Introduction

Mycotoxins are toxic secondary metabolites produced by fungi. These chemical toxins exist in food as a result of fungal infection of crops. Mycotoxins have strong resistance to decomposition and digestion, so they remain in the food chain in meat and dairy products. They also resist exposure to high temperatures, such as cooking and boiling. Their effects on human and animal health include weakened immune systems, cancer, death, and they also can be allergens or irritants.

When mycotoxins samples are purified and concentrated using immunoaffinity (IAC) columns. An alternative to this type of sample preparation method has been developed.

Two Supel™ Tox SPE cartridges were tested in corn, wheat, and/or raw peanut paste matrix blank samples.

Analysis of Aflatoxins

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Supel Tox SPE Cartridges</th>
<th>Analytical column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytical column</td>
<td>Ascentis Express C18, 10 cm x 3.0 mm, 2.7 µm particle size</td>
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</tr>
<tr>
<td>mobile phase:</td>
<td>(A): water; (B): acetonitrile; (C): methanol (74:13:13, A:B:C) with 0.782 pppb bromide and 230 µL nitric acid</td>
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</tr>
<tr>
<td>flow rate</td>
<td>0.40 µL/min</td>
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</tr>
<tr>
<td>temp.</td>
<td>35 ºC</td>
<td>35 ºC</td>
</tr>
<tr>
<td>det.</td>
<td>FLD, 390-440 nm FL, I.C.B.E. cell</td>
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</tr>
<tr>
<td>injection</td>
<td>40 µL</td>
<td>40 µL</td>
</tr>
</tbody>
</table>

Typical sample purification methods for aflatoxins, DON, ochratoxin, and immunoaffinity columns for analysis. It consists of multiple steps causing additional time and labor in comparison to the use of Supel Tox SPE cartridges. The additional manipulations of the sample required in immunoaffinity preparations introduce higher possibilities of reproducibility issues and increased %RSD’s in sample recoveries.

Using the Supel Tox filament SPE cartridges for sample cleanup and Fused-Core™HPLC technology, Aspectra Express C18 column produced a simple robust method for the analysis of aflatoxins in a variety of matrices.

HPLC Conditions

- Column: Ascentis Express C18, 10 cm x 3.0 mm, 2.7 µm particle size
- mobile phase: (A): water; (B): acetonitrile; (C): methanol (74:13:13, A:B:C) with 0.782 pppb bromide and 230 µL nitric acid
- flow rate: 0.40 µL/min
- temp.: 35 ºC
- det.: FLD, 390-440 nm FL, I.C.B.E. cell
- injection: 40 µL

Using Supel Tox SPE vs immunoaffinity

- Supel Tox SPE offers:
  - Simple robust method for the analysis of aflatoxins in a variety of matrices.
  - Consistent and reproducible recoveries of aflatoxins spiked into extracts of corn, wheat, and/or raw peanut paste matrices were obtained using Supel Tox SPE cartridges.

Conclusion

Using the Supel Tox SPE cartridge, a simple, fast method to purify spiked corn and wheat samples for the analysis of DON was established. Sample variation was highly controlled with %RSD’s < 2%. The samples demonstrated suitable recoveries and little background was evident in the chromatograms. Ascentis Express C18 column produced short analysis times and sufficient separation of the aflatoxins from other compounds.

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