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Pesticides in Food: Targeted Quantitation Solution Guide

Your lab, your challenges—
our solutions to help you address them

- Adapt to current and upcoming analytical challenges
- Develop robust, sensitive, reliable quantitation workflow solutions
- Address organizational profitability goals
- Implement easy workflow solutions from sample prep to report generation

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QuEChERS
High throughput sample preparation

QuEChERS extraction

- Easy to use
- Covers broad range of analytes (low polarity to high polarity)
- Suitable for high-moisture samples (fruits and vegetables)
- Fast results at a low cost
- Compatible with LC-MS based workflows

Critical suggestions for sample extraction and clean-up

Sorbents used in QuEChERS Methods		
Material	**Purpose**	**Typical Matrices**
Magnesium sulfate	Removal of excess water	Fruits, vegetables
PSA (Primary/Secondary/Amine)	Removal of organic acids, fatty acids, sugars	Fruits
C18	Removal of lipids and sterols	Milk, meat, fish
GCB (Graphatized Carbon Black)	Removal of pigments and sterols	Wine, green vegetables, carrots

Product Selection		
Matrix Type	**Examples**	**Sorbent Requirements**
General matrices	Apples, cucumbers, melons	Magnesium sulfate, PSA
Fatty matrices	Milk, cereals, fish	Magnesium sulfate, PSA, C18
Pigmented matrices	Lettuce, carrots, wine	Magnesium sulfate, PSA, C18, GCB
High pigmented matrices	Spinach, red peppers	Magnesium sulfate, PSA, C18, GCB

Vanquish UHPLC
Superior performance

Thermo Scientific™ Vanquish™ UHPLC systems

- Thermo Scientific™ Vanquish™ Horizon UHPLC system for ultimate performance
- Thermo Scientific™ Vanquish™ Flex Binary UHPLC system designed for maximum flexibility
- Separations with better reproducibility
- High sample throughput with fast analysis
- Better connectivity of LCMS with dedicated software
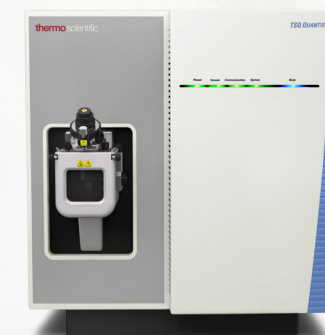
Thermo Scientific™ Accucore™ columns

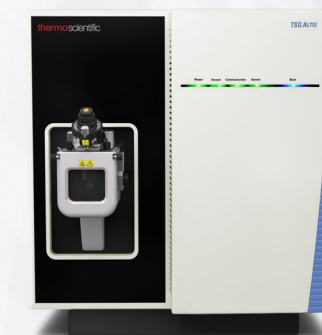- Robust columns with wide separation chemistry for all UHPLC applications

Robust mass spectrometry
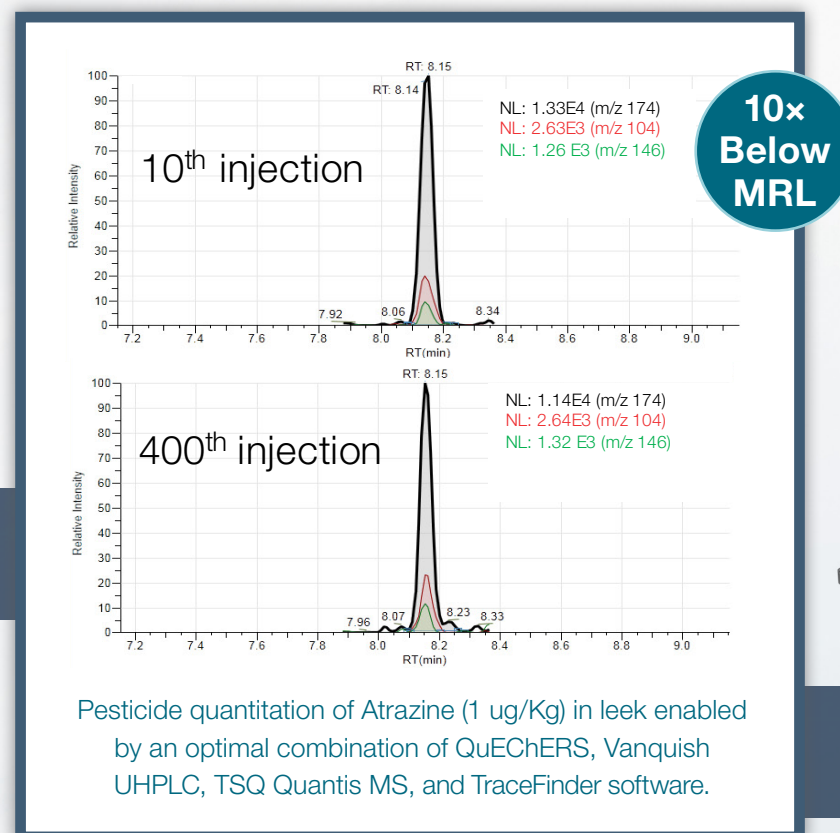## Confident quantitation

- **AIM+ technology**
  The next step in precision design ensures ultimate performance in ion management, inception to detection, from the Thermo Scientific™ OptaMax™ NG ion source housing to the enhanced electron multiplier. AIM+ incorporates segmented quadrupoles and enhanced RF and DC electronics to further optimize ion management precision, reliability, speed, and reproducibility.

