

# The Easiest **Smart Decision** You Can Make

The Agilent 9500 ICP-MS



# Are Interferences Impacting Your Trace Element Analysis?

Do you face growing pressure to deliver faster, interference-free results? Complex matrices, time-consuming method development, and sample re-runs make even routine analysis a struggle. Many labs recognize that single quadrupole ICP-MS systems have their limits. ICP-QQQ technology offers greater accuracy, but it is often perceived as complex and demanding. Labs need performance without compromise.

What is slowing you down?



## Data reliability and confidence

Single quadrupole ICP-MS can struggle with challenging matrices and interferences, leading to complex method development, rework, and uncertainty in results.

Multiple tuning modes, such as standard or no gas mode, and helium KED collision cell modes, add complexity and wait times to every analysis.

Uncertainty in your data can slow decisions and impact your lab's credibility.



## Complexity and usability

ICP-QQQ seems out of reach and too complex for routine labs. Method development feels too hard, requiring expert knowledge and additional high-purity gas supplies.

Staff can spend more time troubleshooting instruments than analyzing samples, draining productivity and morale.



## Limited scalability and future readiness

Your current workflows can't keep pace with evolving analytical demands.

Fear of disruption keeps you locked in place, but risks falling behind, causing inefficiency, compromised quality, and competitors pulling ahead.

*"We need triple quad ICP-MS performance, but can't afford the complexity."*

## What ICP-MS labs tell us



### Interferences affect results

75% of users told us interferences affect their ability to get reliable results with single quadrupole ICP-MS



### Industry moving to ICP-MS/MS

80% of users told us their industry is moving from single quadrupole ICP-MS to ICP-MS/MS



## Simplifying the Power of Triple Quadrupole ICP-MS

The Agilent 9500 delivers true triple quadrupole ICP-MS performance without the complexity.

Its unique, proprietary Dual-Cell System featuring Advanced Helium Mode and Air mode provides unmatched interference removal and sample throughput. Agilent OpenLab ICP-MS software simplifies every step, delivering confident, reproducible results across virtually any sample type. Exceptional performance with less complexity.



### Better data starts with air

The Dual-Cell System (DCS) with Advanced Helium Mode (AHM) and Air mode provides superior interference removal, delivering fast, accurate results in complex matrices.

AHM eliminates the need for multiple gas modes and removes the wait times of method switching, **typically >33% reduction in acquisition time for routine analysis.**



### Your first run is right

Seamless migration of your current ICP-MS methods to the 9500 ICP-QQQ without workflow disruption.

Scale your capabilities as analytical demands evolve—complex matrices, new regulations, lower detection limits.

Intelligent automation and workflow integration keep your lab moving forward, not starting over.

