Agilent Ultivo Triple Quadrupole LC/MS System

A new solution for food testing

Many food labs are encountering challenges analyzing contaminants such as pesticides, veterinary drugs, and mycotoxins. As the food chain becomes more global, protecting the consumer and a product brand demands more speed, sensitivity, and robustness.

This document shows the benefits of the rapid and sensitive analysis of food using the Agilent Ultivo triple quadrupole LC/MS system.

Laboratory challenges	Solution: Agilent Ultivo triple quadrupole LC/MS system
The matrix challenge Many food labs are encountering challenges with matrix in the extracts they analyze. This can occur because of commodities with challenging complexity, or because (in a drive for improved efficiency) labs try to simplify the cleanup of their extracts. One way to offset these challenges is to inject less or dilute the sample. With regulated limits on many contaminants already in a ppb range, you need exceptional technology to maintain acceptable method performance.	**Designed for sensitivity and precision** The system's Cyclone Ion Guide gets more ions to the detector for increased sensitivity, providing reproducible results.
The throughput challenge Increasingly, food labs want to test for more contaminants per run, while simultaneously trying to reduce the time taken per run. So, new MS technology needs to handle more targets and fewer ions per target. This means ensuring that the different ions formed are manipulated quickly and selectively, but without losses.	**Designed to combine speed with low level detection** The system's Vortex Collision Cell improves ion transmission, enhancing MS/MS performance, and the wafer-thin pre and post filters ensure that MRM switching is fast enough for a wide scope of compounds.
The maintenance challenge With food analysis, front-end components inevitably need cleaning from time to time. The routine maintenance required cuts into the productivity of a lab's analysts, and represents time when samples cannot be run.	**Designed for the everyday** With VacShield it is not necessary to vent the instrument for routine maintenance of the ion injector, this frees up time to allow lab personnel to perform other important tasks.
The confidence challenge Food analysis requires stable levels of data quality, accuracy, and reproducibility. You need to know quickly any aspects that might affect baseline performance, and you certainly do not want to have to rerun batches after discovering an issue too late.	**Designed to make reliability routine** Real-time diagnostics monitor key aspects that effect instrument performance, and the user is notified automatically to prevent inconvenient issues.
The lab capacity challenge A lab can be more productive if it contains more instruments doing analysis, but what happens when the lab size is smaller than your aspirations?	**Designed for the future** Seventy percent smaller than similar systems, Ultivo can triple your lab's capacity using the same space.

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Ultivo benefits applied to real world applications

Mycotoxins

Food labs worldwide are using the advantages of LC/MS in different ways for mycotoxin analysis. Many leverage the benefits of QuEChERS extraction to produce a clean extract, which allows for an external calibration of the method using matrix-matched standards. This approach also reduces the amount of routine maintenance required on the mass spectrometer. More information on the excellent results possible with Ultivo when using this approach with corn (Figure 1), peanut products, and black pepper is available in the Application Note: Analysis of Mycotoxins in Food Matrices (5991-8962EN).

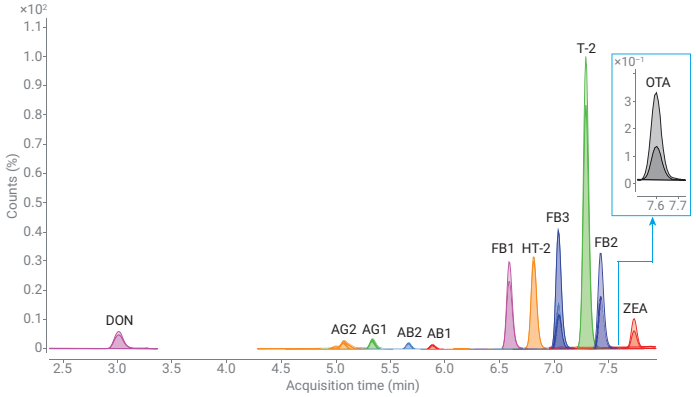

Figure 1. All controlled mycotoxins at their regulated limit for corn, analyzed in under 10 minutes using high frequency polarity switching.

Pesticides and veterinary drugs

The QuEChERS approach is the gold standard for pesticide and veterinary drug analysis. It lends itself to the large multiresidue suites that food labs are increasingly applying.

Multiresidue Pesticides Analysis in Food Matrices (5991-8820EN) shows the excellent results possible with Ultivo when analyzing 251 pesticides in oranges, avocadoes, and black tea, extracted and cleaned using Agilent QuEChERS kits (Figure 2).

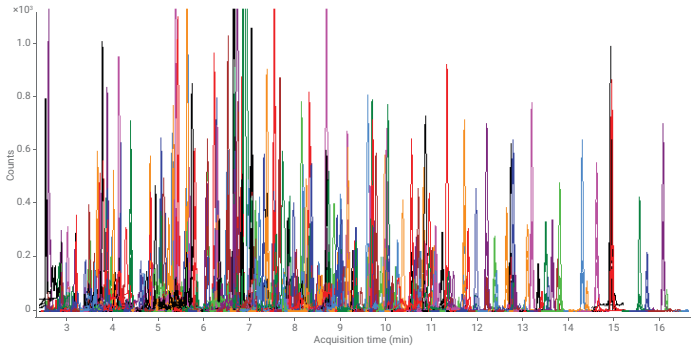

Figure 2. Two hundred fifty-one pesticides at 5 ng/g in black tea analyzed in under 20 minutes using high frequency polarity switching.

For QuEChERS workflows applied to veterinary drugs, cleanup needs to also address the high level of lipids/lipid present in typical samples for this application. Agilent's Enhanced Matrix Removal (EMR) technology ensures fat removal without compromising recovery of key targets. The analysis therefore benefits from removal of matrix effects, and routine maintenance is also reduced.

The Application Note: Multiclass Residue Analysis of Veterinary Drugs in Pork and Hen Eggs Using the Agilent Ultivo Triple Quadrupole LC/MS System (5991-8746EN) shows the excellent results possible with Ultivo when analyzing 151 veterinary drugs in pork and chicken eggs (Figure 3).

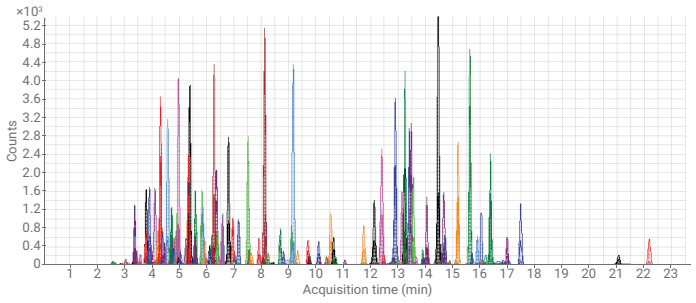

Figure 3. One hundred fifty-one veterinary drugs at 2 ng/g in egg analyzed in under 25 minutes using high frequency polarity switching.

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