- **Easy maintenance**
  – No need to break vacuum for routine maintenance
  – User accessible maintenance designed with simplicity in mind

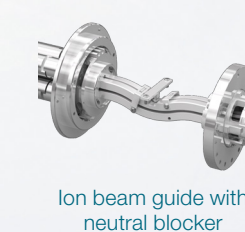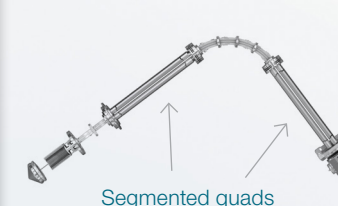Thermo Scientific™ TSQ Quantis™ Triple-Stage Quadrupole MS

Thermo Scientific™ TSQ Altis™ Triple-Stage Quadrupole MS

Features responsible for enabling pesticide quantitation:

- **Sensitivity**
  – Enabled by segmented quads and H-SRM technology
- **Robustness**
  – Enabled by ion beam guide and neutral blocker with OptaMax NG ion source

- **Productivity**
  – Automated compound optimization for fast method development
  – Intuitive user interface for easy method setup
- **Speed**
  – Enabled by Active Q2, with axial DC field
  – Enhanced RF and DC electronics supporting ultra-fast SRM rates (600 SRM/second)

10× Below MRL

10th injection

NL: 1.33E4 (m/z 174)
NL: 2.63E3 (m/z 104)
NL: 1.26 E3 (m/z 146)

RT: 8.15
RT: 8.14

400th injection

NL: 1.14E4 (m/z 174)
NL: 2.64E3 (m/z 104)
NL: 1.32 E3 (m/z 146)

RT: 8.15

Pesticide quantitation of Atrazine (1 ug/Kg) in leek enabled by an optimal combination of QuEChERS, Vanquish UHPLC, TSQ Quantis MS, and TraceFinder software.

Segmented quads

OptaMax NG ion source

Ion beam guide with neutral blocker

Active Q2 (collision cell)

TraceFinder software
Enabling quantitation with confidence

TraceFinder™

- **Productivity**
  – For targeted quantitation labs
- **Intuitive and easy**
  – From method development to automated report generation

- **Compound databases**
  – For SRM workflows
- **Template-driven workflows**
  – With customized templates

Highlights of Thermo Scientific TraceFinder software

- **Method development**
  – Ready made compound databases for SRM methods
- **Productivity**
  – 4-click workflows

- **Easy data review**
  – Intuitive flagging features
- **Report**
  – Easily customizable and automated report generation

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Service and Application Support

Unity™ Lab Services

- Single source for integrated lab service, support, and supply management
- Complete portfolio of services and support solutions
- Enabling users to improve productivity, reduce total cost of ownership, and ensure performance
- Help in instrument and equipment acquisition to disposition

Application support

- From regional demonstration laboratories to centers of excellence support
- From global marketing teams to special solution centers
- Enable your workflows via an extensive network of experienced and expert scientists

Thermo Fisher Scientific ensures success for customers in food safety laboratories focused on targeted quantitation of pesticides.

Partnership to Ensure Your Success

Enables your lab with the capability to address key challenges:

Webinar:

– Comprehensive Pesticide Quantitation Workflow with LC-MS

Application Note:

– LC-MS/MS analysis of polar pesticides in honey with QuPPe extraction

– Fast routine analysis of polar pesticides in foods by suppressed IC and MS

– Robust LC-MS analysis of pesticides with 1.0 mm i.d. column using the Vanquish Horizon UHPLC system

– Fast screening and quantification of pesticide residues using a comprehensive LC-MS solution

– Increased productivity in pesticide residue analysis – quantifying 440 pesticides following China GB 2763-2014

– Being on the Safe Side: Pesticide Quantitation with a Comprehensive LC-MS Workflow

Blog:

– Challenges in Pesticide Quantitation: A Comprehensive Solution

Pesticide Analysis Compendium:

– Comprehensive QQQ workflows for pesticide analysis

– Pesticide Explorer Collection

Support:

– Unity Lab Services

– United States Training Courses

– European Training Courses

– AppsLab Library

Find out more at **www.thermofisher.com/Altis-Quantis**

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