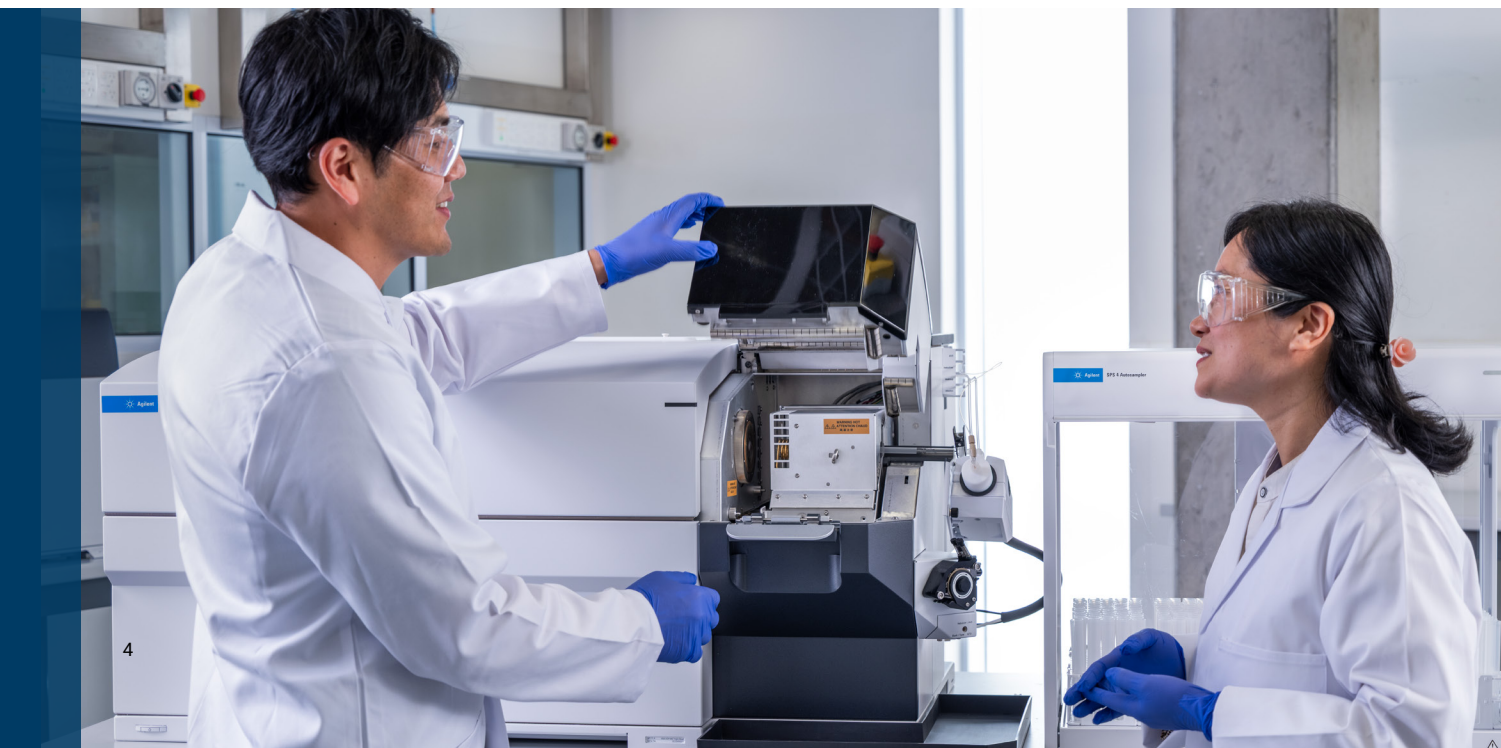
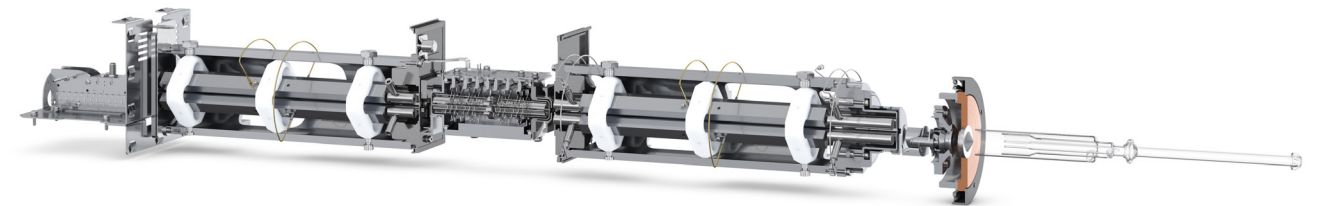


### Superior performance feels effortless

Preset methods and the Method Advisor make ICP-QQQ method development even simpler, reducing the reliance on staff expertise.

Guided diagnostics lead you through troubleshooting, minimizing downtime and expense.

Air mode uses ambient air, eliminating O<sub>2</sub> cylinders and safety concerns.



Agilent introduced the world's first triple quadrupole ICP-MS (ICP-QQQ) in 2012. The Agilent 8800 ICP-QQQ signaled a major advance in ICP-MS technology and redefined performance for trace element analysis.

