Agilent

Trusted Answers

Triple Quadrupole GC/MS

Application Compendium

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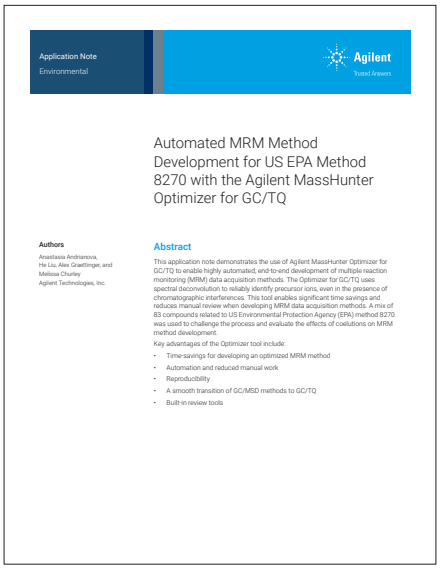
7000D Triple Quadrupole GC/MS

The Agilent 7000D triple quadrupole GC/MS is the latest model of the most successful GC/TQ in history. The right choice for most applications, the 7000D is the fourth-generation version of the GC/TQ used by agencies around the world to create and validate many now-standard GC/MS/MS methods.

The 7000D triple quadrupole GC/MS incorporates a range of features such as the MRM Optimizer tool and dynamic MRM methods to help you move existing single quadrupole methods to the GC/TQ platform and gain the best possible performance in the process.

7000D Triple Quadrupole GC/MS Application Notes



Automated MRM Method Development for US EPA Method 8270 with the Agilent MassHunter Optimizer for GC/TQ

This application note demonstrates the use of Agilent MassHunter Optimizer for GC/TQ to enable highly automated, end-to-end development of multiple reaction monitoring (MRM) data acquisition methods. The Optimizer for GC/TQ uses spectral deconvolution to reliably identify precursor ions, even in the presence of chromatographic interferences. This tool enables significant time savings and reduces manual review when developing MRM data acquisition methods. A mix of 83 compounds related to US Environmental Protection Agency (EPA) method 8270 was used to challenge the process and evaluate the effects of coelutions on MRM method development.

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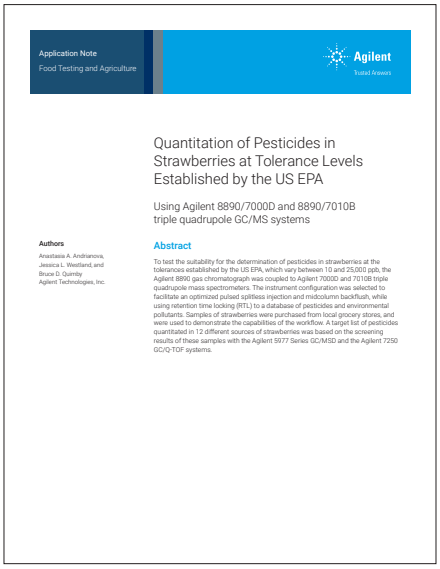

Quantitation of Pesticides in Strawberries at Tolerance Levels Established by the US EPA

To test the suitability for the determination of pesticides in strawberries at the tolerances established by the US EPA, which vary between 10 and 25,000 ppb, the Agilent 8890 gas chromatograph was coupled to Agilent 7000D and 7010B triple quadrupole mass spectrometers. The instrument configuration was selected to facilitate an optimized pulsed splitless injection and midcolumn backflush, while using retention time locking (RTL) to a database of pesticides and environmental pollutants. Samples of strawberries were purchased from local grocery stores, and were used to demonstrate the capabilities of the workflow. A target list of pesticides quantitated in 12 different sources of strawberries was based on the screening results of these samples with the Agilent 5977 Series GC/MSD and the Agilent 7250 GC/Q-TOF systems.

