

GC-MS/MS:3500i

GAS CHROMATOGRAPHY-TRIPLE QUADRUPOLE MASS SPECTROMETER



EPCC / PRODUCTS / APPLICATION / SOFTWARE / ACCESSORIES / CONSUMABLES / SERVICES

Analytical Technologies Limited

An ISO 9001 Certified Company

www.analyticalgroup.net

GC-MSMS is a completely new gas chromatography-triple quadrupole mass spectrometer (GC-MS/MS) created by Analytical Technologies, after many years investment. It has independent intellectual property rights by adopting a series of innovative mass spectrometry technologies. GC-MS/MS adopts the gas chromatography/mass spectrometer interface without cold point in the whole process and the design of EI ion source to ensure efficient and stable sample transmission and ionization efficiency.

GC-MS/MS has excellent anti-population ability and stability, outstanding scalability and best price value. It is suitable for the application of traditional medicine, agriculture residues, food safety, environmental monitoring and so on. Usage habits include professional mass spectrometry control and quantitative analysis software, and combines with standard method library intelligent batch processing and customized report output functions, which reduces the operation difficulty of mass spectrometry software system greatly. At the same time, it also has a rich application method library to meet the application needs of more mass spectrometry users.

▶▶ **Product feature-mass spectrometry system**

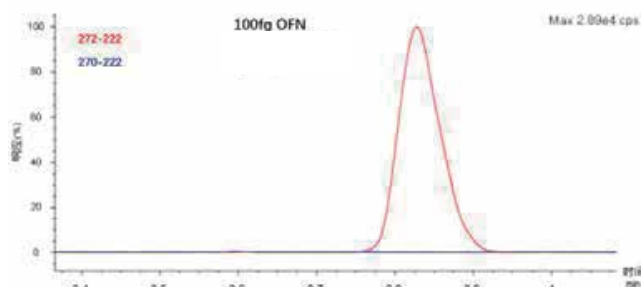
▶▶ **Ion Source**

Adopt the gas chromatography/mass spectrometer interface without cold point in the whole process and the design of EI ion source to ensure efficient sample transmission and ionization efficiency.



▶▶ **Collision Cell with Axial Acceleration**

Improve scanning speed
 Improve collision efficiency
 Eliminate crosstalk between ion pairs and no memory effect.



▶▶ Tandem QQQ quality analyzer

Adopting design of tandem quadrupole mass spectrometers and six pole collision pool.

The stable dual mass analyzer can carry out various mass analysis scans and is suitable for various mass spectrometry research work.

Efficient collision pool for maximum ion transport.

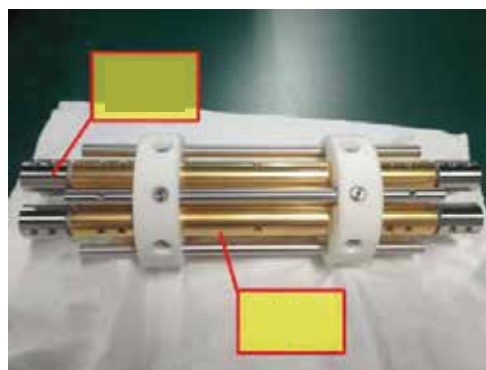
Including full scan, SIM, SRM, product ion scan, precursor ion scan, neutral loss scan and MRM.



▶▶ Pure molybdenum quadrupole Mass Spectrometers

Pure molybdenum quadrupole has the best material stability to ensure the stability of the quality axis.

Gold plating on the surface and inert treatment to eliminate organic deposition.



▶▶ Intelligent MRM

The intelligent MRM function provides users with the convenience of method editing and modification.

Be able to analyze more target compounds in a single run for more efficient use of instrument analysis time and increased sample throughput.

▶▶ Excellent sensitivity

High ionization efficiency and ion transport efficiency.

The innovative technology of axial acceleration collision pool improves the collision efficiency greatly.

The patented technology of pulse counting detection can detect ion signals without loss and filter noise interference effectively.

▶▶ Excellent stability

The patented closed-loop adaptive adjustment technology of dual-channel RF power supply improves the stability of quadrupole RF power supply.

The patented anti temperature and humidity alternating technology is suitable for a wider range of temperature and humidity applications.

▶▶ Mass Pundit mass spectrometry workstation

Mass Pundit mass spectrometry is easy to operate. The function of one-click automatic tuning and quality calibration reduces the complexity of instrument control and the threshold of instrument use. Mass spectrometry analysis software and report template can be customized according to different application fields and different users to meet the use needs of various application fields.

