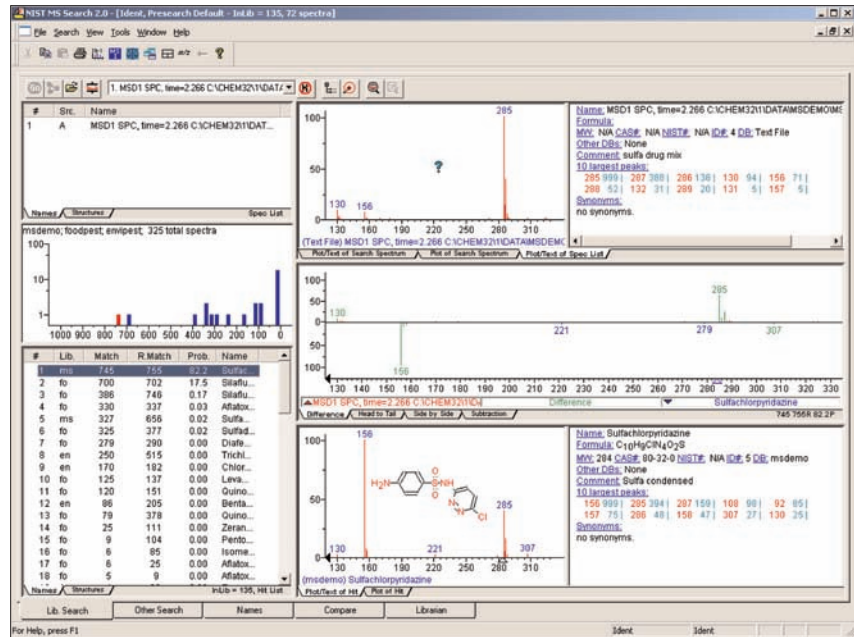
Identify compounds quickly

The optional NIST mass-spectral library search software quickly identifies compounds by matching MS spectra with user-created library spectra. You can combine UV and mass-spectral searching and reporting. The software is compatible with both ESI and APCI data.

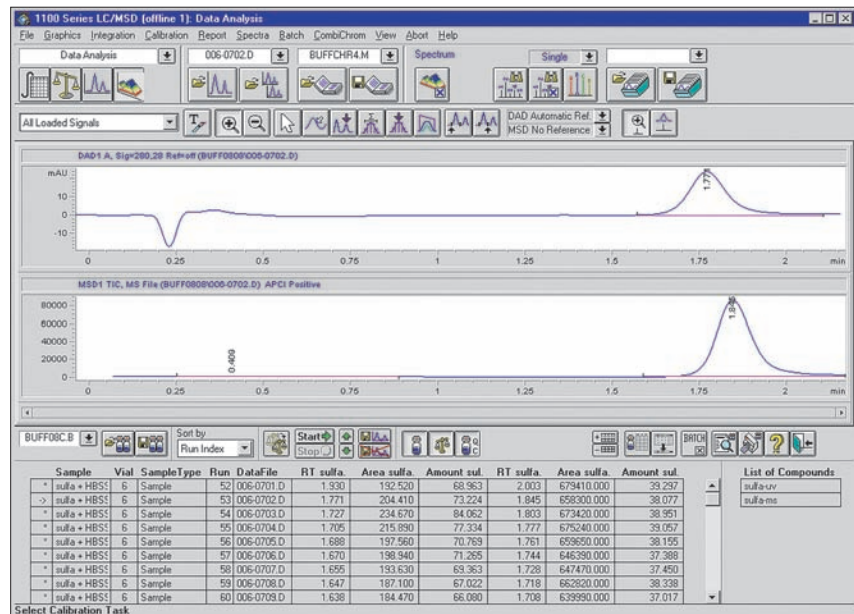
Automation for rapid quantitation

Instrument control, data analysis and reporting can be automated and included as part of your method.

- Quantitate using both UV and MS signals in a single calibration table
- Choose from a variety of common quantitation methods, including peak areas or heights, internal or external standards, peak ratios or multipoint calibration curves
- Use batch review software to quickly evaluate and update results from large batches of samples
- Report results with preconfigured formats or using the drag-and-drop report builder to customize reports



Identify compounds quickly with optional library search software.



Batch review software helps you evaluate and, if necessary, reprocess the results from large batches of samples.