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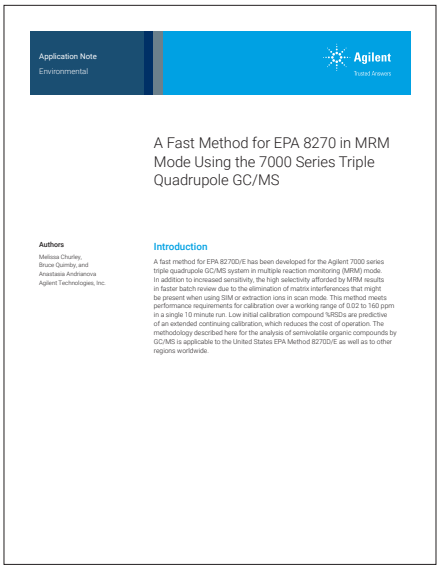
7000D Triple Quadrupole GC/MS Application Notes



A Fast Method for EPA 8270 in MRM Mode Using the 7000 Series Triple Quadrupole GC/MS

A fast method for EPA 8270D/E has been developed for the Agilent 7000 series triple quadrupole GC/MS system in multiple reaction monitoring (MRM) mode. In addition to increased sensitivity, the high selectivity afforded by MRM results in faster batch review due to the elimination of matrix interferences that might be present when using SIM or extraction ions in scan mode. This method meets performance requirements for calibration over a working range of 0.02 to 160 ppm in a single 10 minute run. Low initial calibration compound %RSDs are predictive of an extended continuing calibration, which reduces the cost of operation. The methodology described in this note for the analysis of semivolatile organic compounds by GC/MS is applicable to the United States EPA Method 8270D/E as well as to other regions worldwide.

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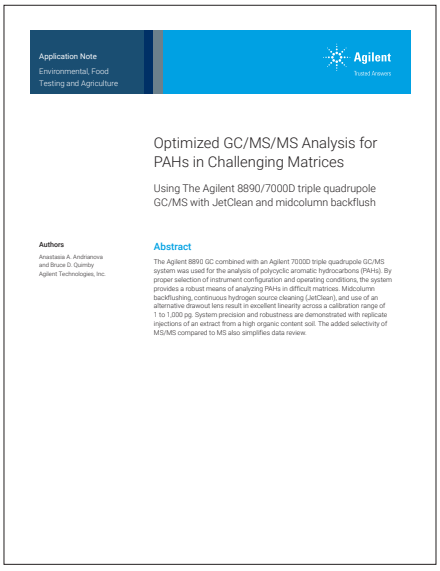

Optimized GC/MS/MS Analysis for PAHs in Challenging Matrices

The Agilent 8890 GC combined with an Agilent 7000D triple quadrupole GC/MS system was used for the analysis of polycyclic aromatic hydrocarbons (PAHs). By proper selection of instrument configuration and operating conditions, the system provides a robust means of analyzing PAHs in difficult matrices. Midcolumn backflushing, continuous hydrogen source cleaning (JetClean), and use of an alternative drawout lens result in excellent linearity across a calibration range of 1 to 1,000 pg. System precision and robustness are demonstrated with replicate injections of an extract from a high organic content soil. The added selectivity of MS/MS compared to MS also simplifies data review.

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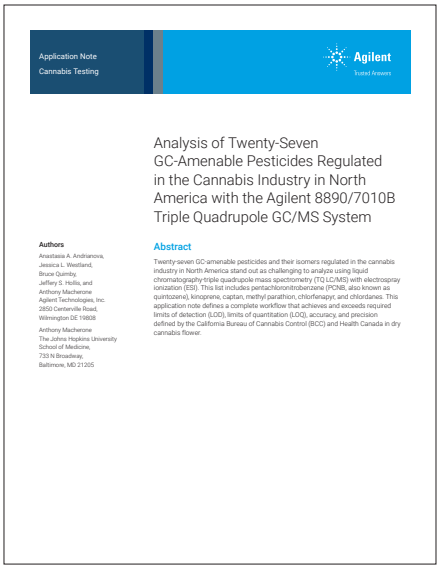
7010B Triple Quadrupole GC/MS

The Agilent 7010B triple quadrupole GC/MS is the most sensitive version of Agilent's compact benchtop triple quad (MS/MS) systems, providing attogram-level detection limits in electron ionization (EI) mode. The breakthrough in sensitivity allows you to optimize sample preparation, reduce maintenance cycles by injecting less, or achieve new detection limits.

7010B Triple Quadrupole GC/MS Application Notes



Analysis of Twenty-Seven GC-Amenable Pesticides Regulated in the Cannabis Industry in North America with the Agilent 8890/7010B Triple Quadrupole GC/MS System

Twenty-seven GC-amenable pesticides and their isomers regulated in the cannabis industry in North America stand out as challenging to analyze using liquid chromatography/triple quadrupole mass spectrometry (TQ LC/MS) with electrospray ionization (ESI). This list includes pentachloronitrobenzene (PCNB, also known as quintozene), kinoprene, captan, methyl parathion, chlorfenapyr, and chlordanes. This application note defines a complete workflow that achieves and exceeds required limits of detection (LOD), limits of quantitation (LOQ), accuracy, and precision defined by the California Bureau of Cannabis Control (BCC) and Health Canada in dry cannabis flower.