▶▶ Product Features

GC-MS/MS is equipped with GC3500i gas chromatography, which adopts advanced electronic flow control system, microfluidic plate control technology, high-precision independent temperature control system and high-sensitivity detector, with flexible and friendly user interface, high-speed sampling frequency and signal processing speed, meeting the user's requirements for instrument analysis capability, reliability, stability and advancement.

▶▶ **Intelligent instrument control, which is simple and easy to use**

The host monitoring software is developed based on the intelligent system of the micro-kernel processing architecture. It is equipped with an 8-inch full-fit high-resolution capacitive touch screen and an image UI combined with intelligent functions such as self-diagnosis reminder, self-detection of leakage, and self-saving of carrier gas, reducing the difficulty of use and maintenance, and easily grasp the status of the instrument.

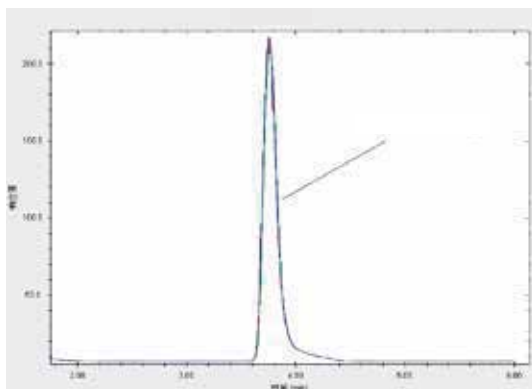
The system innovatively adopts a multi-core collaborative processing architecture, and task instructions are automatically allocated according to the current load of each micro-core, which greatly improves the response time, execution efficiency and stability of processing tasks, ensuring that the software still operates smoothly after long-term operation.

The software follows the simple and easy-to-use design concept, retains the necessary system parameter monitoring and setting, and simplifies various unnecessary complex settings through intelligent one-key operation. At the same time, the simple and refreshing monitoring and parameter setting interface adopt a combination of quasi-materialization and flattening and modular design, and the interface is easy to learn.



▶▶ **Excellent chromatographic stability**

The whole flow path of the machine adopts a new generation of high-precision electronic pressure/flow control, with automatic atmospheric pressure and temperature compensation. The highest control accuracy can reach 0.01kPa, with reliable inlet and column oven temperature control module, ensuring that the system has excellent analysis reproducibility. In addition, in some specific applications, the target analyte has a high boiling point and strong adsorption, and can be equipped with a fully inert pipeline to ensure the excellent reproducibility of the system.



▶▶ PTV solvent diversion inlet

Support hot/cold diversion and diversion-less modes, as well as large volume injection (solvent diversion) and on column injection (TPOC), with air cooling, the temperature range can be controlled from 5°C to 450°C, and with liquid nitrogen cooling, the lowest temperature can reach -100°C, liquid carbon dioxide can reach -50°C. Program temperature up to the three gradients can be programmed, and the heating rate can reach 800°C/min.

Large volume injection can be used to reduce the concentration process in pretreatment. Convenient cryogenic option for analytical applications at initial cryogenic conditions (cold on-column loading)

The compact and low-melt design and efficient forced ventilation system increase sample throughput.

▶▶ Retention time lock

Excellent GC analytical techniques require consistent retention times. With the new generation of high-precision electronic pressure/flow control, reliable column oven temperature control module and convenient analysis workstation, in the case of cutting and long-term use of chromatographic column efficiency changes, the retention time can be locked in one injection, reducing repetitive editing of MS methods by experimenters and easily obtain high-quality gas phase data.

Consistent retention times can be obtained on the same GC or GC-MS system, or even multiple GC and GC/MS systems.

▶▶ Product Features

▶▶ Post-column backflush technology

The backflushing flow path is precisely controlled by auxiliary EPC, without dead volume.

Reduce contamination by backflushing the matrix of high molecular weight compounds through split flow to avoid entering the detector; and reduce the accumulation of high boilers in the column.

Faster cycle times, backflushing away high molecular weight compounds, reducing chromatographic run time and column temperature.

Longer column life and reducing detector maintenance.

Improve data quality and get better analytical results.

▶▶ Automatic sampler

▶▶ Liquid injection

Whether standard injections, fast injections, sandwich injections or large volume injections of up to 1000 µl of liquid samples, GC3500i provide highly reliable and efficient operations, allowing you to easily have stable and reproducible analyses result and no cross-contamination or analyte discrimination. The maximum 110-position autosampler is optional, and there is no need for personnel to be on duty during high-throughput injection.