Software and solutions to increase throughput

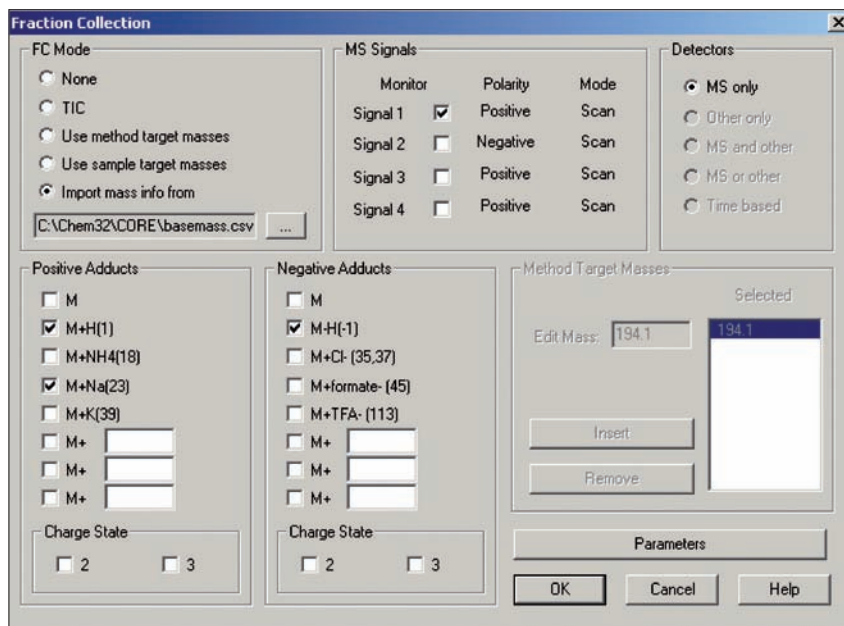
Agilent's complete solutions for sample purification, molecular weight confirmation and high-throughput analysis make it easy for both experts and non-experts to take advantage of the unequivocal information provided by mass spectrometry. These seamless solutions consist of Agilent 1200 Series LC modules, the Agilent 6100 Series Quadrupole LC/MS systems and easy-to-use, application-specific software. Whether you deal with single synthesis products or combinatorial libraries – Agilent has solutions for high productivity.

Mass-based fraction collection for confident, high-yield purifications

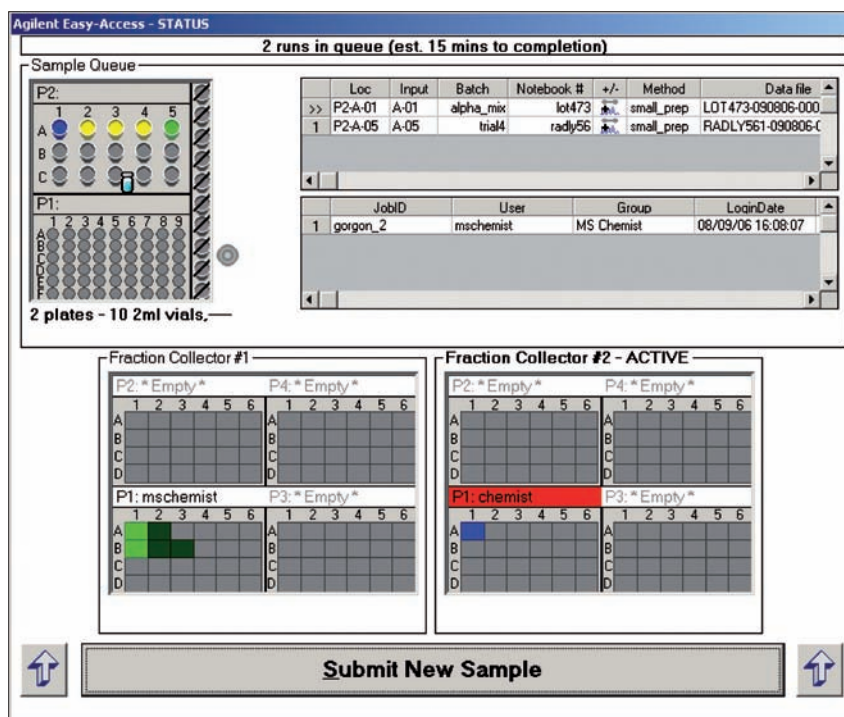
The 6100 Series adds the confidence of mass-based collection to analytical- or preparatory-scale compound isolation with the Agilent 1200 Series purification platform. Agilent's mass-based fraction collection is easy to use, precise, reproducible and reliable. It is based on a superior active splitter design that allows you to change the split ratio for each method without replumbing. The system also includes a built-in delay sensor and software to precisely calculate the delay volume between any detector and the fraction collector, preventing the loss of valuable fractions. Optional Easy Access software simplifies walk-up access for multiple users.

Easy, walk-up molecular weight confirmation and purification

LC/MS Easy Access software makes it straightforward for multiple synthetic chemists to confirm molecular weights and purify samples. The software is exceptionally easy to use. Just enter your name, password, and sample identification. Then, select a method and enter a molecular formula or expected molecular weight for the compound you have synthesized. Easy Access software reports sample status, schedules the analysis, and confirms the molecular weight or fractionates the sample.