Four years later (2016) the Agilent 8900 ICP-QQQ was launched, cementing Agilent's leadership in ICP-QQQ.

The 9500 makes ICP-QQQ accessible to all laboratories. This can only be achieved through the experience and knowledge of the company that brought you the first ICP-QQQ over a decade ago.

## Built for Confidence, Designed for Simplicity



View the Agilent 9500 Triple Quadrupole ICP-MS



### Instrument dimensions comparison

<b>9500</b>	W 1060 mm	x	D 600 mm	x	H 530 mm	→ <b>65 mm/11% shorter ICP-QQ power. Smaller footprint.</b>
<b>7900</b>	W 730 mm	x	D 600 mm	x	H 595 mm	
<b>8900</b>	W 1060 mm	x	D 600 mm	x	H 595 mm	

### ICP-QQ power with single quad simplicity

With all the single quad technology (UHMI, off-axis lens, wide dynamic range detector) and more

Unlocking ICP-MS/MS capability, with intuitive method development and interference-free analysis

### Unparalleled interference removal

Innovative, proprietary, Dual-Cell System with Advanced Helium Mode and Air mode

Increased capabilities without additional complexity

### Effortless method setup

OpenLab ICP-MS features automated development tools: Method Advisor, pre-set methods, and batch conversion tool to unlock the power of AHM and Air mode

### Easier installation and startup

Flexible setup with direct connection from instrument to accessories (autosampler, autodilutor, and chiller)

No connections or vents on the rear

Ergonomic design with right-hand side access

### Improved durability and lower running costs

20% reduction in power consumption and 50% reduction in exhaust flow

Addition of air inlet filter and improved airflow

Enhanced corrosion resistance

### Easier maintenance

Easy-fit sample introduction with improved layout and access to peristaltic pump, spray chamber, torch, and cones

Cell gas clean sensor to notify when replacement is due

### Easy-fit torch

Latest generation plasma generator technology

Shield and bonnet-free Easy-fit torch with single motion lock and automatic gas connection

### Enhanced performance

Reduced transition metal background (Cr, Ni, Fe, Zn) from new u-lens

Q2 mass range extended to 300  $m/z$

Reduced minimum dwell time to 0.05 ms

## Better Data Starts with Air

### The Dual-Cell System (DCS)

#### Confidence in every result

DCS represents a major leap forward in ICP-MS technology. DCS delivers exceptional interference removal and high sensitivity across the entire mass range.

Its dual ion guide architecture promotes both collision-induced dissociation (CID) and kinetic energy discrimination (KED), overcoming the limitations of conventional helium mode, enabling broader applicability and improved abundance sensitivity. DCS opens up new possibilities, like using ambient air as a reaction gas to perform oxygen mass-shift reactions, removing difficult on-mass interferences and simplifying your analysis.

### How Advanced is your Helium Mode?

#### One mode does it all

##### Advanced Helium Mode (AHM)

AHM collision dual-cell technology delivers high sensitivity and strong interference removal via CID and KED. Compared to conventional He mode, AHM provides ~20x higher sensitivity for low-mass elements such as Li, Be and B, and ~2x for mid-to-high masses. AHM combines multiple tuning modes into one streamlined mode, enabling >33% reduction in acquisition time for simpler, faster, performance without compromise.