▶▶ Headspace injection

The software's overlapping sample preparation function allows pre-processing such as preheating of multiple samples and analysis of GC to be carried out simultaneously to maximize the utilization of the equipment. The headspace needle is constantly heated and continuously cleaned by carrier gas purge during the process to prevent cross-contamination.

▶▶ Solid Phase Microextraction (SPME)

All steps required for SPME analysis can be fully automated, including fiber tip aging, sample extraction, fiber tip analysis, and fiber tip replacement. Derivatization can be performed directly on the fiber tip or by adding reduced, increasing its service life and increasing the uptime of the instrument.

▶▶ Dynamic Headspace (Purge and Trap DHS)

Compared with static headspace, dynamic headspace greatly improves the detection limit, and retains the characteristics of good reproducibility and easy operation of static headspace. Solid sample viscous material and liquid sample headspace are blown away by inert gas, and volatile substances are transferred to replaceable adsorption wells for enrichment, and the entire process is automated GC/MS analysis.

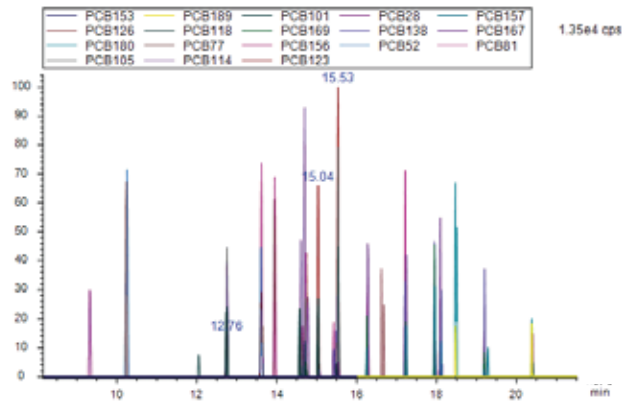
▶▶ Applications GC-MS/MS



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▶▶ Detection of polychlorinated biphenyls in water

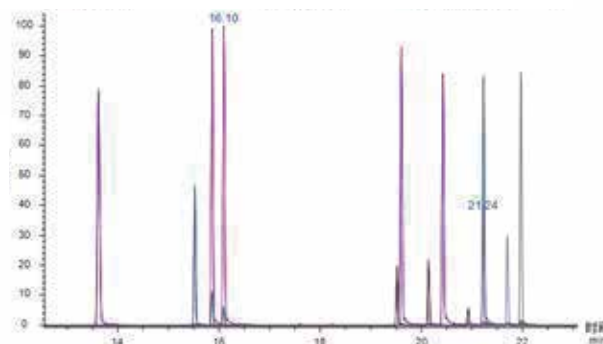
The GC-MSMS analysis scheme established on the basis of "HJ715-2014 Determination of Polychlorinated Biphenyls in Water Quality-Gas Chromatography-Mass Spectrometry" effectively reduces the signal-to-noise ratio and improves the sensitivity of target compounds.



Chromatograms of 18 polychlorinated biphenyls Analysis by GC-MS/MS

▶▶ Detection of nitrophenols in water

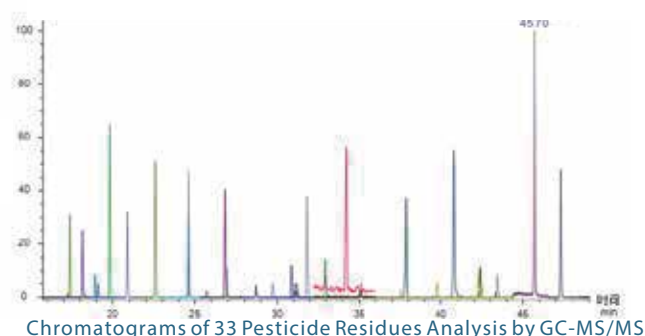
The analysis scheme established according to "HJ1150-2020 Determination of Nitrophenolic Compounds in Water Quality; Gas Chromatography-Mass Spectrometry" can provide a reference for the detection of nitrophenolic compounds in water quality.