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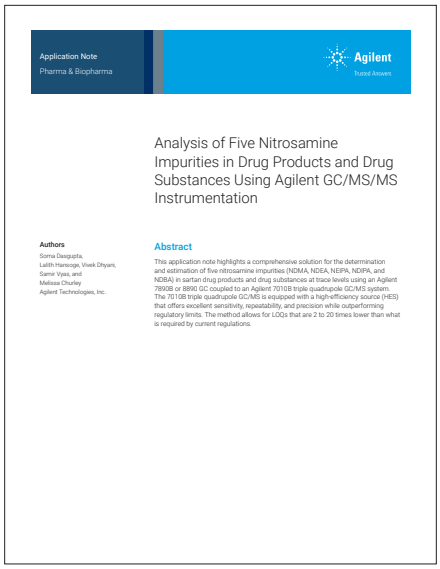

Analysis of Five Nitrosamine Impurities in Drug Products and Drug Substances Using Agilent GC/MS/MS Instrumentation

This application note highlights a comprehensive solution for the determination and estimation of five nitrosamine impurities (NDMA, NDEA, NEIPA, NDIPA, and NDBA) in sartan drug products and drug substances at trace levels using an Agilent 7890B or 8890 GC coupled to an Agilent 7010B triple quadrupole GC/MS system. The 7010B triple quadrupole GC/MS is equipped with a high-efficiency source (HES) that offers excellent sensitivity, repeatability, and precision while outperforming regulatory limits. The method allows for LOQs that are 2 to 20 times lower than required by current regulations.

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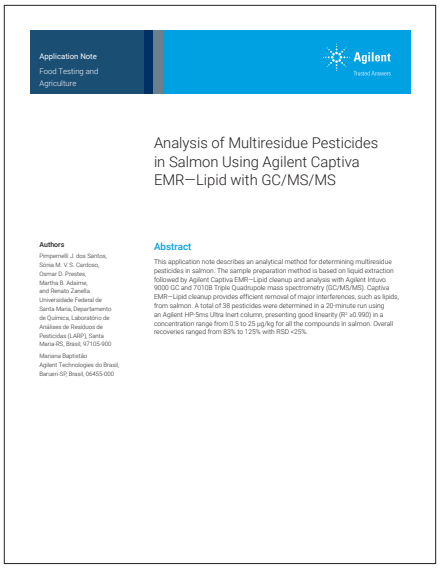
7010B Triple Quadrupole GC/MS Application Notes



Analysis of Multiresidue Pesticides in Salmon Using Agilent Captiva EMR—Lipid with GC/MS/MS

This application note describes an analytical method for determining multiresidue pesticides in salmon. The sample preparation method is based on liquid extraction followed by Agilent Captiva EMR—Lipid clean up and analysis with the Agilent Intuvo 9000 GC and 7010B triple quadrupole mass spectrometry (GC/MS/MS). Captiva EMR—Lipid clean up provides efficient removal of major interferences, such as lipids, from salmon. A total of 38 pesticides were determined in a 20-minute run using an Agilent HP-5ms Ultra Inert column, presenting good linearity (R2 ≥0.990) in a concentration range from 0.5 to 25 µg/kg for all the compounds in salmon. Overall recoveries ranged from 83 to 125% with RSD <25%.

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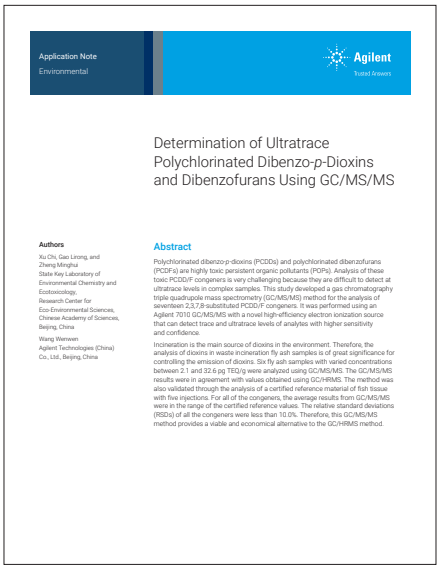