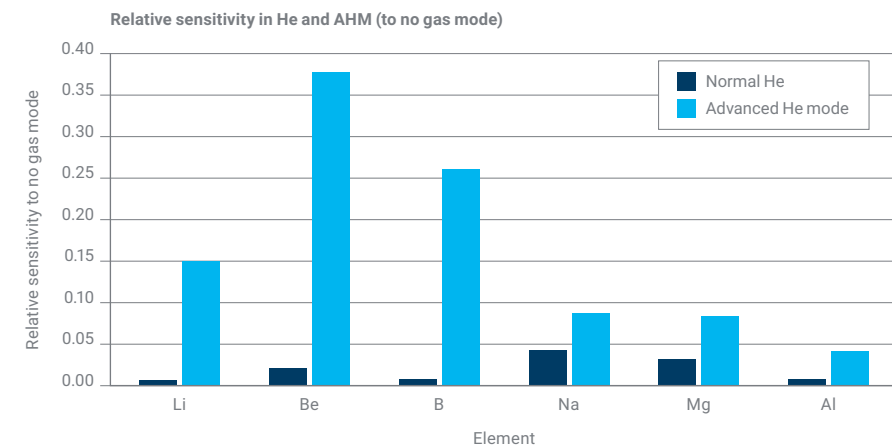
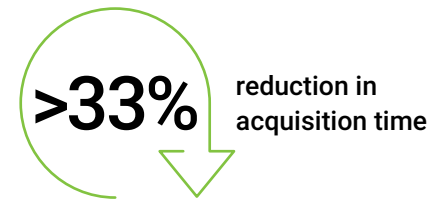
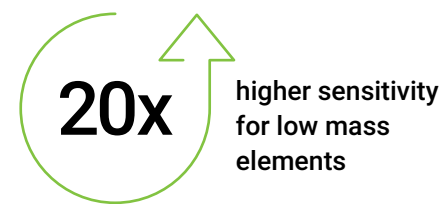


Figure 1. AHM boosts sensitivity for low-mass analytes ( $m/z < 23$ ) by ~20x over He mode.



#### >33% reduction in sample acquisition time

Single measurement in Advanced Helium Mode, replacing no gas, Helium and High Energy Helium tune modes.



#### 20x higher sensitivity at low masses in AHM

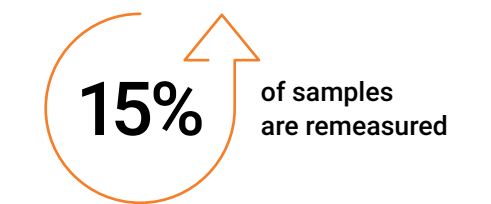
DCS maintains ion transmission even for low-mass elements (Li, Be, B, etc.) in Helium collision cell for vastly improved abundance sensitivity.



An integrated Air Purifier removes moisture and hydrocarbons for stable performance, and an automatic control valve limits air exposure to extend filter life.

#### Air mode reaction

Effective interference removal using ambient air, eliminating the need for additional reactive gases and associated safety considerations and infrastructure costs. Oxygen mass-shift ( $MO^+$  generation at  $+16 m/z$ ) reactions to reduce on-mass interferences, simply using the  $O_2$  from air.



#### Eliminate your re-runs!

Using AHM and Air mode with ICP-MS/MS provides interference-free results, so your first run is right no matter what samples you are running.

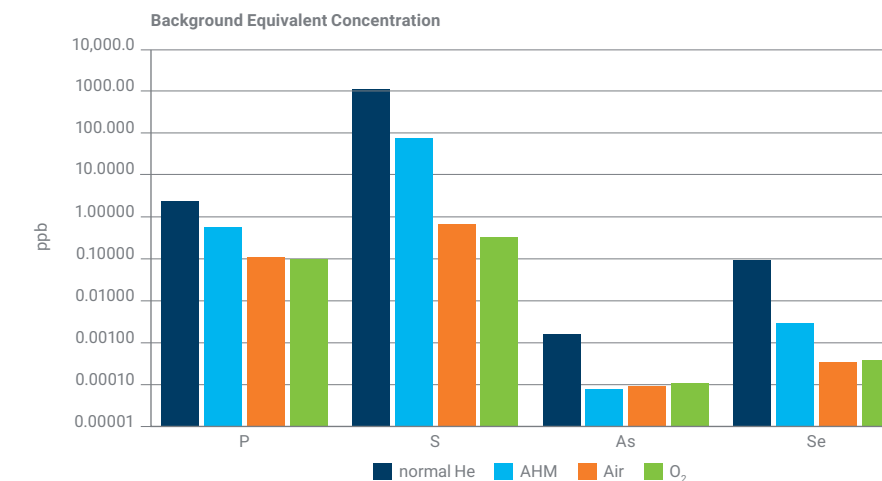


Figure 2. BEC of Air mode with respect to conventional He mode, new Advanced Helium Mode and oxygen mode.