Chromatograms of 12 Nitrophenols Analysis by GC-MS/MS

▶▶ Detection of banned pesticide residues in herbal medicines

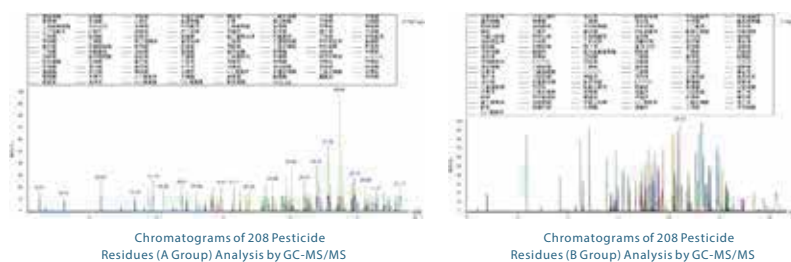
The sensitivity of the method meets the requirement of "undetectable" limit of quantification stipulated in the new pharmacopoeia. The established GC/MS analysis scheme can provide a reference for the residues in medicinal materials. detection of banned pesticide.



Chromatograms of 33 Pesticide Residues Analysis by GC-MS/MS

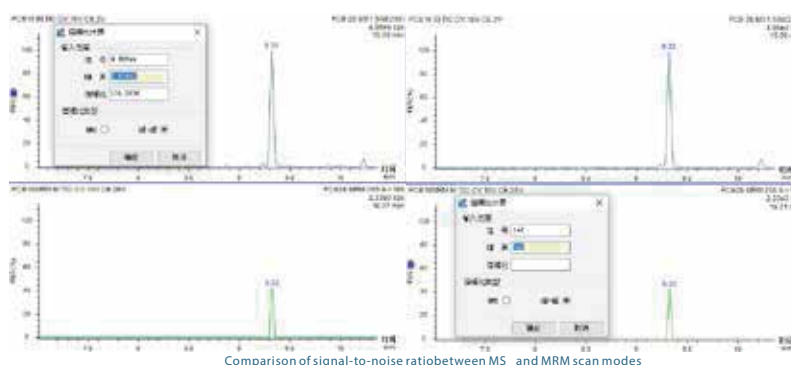
▶▶ Detection of various pesticide residues in food

GB23200.113-2018 Detection of Residues of 208 Pesticides and Their metabolites in plant-derived foods by Gas Chromatography-Mass Spectrometry” is the first national standard to use GC-MS/MS for the detection of various pesticide residues. Compared with traditional GC or GC-MS methods, the detection throughput, selectivity and sensitivity of GC-MS/MS national standard are greatly improved (the limit of quantification for many pesticides is lower than 0.01mg/kg), and it will become a powerful assistant for pesticide residue analysis in the industry.



Chromatograms of 208 Pesticide Residues (A Group) Analysis by GC-MS/MS

Chromatograms of 208 Pesticide Residues (B Group) Analysis by GC-MS/MS



Comparison of signal-to-noise ratio between MS and MRM scan modes

▶▶ Technical Specification of Gas Chromatograph-Triple

▶▶ Quadrupole Mass Spectrometer

1. General technical specifications

Gas chromatograph-triple quadrupole mass spectrometer, integrating the capability of gas chromatograph and mass spectrometer, has sufficient sensitivity and selectivity, good stability and strong anti-interference. Therefore, it is applicable to the qualitative and quantitative analysis on high sensitivity of trace pesticides and veterinary drugs in complex matrix.

2. Work environment

1) Work environment temperature: 18-25

2) Humidity in work environment: (20~60)%RH

3) Power supply: five sets of single-phase (220±20)VAC, 10A, 50Hz power supply

3. System technical requirements

- Configuration and performance indicators of gas chromatograph (new version)
- Column oven
- Maximum service temperature: 450°C;
- Heating rate: 120/min at maximum, typically 50°C/min; The temperature rise program in 32 steps and 33 stages and temperature decline program is supported, with the reproducibility better than 0.5%; 5min are required for cooling from 450°C to 50°C;
- Temperature control accuracy: within ±0.1°C;
- Holds up to 3 capillary columns
- Split / splitless injection ports
- Maximum service temperature: 450°C;
- Gas circuit system: The programmable electronic gas circuit control is adopted to provide various control modes such as constant pressure, constant flow, programmed boost and programmed up flow;
- Flow control: 0-500mL/min (N₂); 0-1,000mL/min (He, H₂)

Pressure control:0-100.00psi (689.5kpa);