Determination of Ultratrace Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans Using GC/MS/MS

Polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) are highly toxic persistent organic pollutants (POPs). Analysis of these toxic PCDD/F congeners is very challenging because they are difficult to detect at ultratrace levels in complex samples. This study developed a gas chromatography triple quadrupole mass spectrometry (GC/MS/MS) method for the analysis of seventeen 2,3,7,8-substituted PCDD/F congeners. It was performed using an Agilent 7010 GC/MS/MS with a novel high-efficiency electron ionization source that can detect trace and ultratrace levels of analytes with higher sensitivity and confidence.

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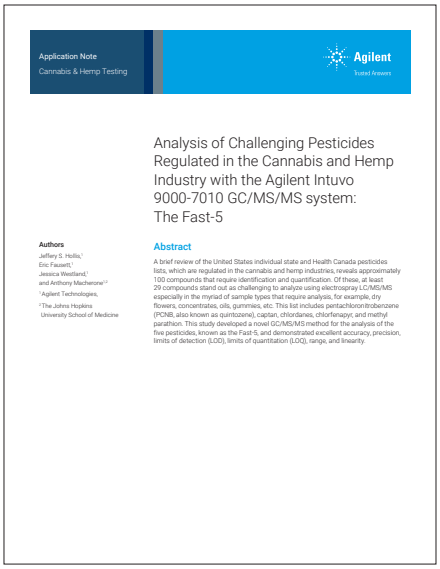
7010B Triple Quadrupole GC/MS Application Notes



Analysis of Challenging Pesticides Regulated in the Cannabis and Hemp Industry with the Agilent Intuvo 9000-7010 GC/MS/MS system: The Fast-5

A brief review of the United States individual state and Health Canada pesticides lists, which are regulated in the cannabis and hemp industries, reveals approximately 100 compounds that require identification and quantification. Of these, at least 29 compounds stand out as challenging to analyze using electrospray LC/MS/MS especially in the myriad of sample types that require analysis, for example, dry flowers, concentrates, oils, gummies, etc. This list includes pentachloronitrobenzene (PCNB, also known as quintozene), captan, chlordanes, chlorfenapyr, and methyl parathion. This study developed a novel GC/MS/MS method for the analysis of the five pesticides, known as the Fast-5, and demonstrated excellent accuracy, precision, limits of detection (LOD), limits of quantitation (LOQ), range, and linearity.

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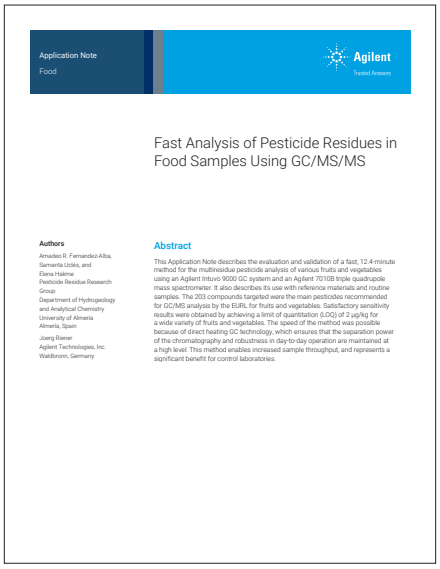
Agilent products and solutions are intended to be used for cannabis quality control and safety testing in laboratories where such use is permitted under state and country law.



Fast Analysis of Pesticide Residues in Food Samples Using GC/MS/MS

This application note describes the evaluation and validation of a fast, 12.4 minute method for the multiresidue pesticide analysis of various fruits and vegetables using an Agilent Intuvo 9000 GC system and an Agilent 7010B triple quadrupole mass spectrometer. It also describes its use with reference materials and routine samples. The 203 compounds targeted were the main pesticides recommended for GC/MS analysis by the EURL for fruits and vegetables. Satisfactory sensitivity results were obtained by achieving a limit of quantitation (LOQ) of 2 µg/kg for a wide variety of fruits and vegetables. The speed of the method was possible because of direct heating GC technology, which ensures that the separation power of the chromatography and robustness in day-to-day operation are maintained at a high level. This method enables increased sample throughput, and represents a significant benefit for control laboratories.

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