Air mode achieves low BECs for P, S, As, and Se which were previously only available to labs with an additional oxygen reaction gas supply.

Also note that AHM on the 9500 is capable of resolving  $^{75}As$  interference – with a significant improvement over He mode and comparable to  $O_2$  mass-shift.

The combination of AHM and Air mode with the 9500 ICP-QQQ provides a simple, high-performance, robust method to provide interference-free results you can trust.

# Proven Results Every Lab Can Achieve

## Productivity gains with Advanced Helium Mode

### Single, high-performance measurement mode

Routine environmental and food methods can run in a single Advanced Helium Mode tune. AHM combines CID + KED to deliver stronger interference removal while maintaining light-mass sensitivity, improving method detection limits. Single mode simplicity with no gas-switch stabilization times typically provides >33% reduction in acquisition time. OpenLab ICP-MS batch conversion updates your previous method automatically.

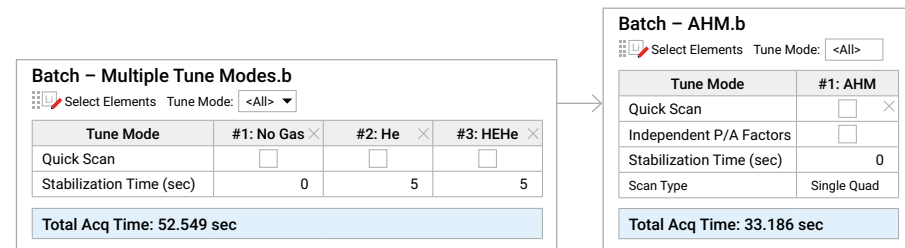


Figure 3. Drinking water analysis method comparison between the Agilent 7900 and 9500. AHM mode provides a 37% acquisition time saving, from 53 to 33 s, with single mode simplicity.

## Long-term stability with AHM and Air mode

### High-salinity seawater

The 9500 delivers stable, long-run performance for direct high-salinity analysis using on-line reverse dilution, reducing manual prep and contamination risk. With the AVS MS and optimized rinse, stability is maintained across 130+ analyses (EPA 6020), while achieving ppt-level method detection limits for 27 elements and 90–110% recoveries (CRMs/spikes) in ~140 s per sample.

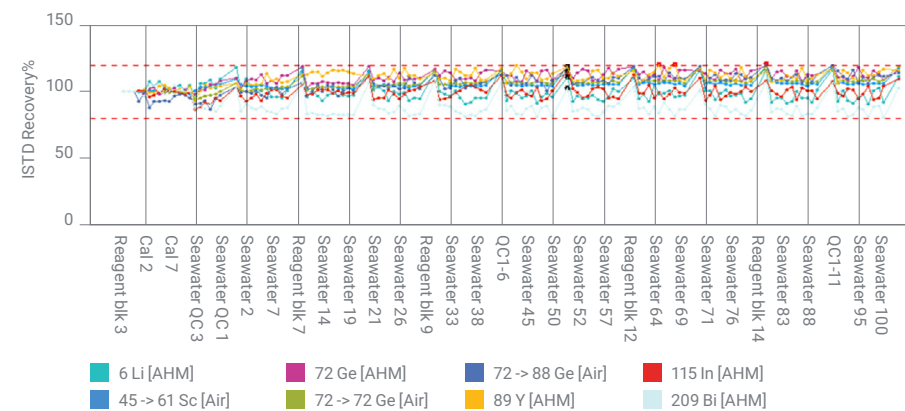


Figure 4. ISTD stability over 100 injections of undiluted seawater samples.



### What analysts say about the 9500

"My ICP-MS analysis is simpler to learn, set up, and run samples – fewer buttons to press and things to think about."