Simple software setup makes mass-based fraction collection easy.



An easy-to-use graphical user interface simplifies everything from scheduling and running your sample to automating your report.

ChemStation data browser software for easy remote data review

The Agilent ChemStation data browser software is an ideal complement to the walk-up access capabilities of the LC/MS Easy Access software. It provides fast, easy remote review of analyses and purification results. Although designed for drug discovery, you can use the data browser software to review any datafile generated on an LC or LC/MS ChemStation data system.

The data browser software can display results for an entire well-plate and uses convenient color coding to show which syntheses were successful. MS, UV, light-scattering, or other detector signals can be used to provide an estimate of sample purity. The threshold for purity acceptance can be changed with a slider, enabling "what if" scenarios.

The software makes it easy to compare samples, to troubleshoot synthesis problems and allows you to choose elements for custom reports.

The data browser software's results can be automatically printed out at the ChemStation, accessed over the network via a server or be received by e-mail when the Easy Access software is installed.



With the ChemStation data browser software, you choose which views to include in your display. Use the color-coded Plate/Sample View to see immediately which syntheses were successful.

Complete solution for high-throughput qualitative and quantitative analyses

Unattended high-throughput applications demand the utmost in speed, performance, and robustness. To meet this challenge, Agilent offers the Agilent 1200 Series high-throughput LC/MS system, a scalable, modular system for high-volume identification, quantification and purity measurements.

- Well-plate LC system for the shortest cycle times, overlapped injections, outstanding linearity and precision, and the lowest carryover
- ChemStation software for integrated instrument control, complete automation, system validation and enhanced data evaluation
- Sample extension for high-capacity, walk-up and bar-code capabilities
- Valve solutions for efficient column regeneration, column and solvent selection and automated sample cleanup and enrichment
- Comprehensive compliance and support services

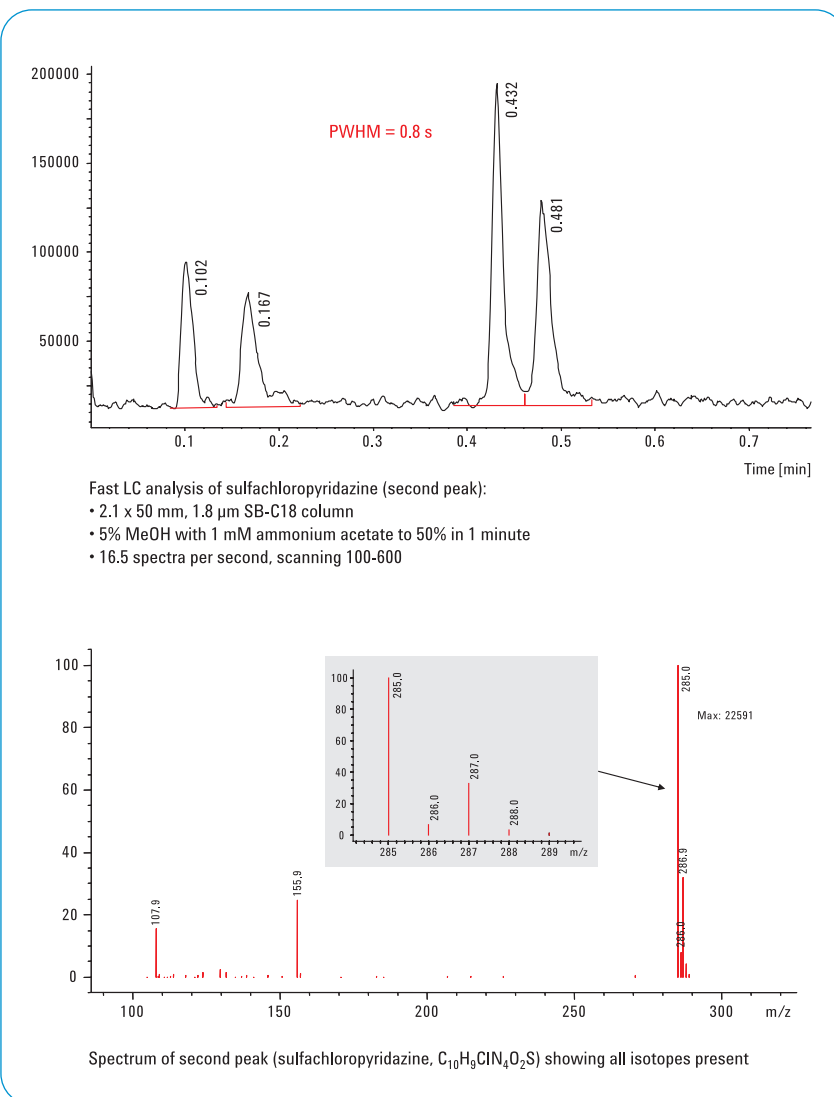
Faster scanning

LC/MS throughput can be enhanced greatly with the 10,000 u/s fast scan mode of the 6140. This enables you to:

