



# Reliable solutions for pesticide analysis

Run more samples, solve more  
problems, deliver more results



**Agilent Technologies**

# A proven history of innovation.

Nearly four decades ago, Agilent Technologies created the first benchtop GC/MS. Then we developed the first modular benchtop GC/MS and the first monolithic quartz quadrupole. In 1997, we introduced the first gold plated hyperbolic quartz quadrupole and in 1999 the first networked GC/MS.

In the early 1990s, Agilent pioneered a number of innovations to bring the power of mass spectrometry to liquid chromatography. These included an orthogonal atmospheric pressure ionization (API) source, a fixed-position nebulizer, a built-in calibrant delivery system, and an automatic tuning program. These developments made LC/MS more routine and rugged for pesticide analysis.

In 1994, Agilent introduced the first benchtop ICP-MS. Over the past decade, Agilent has continued to redefine the state of ICP-MS technology. Examples include the second generation Octopole Reaction System (ORS) as well as the GC-ICP-MS and LC-ICP-MS interfaces for elemental speciation analysis.

Agilent continues to extend the boundaries of analytical technology with new developments in state-of-the-art instrumentation, data analysis software, and high quality supplies and services.



Agilent's uniquely engineered monolithic quadrupole is produced using a combination of patented and proprietary technologies.

## A reputation for reliability

Analyzing pesticides in food and water is an increasingly complex challenge. Regulatory agencies worldwide are demanding lower limits of detection with high degrees of accuracy and precision. Agilent is dedicated to providing solutions that reliably meet new analytical challenges.

There are over 700 pesticides currently used worldwide, and the list is growing. No single analytical technology can analyze and monitor such a diverse collection of

compounds effectively. With Agilent's complete line of separation systems, you can reliably and routinely identify and quantify ultra-trace levels of these compounds—and many others.

All of Agilent's systems are designed from the ground up for ruggedness, reliability and ease of use.



instruments, software,

# A complete portfolio of MS products.

With nearly 40 years of experience in food safety and environmental analysis, Agilent offers you uncompromising quality and reliability across a complete portfolio of MS products.

Our MS products provide unmatched performance, sensitivity and accuracy for continuous productivity and reliable results in your laboratory. Furthermore, when you replace older Agilent instruments with the newest Agilent technology, you will immediately enjoy faster set-up time, reduced downtime, familiar instrument operation and service, and common instrument supplies.



## 5973 inert GC/MSD

The Agilent 5973 inert MSD with **proprietary solid inert ion source**—not just an inert coating—offering greater sensitivity for active compounds such as pesticides.



## 7500 Series ICP-MS

With second generation ORS technology, Agilent's 7500 Series ICP-MS systems effectively remove plasma and matrix-based interferences, making trace analysis routine.



## 1100 LC/MS Systems

New **Time of Flight mass spectrometer** and **Ion Trap mass spectrometer** make a powerful combination for getting accurate LC/MS results fast.



**Ion Trap**



**Time of Flight**



**Quad**

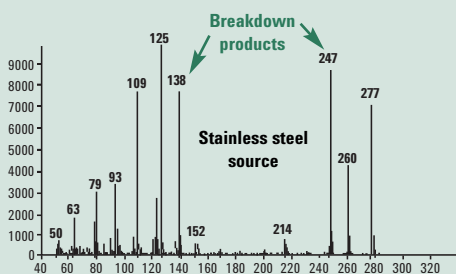
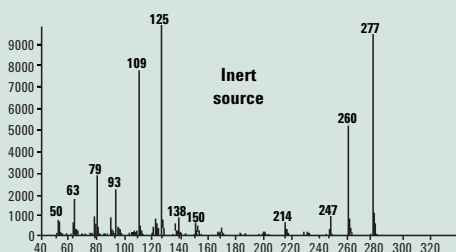
applications, consumables, service

# New 5973 inert GC/MS system offers breakthrough performance for pesticide analysis.

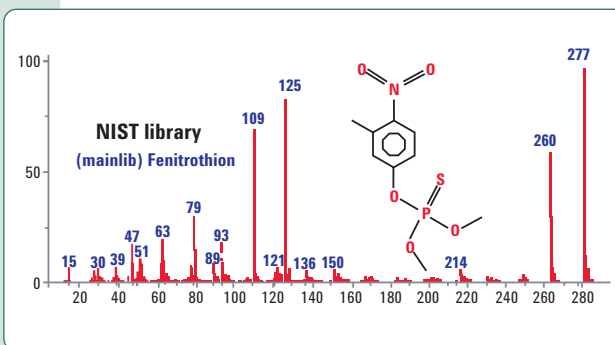
Agilent's GC systems are the workhorses of routine environmental and food analysis, offering fast, high-efficiency separations with high sensitivity and reliability. When coupled with the world's leading mass spectrometer, the resulting 5973 inert GC/MS system from Agilent is ideal for analyzing active compounds such as pesticides in complex matrices.