"My analysis is finished sooner allowing me to report results faster to our clients."

"My methods can handle more interferences, so I have fewer issues and re-runs."

"No need to get Health & Safety approval for having an O<sub>2</sub> cylinder in the lab, no expense for set up of a gas cabinet and sensors."

## High-purity material analysis with high-matrix-tolerant plasma

### Sub-ppt impurity analysis in 100s ppm high purity titanium

With an optional m-lens, analysts can confidently analyze Ti matrix samples and verify material purity over extended measurement periods. The m-lens is designed to minimize background signals from easily ionized elements that can deposit on interface components during long runs. This enables the 9500 to maintain high-power, matrix-tolerant plasma conditions while achieving ultralow background equivalent concentrations (BECs), critical for ppt-level impurity analysis, see Table 1.

## Interference reduction using Air mode

### Rare earth elements

Air mode can suppress doubly charged rare earth element (REE) ion interferences on arsenic (As) and selenium (Se), which are common in food and soil. For instance, doubly charged ions of <sup>150</sup>Nd and <sup>150</sup>Sm interfere with <sup>75</sup>As, while <sup>156</sup>Gd and <sup>156</sup>Dy interfere with <sup>78</sup>Se.

While AHM collision cell mode effectively reduces polyatomic ion interferences (ArCl<sup>+</sup>, CaCl<sup>+</sup>), it is ineffective against doubly charged ions (e.g. REE<sup>2+</sup>). Air mode moves the affected elements away from interference by converting the ions to AsO<sup>+</sup> and SeO<sup>+</sup>, shifting their masses away from overlaps with REE<sup>2+</sup> ions.

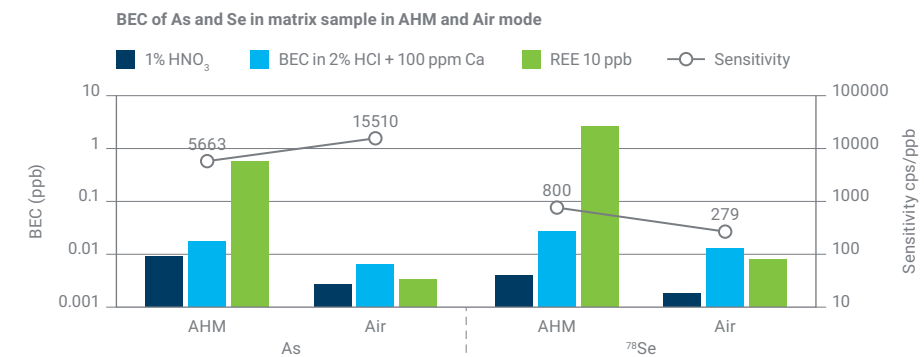


Figure 5. BEC of As and Se in two types of matrix solutions by AHM and Air mode.

Table 1. MSA calibration curves for the Ti digestion solution and procedural blank were used to determine 3σ DLs of blank samples (n = 5), BECs, and impurity metal concentrations in the original Ti sample.