- Take advantage of fast chromatography and acquire enough data points across a chromatographic peak for reproducible quantitation
- Use positive/negative switching to analyze in both ionization modes while maintaining chromatographic integrity

Throughput advantages

The well-engineered communication and automation features of the Agilent 6100 Series systems offer additional benefits for rapid analysis of multiple samples:



The fast scan mode of the 6140 enables users to take advantage of rapid-resolution and ultra-fast LC.

- 6100 Series systems are ready to use again 10–15 seconds after completion of a run, maximizing injection-to-injection speed
- Data can be analyzed offline while the next run proceeds
- Overlapped injections mean a sample for injection can be drawn while the previous sample is being analyzed
- Column regeneration solutions enable one column to be equilibrated while another is analyzing samples

Even better validation and support from the recognized industry leader

The built-in compliance features of Agilent systems are unsurpassed, enabling hardware, software, methods, and data to be validated at lower cost and in less time. You receive a declaration of system validation with each Agilent 1200 Series module and Agilent 6100 Series system, as well as the software to speed installation qualification, operational qualification/performance verification, and performance qualification.



ChemStation Security Pack software supports 21 CFR Part 11 compliance

Save time and money with compliance products and services

In addition to the features in the standard ChemStation software, Agilent offers a full suite of software products that make it easier to meet stringent regulatory requirements:

- ChemStation Plus Security Pack for secure results review and approval in compliance with 21 CFR Part 11
- ChemStore for central, secure data storage

Agilent also offers comprehensive validation services, including:

- Hardware requalification
- Repair qualification
- Multivendor validation services
- Free compliance e-seminars

Reduce validation requirements with the multisignal output accessory

Agilent's multisignal output accessory offers a validation alternative for laboratories with multiple 6100 Series systems. It converts the unprocessed digital MS signals from a 6100 Series system into analog format and transmits the analog data directly to a Laboratory Information Management System (LIMS) for processing. Calculations are done on the LIMS, making the single LIMS the focus of validation and reducing the validation requirements for the individual mass spectrometer data systems.

Broad range of support services and low overall cost-of-ownership

The 6100 Series systems are designed to minimize service requirements, but when service is needed, you can rely on Agilent's worldwide support organization. Agilent offers:

- Seven-year support life
- Lower-cost service contracts (one-half to two-thirds the cost of some other brands)
- Industry-specific support packages
- Single source of support for all 1200 Series LC modules and 6100 Series Quadrupole LC/MS systems
- Support options including service contracts, on-demand support, preventive maintenance, phone and Internet support, and 24-hour instrument exchange

Specifications

Mass range:	6110 and 6120: m/z 10–1500 6130: m/z 2–3000 6140: m/z 10–1350
Mass accuracy:	± 0.13 u within the calibrated mass range in scan mode
Mass axis stability:	Mass drift does not exceed the larger absolute value of ± 0.1 u or ± 100 ppm of measured mass over a 12 hour period at constant temperature ± 3 degrees centigrade
Scan Speed:	6110: 2500 u/s 6120: 2500 u/s 6130: 2500 u/s in standard mode, 5250 u/s in fast-scan mode 6140: 2500 u/s in standard mode, 10000 u/s in fast-scan mode
SIM sensitivity:	<ul style="list-style-type: none">• ESI at 400 $\mu\text{L}/\text{min}$ or APCI at 1000 $\mu\text{L}/\text{min}$• Selected ion monitoring of m/z 609.3• Positive ionization 6110 and 6120: 10 pg reserpine, 100:1 RMS (20:1 peak-to-peak) 6130 and 6140: 1 pg reserpine, 100:1 RMS (20:1 peak-to-peak)
Scan sensitivity:	<ul style="list-style-type: none">• ESI at 400 $\mu\text{L}/\text{min}$ or APCI at 1000 $\mu\text{L}/\text{min}$• Scan range m/z 100–650• Scan speed 2500 u/s• Extracted ion at m/z 609.3• Positive ionization 6130 and 6140: 50 pg reserpine, 100:1 RMS (20:1 peak-to-peak)
Multiple signal acquisition:	6120, 6130 and 6140: Ability to cycle through four different acquisition modes on a scan-by-scan basis within a single run.

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