Ultivo is an exceptionally innovative new mass spectrometer, which can minimize laboratory workspace needs, as it requires a footprint of only 350x350 mm, is designed to address several challenges faced by analysts, and is integrated into the Ultivo Triple Quad LC/MS platform. Ulto is designed to address many of the challenges faced by labs performing environmental and food safety analyses. Innovative technologies housed within Ultivo allow us to achieve a reduced overall footprint, while maintaining the performance found in many larger MS systems. Innovations such as VacShield, Carbon on Glass (C2G), Optional Cell and the lyophilized Mycotoxin Shoot Cup, maximize quantitative accuracy and sensitivity, while providing long-term confidence in results. Ultivo enforces the need for user intervention for optimal setup and system maintenance, but is attractive for the non-expert MS user with a compact footprint. MassHunter simplifies data acquisition, method development, data analysis and reporting. This software’s capabilities can improve the quality of your results by reporting time point results in a manner that is easily interpretable, increasing the likelihood of confidence in results.

### Experimental

#### Sample Preparation

Com, peanut, and black pepper were chosen as commonly regulated crop foods of diverse matrix compositions for mycotoxins. 12 mycotoxins in corn and peanut matrices, and 5 mycotoxins in black pepper matrix were quantified using dynamic MRM in a 5-10 min Ultimate LC/MS/MS method. Mycotoxins standards were spiked into matrix extracts for quantification. 5g corn flour, 5g peanuts, or 3g black pepper were extracted with 25 mL of ACN: HPLC water (50:50), filtered, and then diluted with HPLC water to 100 ppb. A novel modified liquid removal sorbent technique was used to clean up the mycotoxins in the black pepper. A novel modified liquid removal sorbent technique was used to clean up the mycotoxins in the black pepper.

#### Instrument Parameters

- Ultimate Triple Quad MS Parameters
  - Column: Eclipse Plus C18 3.0 x 150 mm, 1.8µm
  - Column temp: 45°C
  - Injection volume: 2 µL
  - Flow rate: 0.450 mL/min
  - Pressure: 30 psi
  - Capillary voltage: 3300 V(+); 2800 V(-)
  - Nozzle voltage: 0 V(+); 0 V(-)
  - Cycle Time: 500 ms

### Results and Discussion

#### Mycotoxin Signal Response

Excellent precision and sensitivity was attained for mycotoxins in various food matrices, as a combination of sample preparation techniques, LC separation, and the innovative technology in the Ultivo triple quadrupole mass spectrometer. Excellent linearity was achieved across calibration range for all analytes. The precision of the Ultivo triple quadrupole mass spectrometer was determined by a series of mycotoxins spiked into corn matrix at 100 ppb, with an average RSD of 2.34% and an average S/N of 169.

#### Mycotoxin Maximum Residue Limits and Sensitivity

- Mycotoxin Corn Peanut Black Pepper
- Corn: 10 ppb
- Peanut: 5 ppb
- Black Pepper: 100 ppb

#### Conclusions

- Ultivo is an exceptionally innovative new mass spectrometer, which can minimize labor-intensive resources, thus enabling the accurate and sensitive detection of commonly regulated mycotoxins. Excellent linearity was achieved across all analytes.

#### References


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Figure 1: Ultivo Integrated into LC Stack

Figure 2: Excellent detection of mycotoxins in corn matrix at 1/10 assigned Maximum Levels (ML).

Figure 3: Quantitation limit for all mycotoxins studied in each matrix, defined as a fraction of the assigned ML.

Table 2: Maximum Levels (ML) for mycotoxins used in this study.

<table>
<thead>
<tr>
<th>Mycotoxin</th>
<th>Corn (ppb)</th>
<th>Peanut (ppb)</th>
<th>Black Pepper (ppb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aflatoxin B1</td>
<td>10</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Aflatoxin B2</td>
<td>10</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Aflatoxin M1</td>
<td>10</td>
<td>10</td>
<td>100</td>
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<tr>
<td>Aflatoxin G1</td>
<td>10</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Ochratoxin A</td>
<td>2</td>
<td>2</td>
<td>500</td>
</tr>
<tr>
<td>Fumonisin B1</td>
<td>100</td>
<td>100</td>
<td>n/a</td>
</tr>
<tr>
<td>Fumonisin B2</td>
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<tr>
<td>Fumonisin B3</td>
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</tr>
<tr>
<td>Zearalenone</td>
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<td>500</td>
<td>n/a</td>
</tr>
<tr>
<td>T-2 Toxin</td>
<td>100</td>
<td>100</td>
<td>n/a</td>
</tr>
<tr>
<td>HT-2 Toxin</td>
<td>500</td>
<td>500</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Figure 4: The mycotoxin signal without precision in all three matrices.

Figure 5: Excellent precision demonstrated for Aflatoxin B1 at 1/10 ML (50 ppb or 500 ppb) in all matrices.

Figure 6: Exceptional linearity was demonstrated for 6 selected compounds in corn matrix.