Analyte	Q1	Q2	Tune	No Ti Matrix		Ti Matrix		Impurity Metal Conc in Original Ti Powder (ppb)
				DL (ppt)	BEC (ppt)	DL (ppt)	BEC (ppt)	
B	11	11	H <sub>2</sub>	1.92	2.83	6.32	12.7	49.4
Na	23	23	NH <sub>3</sub> + H <sub>2</sub>	2.03	3.25	7.52	91.4	441
Mg	24	24	NH <sub>3</sub> + H <sub>2</sub>	0.66	<DL	42.8	1600	8000
Al	27	27	NH <sub>3</sub> + H <sub>2</sub>	0.52	<DL	5.14	57.1	286
K	39	39	NH <sub>3</sub> + H <sub>2</sub>	2.30	4.33	2.34	6.26	9.7
Ca	40	40	H <sub>2</sub>	0.62	1.52	1.36	48.9	237
V	51	51	NH <sub>3</sub> + H <sub>2</sub>	0.23	<DL	2.39	3.44	17.2
Cr	52	52	NH <sub>3</sub> + H <sub>2</sub>	0.65	1.33	7.64	100	493
Mn	55	55	NH <sub>3</sub> + H <sub>2</sub>	0.25	0.29	3.07	38.2	190
Fe	56	56	NH <sub>3</sub> + H <sub>2</sub>	2.34	2.64	265	4240	21200
Co	59	59	NH <sub>3</sub> + H <sub>2</sub>	ND	<DL	0.67	0.84	4.2
Ni	60	60	NH <sub>3</sub> + H <sub>2</sub>	0.84	<DL	18.6	90	450
Cu	63	97	NH <sub>3</sub> + H <sub>2</sub>	2.35	2.4	8.22	110	538
Zn	68	68	NH <sub>3</sub> + H <sub>2</sub>	1.48	5	8.94	18.3	66.5
Y	89	89	H <sub>2</sub>	0.03	<DL	0.09	<DL	<DL
Zr	90	90	H <sub>2</sub>	0.09	<DL	0.22	1.24	6.2
Nb	93	93	H <sub>2</sub>	0.06	<DL	0.16	0.57	2.8
Mo	95	95	H <sub>2</sub>	ND	<DL	2.30	3.76	18.8
Ru	101	101	H <sub>2</sub>	ND	<DL	0.17	<DL	<DL
Pd	105	105	NH <sub>3</sub> + H <sub>2</sub>	0.14	<DL	0.11	<DL	<DL
Sn	118	118	H <sub>2</sub>	0.24	<DL	0.80	3.37	16.9
Hf	178	178	H <sub>2</sub>	ND	<DL	0.09	<DL	<DL
Ta	181	181	H <sub>2</sub>	0.02	<DL	0.27	1.19	6.0
W	182	182	H <sub>2</sub>	0.06	<DL	0.14	0.52	2.6
Bi	209	209	H <sub>2</sub>	0.05	<DL	0.55	0.90	4.5

## Superior Performance Feels Effortless

### OpenLab ICP-MS software

From instrument control to data analysis, all key tasks are performed within a single, integrated software platform.

OpenLab ICP-MS is designed to fit seamlessly into daily laboratory workflows. Its intuitive layout supports both new and experienced users. Beginners can start with confidence, focus on their analysis and trust their results. Advanced users can work efficiently without compromise.

OpenLab ICP-MS is the next generation, with its origins from Agilent ICP-MS MassHunter, and is available for all Agilent ICP-MS instruments.

\* OpenLab ICP-MS supports Agilent 7800, 7850, 7900, 8900, 9500 ICP-MS instrument models.