**The Agilent 5973 inert MSD is a revolutionary breakthrough in quadrupole mass spectrometry.** It features superior sensitivity for active compounds; up to 10,000 amu/sec scan rates; proprietary hyperbolic mass filter; and high-sensitivity off-axis high-energy dynode detector.



**Improved spectral integrity.** New inert source eliminates surface activity reactions, resulting in more reliable library matches.

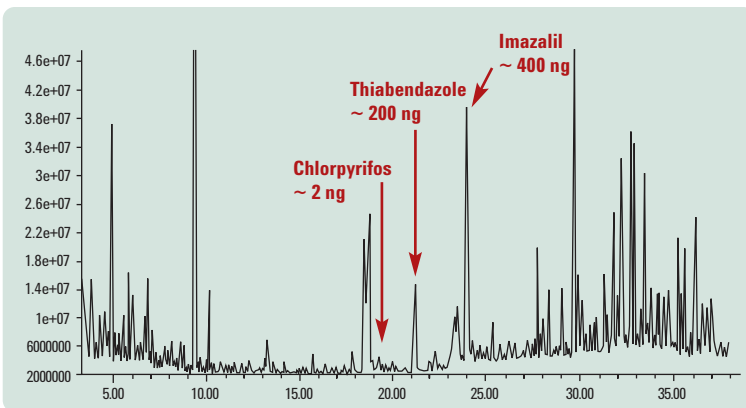


The Agilent 5973 inert GC/MS incorporates a proprietary inert ion source for exceptional system performance. The source is constructed of a solid inert material that does not wear away with cleaning. This means that you can run sample after sample with complete confidence in your data.

# Unique software tools increase productivity and confidence.

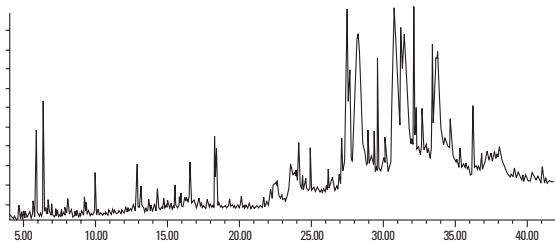
## Agilent's revolutionary retention time locking (RTL) for utmost productivity.

This exclusive technology makes it much easier and faster to analyze target contaminants in complex matrices. With RTL, analysts get the same retention times from day to day and from instrument to instrument, regardless of operator, detector type or column maintenance. The Agilent RTL Pesticide Library (product number G2081AA) lets you quickly and cost effectively screen for more than 560 pesticides and endocrine disruptors in a single run. Each entry in the RTL library has a full mass spectrum and a target retention time. The match or mismatch of the unknown retention times with the library entries is used as a qualifier, adding another level of confidence in your results.



Extraordinary results for real samples. Three unknowns identified using the Agilent RTL Pesticide Library.

### The sample



Total ion chromatogram of typical surface water extract. Data provided by the California Department of Food and Agriculture.

### The results

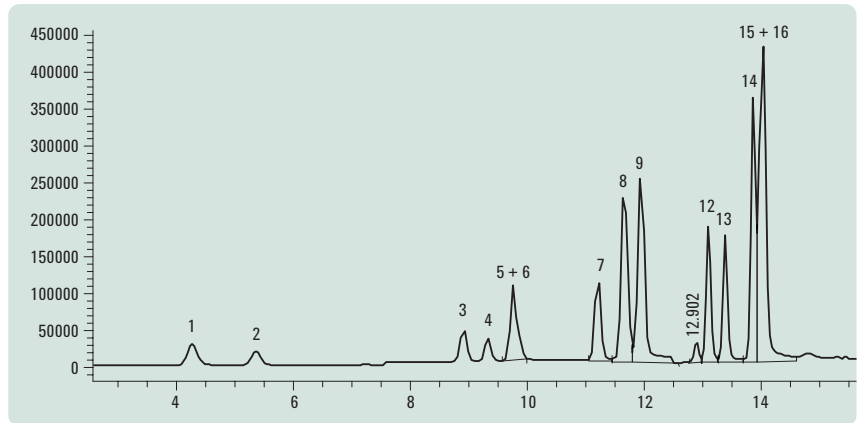
	California Department of Food and Agriculture (CDFA)	Deconvolution Reporting Software (DRS)
Number of pesticide hits	37	Same 37 plus 34 additional
Number of false positives	1	0
Time required to process	~8 hours	20 minutes

**Comparison of the time to process 17 surface water samples by GC/MS.** CDFA: A skilled analyst processing the 17 samples took about 8 hours to review results and eliminate false positives. Agilent DRS: Fully automated process took about 20 minutes and found an additional 34 compounds.