- Control accuracy:±0.001 psi,capable of realizing sample injection under pulse pressure.
- Operation mode:split or spliteless;
- Programmable electronic gas circuit control
- Modular design is adopted,which can support upto 18 channels of electronic pressure and flow control;
- The flow,presure,linear speed and split ratio of the injection port are set directly through the work station software or touch screen;
- It has the function of automatic atmospheric pressure and temperature compensation.
- Automatic sample injector
- Support 16bitor 110bit automatic sample injector
- Injection Volume: 0.1uL-250uL (16 bit) or 500uL (110 bits)
- Sampling accuracy:±0.01%
- Injection precision:RSD 0.5%
- Requirements for configuration and performance indicators of masss spectrometry system
- Elion source:double filament,with10-300eV ionization energy and 150°C-350°cof heating temperature.
- Sample injection interface:Non-cold point heat tracing technology is adopted for the MS/MS interface,and the interface temperature is 50-400°C,so as to ensure the efficient transmission of GC-MS/MS samples.
- Ion optical system
- 190°deflection is adopted to effectively filter the unionized neutral particles,so as to reduce the background noise and avoid the pollution to the detector.

- No redundant transmission poleisset in the ion transmission system,and the ions can directly enter Quadrupole to avoid ion loss during transmission.
- Mass analysis system
- Mass analyzer:Triple quadrupole mass analyzer.
- Quadrupole:Gold-plated quadrupole made of high precision pure Mo materialis used,and the material can realize the best stability through deactivation;Clean able pre-and post-quadrupoles are setto eliminate the organic deposits;and the best mass axisstability can been sured without heating heating.
- Collisioncell:Hexapole axial acceleration design is adopted,capable of effectively elimi-natingthe interference of ion pair and ensuring the high-through put analysis capabili-ty. High-purity nitrogenis adopted as the collision gas(with the purity>99.999%).
- Resolution:0.4-3.0amu,adjustable.
- Mass stability:<±0.1amu/24hours.
- Scanning speed:upto20,000amu/s.
- Number of MRM channels:100channels/s
- Mass range m/z:EI,5-1,100amu;
- Sensitivity:EI,MRM mode:100fg/uL of no of 1uL,> 15000:1
- 10Full scan,selected ion monitoring(SIM),production scan,precursorion scan,neutral loss scan,multiple reaction monitoring(MRM),etc.
- Detector
- 190°off-axi selectron multiplier technology,with out any positive and negative ion dis-criminationeffect,which has long service life,capable of ensuring the long-term data stability.
- Pulse-counting detector,to ensure the data reproducibility of low limit of detection.
- Vacuum system:Mechanical pump and dualin let turbo molecular pump at250+450L/s.A differential pumping system is for med between the ion transmission area and mass analysis area, functioning for automatic power-off protection.

- Work station software:
- Basic features of software system: Windows 10 operating system. The software can control the gas chromatograph, liquid chromatograph and mass spectrometer, with built-in data processing and report editing functions. Besides, the software can realize the function configuration condition optimization of the instrument automatically, the automatic quantification, the mass and data analysis, and the establishment and retrieval of spectral data base.
- The system has the functions of automatic correction and instrument condition monitoring.
- The GC-MS/MS operation software can be installed on the personal computer and used for the offline processing of sample analysis data report generation. (When bidding, the customer's on-site installation diagram of gas-liquid-triple quadrupole mass spectrometer should be provided, with the product model indicated, which should be searched on the official website of head quarters)

▶▶ Accessory system

- Computer system Brand computer with main stream configuration, 4GB memory, 1TB hard disk.
- AC stabilized power supply 15KVA, input voltage of 140V-300V, output voltage of 220V±1%.
- Laser printer 6018L, black and white laser printer.
- Mechanical pump Pumping speed: 65m³/h, 220V power supply, 800W.

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HPLC Servicing :HPLC Servicing : We have team of service engineers who can attend to any make of HPLC promptly @the most affordable cost.

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Our Products & Technologies



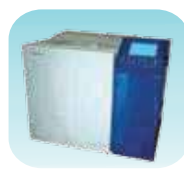
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Chromatograph
3007



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Optical Emission
Spectrophotometer



DSC/TGA



Semi Auto Bio
Chemistry Analyzer



HEMA 2062
Hematology
Analyzer



Micro Plate
Reader/Washer



URINOVA 2800
Urine Analyzer



Total Organic
Carbon 3800



Fully Automated
CLIA



NOVA-2100
Chemistry Analyzer



PCR/Gradient PCR/
RTPCR



TOC
Analyzer



Laser Particle
Size Analyzer



Ion Chromatograph



Water purification
system

Regulatory compliances



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