## All-Agilent Automation

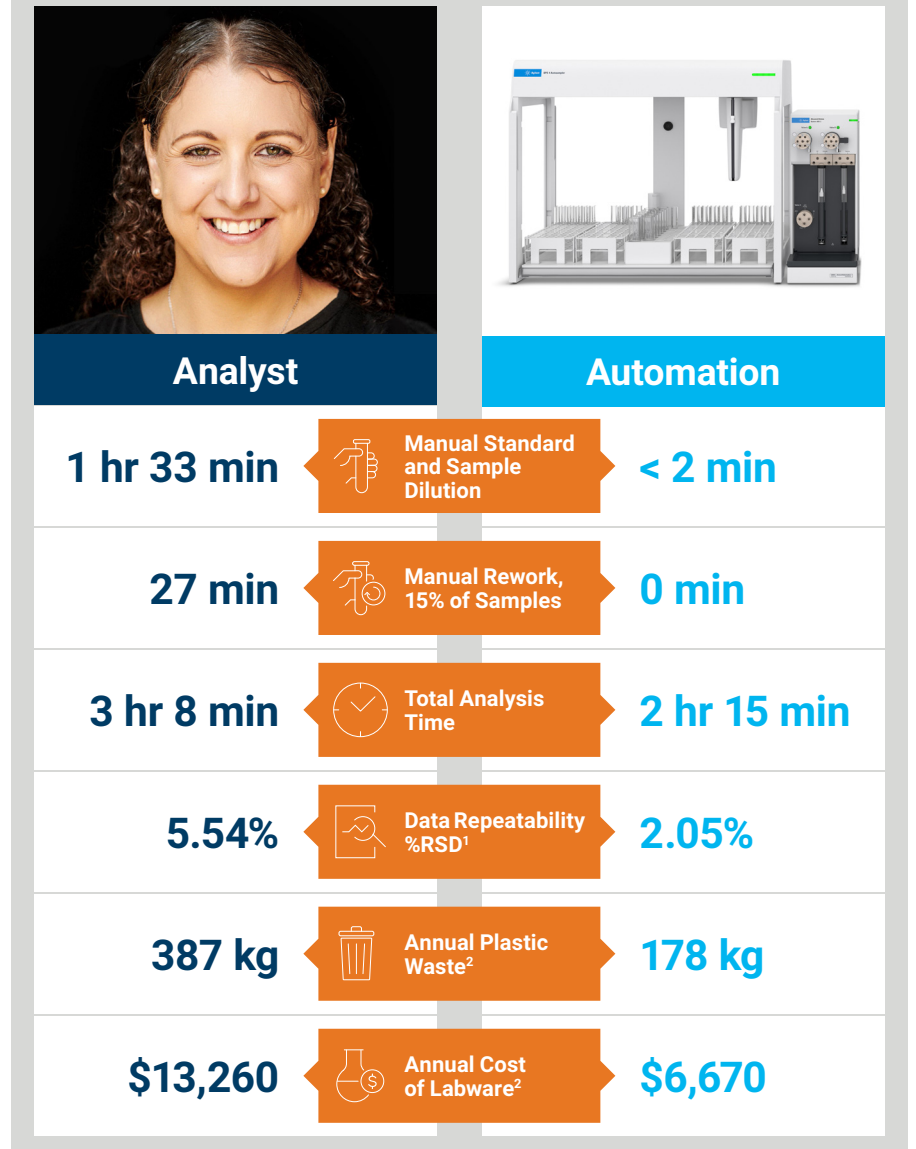
Less Work. More Flow.

Only Agilent offers a completely integrated ICP workflow automation system—comprising hardware, software, and support—designed to free up your analysts for more productive pursuits.

Our simple and reliable single-vendor solution integrates automated calibration, dilution, analysis, and reporting to lower your cost-per-sample and turnaround time while improving the quality of your results.

### The scenario:

**Analysis of 100 samples with 5-point calibration, 50x pre-analysis dilution, 15% rework.**



1. Based on results from five analysts over 3 days. 2. Based on 100 samples per day, 260 days per year.

Unattended runs, seamlessly integrated



**Increase your productivity with fully integrated automation options**

1. SPS 4 or SPS 6 autosampler for higher sample capacity enabling unattended analysis
2. SPS + AVS MS discrete sampler to increase the sample throughput
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**Analyst training and support**

Improve lab operations and minimize downtime with courses covering troubleshooting, maintenance, sample preparation, and software operations. An active online community provides answers for problems faced by analysts. [Education](#) | [Community](#)

## The Agilent 9500 ICP-QQQ advantage

- Proprietary Dual-Cell System combines Advanced Helium Mode and Air mode for simpler, more powerful interference removal
- Advanced Helium Mode replaces multiple tune modes with one streamlined mode, cutting acquisition time by >33%
- Air mode uses ambient air for oxygen mass-shift reactions, avoiding additional reactive gas infrastructure and safety burden
- ICP-MS/MS performance delivers interference-free results you can trust across complex matrices
- OpenLab ICP-MS software makes triple-quad performance feel effortless, simplifying every step from setup to results with batch conversion, Method Advisor, and guided diagnostics
- Designed to reduce re-runs, improve productivity, and make ICP-QQQ more accessible to every lab.

Learn more:

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