**The most comprehensive pesticide screening tool available today.** Agilent's Deconvolution Reporting Software (DRS) for GC/MS (product number G1716AA) combines the power of Agilent's RTL technology, ChemStation quantitation, and NIST's Automated Mass Spectral Deconvolution and Identification Software (AMDIS) to give you a completely automated reporting package that can quantitate and screen for more than 560 pesticides and endocrine disruptors in minutes, rather than hours.

# Advanced technology for even greater reliability of results.

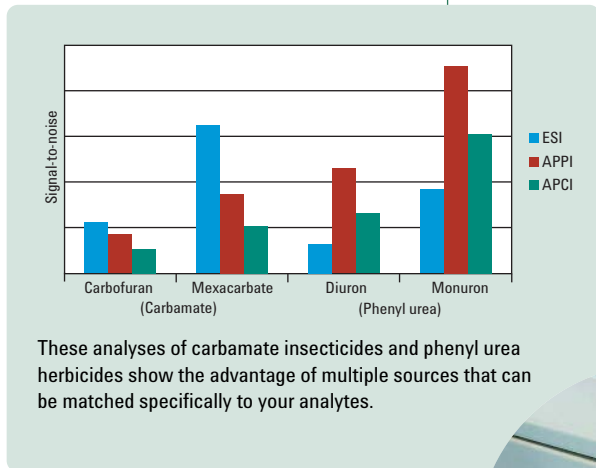
Agilent's LC and LC/MS systems are optimal for routinely analyzing polar and moderately polar pesticides and contaminants at trace levels. The newest pesticides are more water-soluble than their predecessors, are more polar, and degrade easily at high temperatures—qualities that make GC analysis complex and time consuming. In contrast, these qualities are ideal for LC/MS analysis.



**The Agilent 1100 Series LC/MS quadrupole coupled to an Agilent 1100 Series LC system separated 16 herbicides in a single analytical suite.** Compounds 5 and 6 coeluted, as did compounds 15 and 16. These compounds were quantitatively analyzed easily because of the differences in their mass spectrum.



Built-in calibrant delivery system and premixed calibrants facilitate automated tuning for the quadrupole and TOF. Automatic reference addition is included with the ESI-TOF dual spray.



These analyses of carbamate insecticides and phenyl urea herbicides show the advantage of multiple sources that can be matched specifically to your analytes.

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

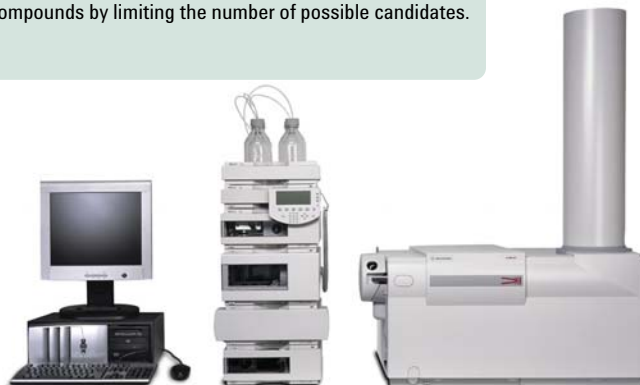
Use the atmospheric pressure chemical ionization (APCI) source to analyze a range of smaller polar and nonpolar molecules.

Use the PhotoMate APPI™ source from Syagen Technology® to ionize samples of low polarity that respond poorly or not at all with APCI and ESI.

# New LC/MS capabilities make it easier to identify unknowns.

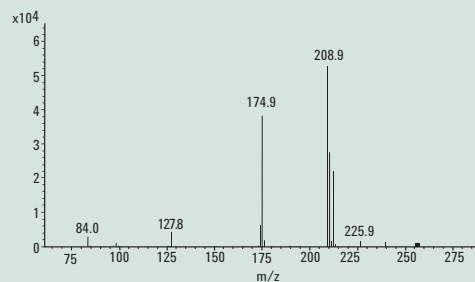
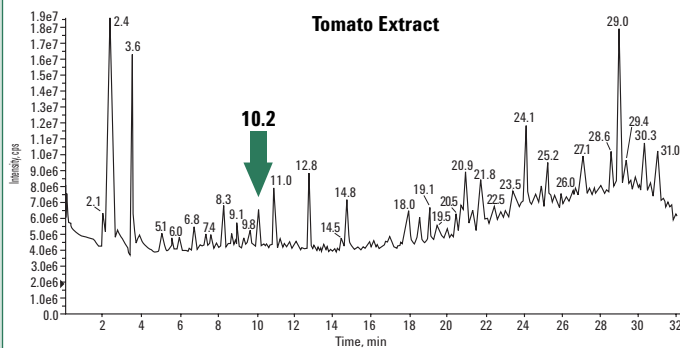
Agilent's revolutionary new TOF (Time of Flight) mass spectrometer and Trap mass spectrometer are both scanning instruments, but Ion Trap MS provides specific fragmentation data while TOF MS supplies accurate mass measurements. When you use Ion Trap MS for compound screening followed by TOF confirmation, you can quickly and accurately identify true unknowns.

**The Agilent 1100 Series LC/MSD TOF analyzer.** Combining TOF mass spectrometry with Trap mass spectrometry is a practical approach that enables highly reliable identification of unknown organic compounds by limiting the number of possible candidates.

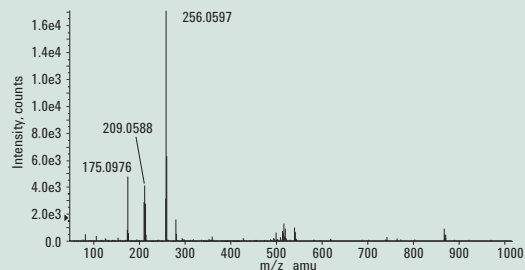


**Agilent's latest LC/MS capabilities help you find exactly what is in every sample.**

LC/MSD TOF total ion chromatogram (TIC) of tomato extract



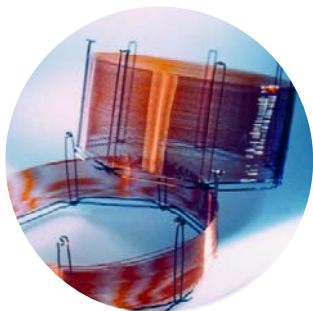
LC/MSD Trap MS/MS of imidacloprid peak in tomato extract, [M+H]<sup>+</sup> precursor m/z 256



LC/MSD TOF high fragmentor accurate mass spectrum of Imidacloprid peak in tomato extract.

**Analysis by TOF gives an accurate mass measurement within 3 ppm and provides a unique empirical formula.** The ion trap produces MS<sup>n</sup> fragments traceable to the precursor.

# Agilent columns, supplies and services assure fully optimized systems.



To ensure the best performance and maximum efficiency from your Agilent analytical systems for trace level analysis, select Agilent brand consumables and supplies. These include high-efficiency columns, precise syringes, perfectly-sized vials, high-quality septa, and clean, deactivated liners—plus much more.

For trace levels of analysis, Agilent consumables deliver a complete inert flow path to the 5973 inert GC/MSD. New splitless liners—deactivated for superior inertness—and the HP-5MSi (mass spec inert) capillary column are specially tested to ensure area response performance at very low levels on column. When used with Agilent's 5973 inert GC/MSD system, these consumables help maintain response linearity over a wide concentration range.

Other Agilent GC/MS columns offer unsurpassed sensitivity and low column bleed. For fast, high resolution HPLC analyses, look to our line of rugged and reliable ZORBAX Eclipse columns.

## World-class service

With nearly 40 years of experience in instrument design, laboratory operation, business processes, and regulatory requirements, the Agilent Service team works with you to find the best solution for your laboratory needs. Agilent Services help you get the job done with extreme precision so you can:

- Resolve problems quickly
- Optimize your assets
- Extend the life of your instruments
- Maximize uptime

Look to Agilent Services for compliance, education, maintenance, repair, consultation, telephone support, laboratory resource management, and more. With our flexible service agreements, you can choose the services that best fit your needs.

## Premier Web-based support

With an Agilent system, you have technically advanced, knowledgeable and dedicated support just a phone call or mouse click away.

Access the Agilent Web site anytime, anywhere for complete, up-to-date information.

## Agilent's Value Promise

Agilent is the only analytical instrument company offering **10 years of guaranteed value** on all new product purchases. The Agilent Value Promise:

- Guarantees you at least 10 years of instrument use from the date of purchase or we will credit you with the residual value of your system when you upgrade to a replacement model.
- Applies to Agilent gas and liquid chromatography systems, including GC/MS, LC/MS and ICP-MS.
- Ensures a safe purchase.

Agilent stands behind our systems to maximize your return on investment.

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