CrossTOX® Multi-Mycotoxin Analysis for LC-MS/MS

Matrix Removal for a Superior Analysis

Sample preparation

Mycotoxins are ubiquitous and pose a health risk to animals and humans. Due to incorrect storage conditions or climatic impact (high humidity/drought), mold growth and mycotoxin formation can occur in the field or in storage. The prevalence of mycotoxins and their toxicity are reasons for strict regulation, as the health effects of mycotoxin ingestion can be dramatic.
Grains are contaminated with a variety of mycotoxins due to fungal growth in the field and the effects of mold during storage. Matrices such as nuts and kernels are more likely to be affected by storage mold, and therefore mycotoxins such as Aflatoxins or Ochratoxin a are more commonly found in these types of matrices. This implicates the necessarity of multi-mycotoxin analysis using the CrossTOX® column in combination with LC-MS/MS for correct determination and quantification.

CrossTOX® - a fast way to clean-up all mycotoxins in a single step

A Small syringe compatible cartridge allows fast and efficient matrix removal with best recovery for mycotoxins, especially suitable for analysis of multiple mycotoxins by LC-MS/MS.

- High recovery rates
- Efficent removal of matrix interferences
- Suitable for many matrices:
  (cereal / nuts / dried fruit / animal feed / complex matrices)

CrossTOX® compatible with syringe

Processing Protocol

Extraction and sample clean-up

Weigh in 20 grams of homogenized matrix and extract with 100 mL acetonitrile/water/acetic acid (84/15/1 (v/v/v)). Downscaling depending on matrix availability is possible and saves solvent. Extraction is performed using Ultraturax or equivalent for a minimum of 5 minutes; depending on the extraction tool, extraction time may vary. The crude extract is centrifuged at 3000 x g or filtered. The filtrate is then passed through the CrossTOX® column (a volume of 0.5 - 3 mL can be used). The flow-through is collected in a GC vial and can be used directly for LC-MS/MS analysis.

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LC-MS/MS parameter

Accucore Biphenyl 100 mm x 2.1 mm; 2.6 µm UPLC column with Defender Guard was used. The column temperature was set at 38 °C.
Eluent A): HPLC water/methanol (98 / 2 (v/v))+ 1% acetic acid + 5 mM ammonium acetate.
Eluent B): HPLC water/methanol (2 / 98 (v/v)) + 1 % acetic acid + 5 mM ammonium acetate. Flow rate 0.4 mL / min.
MS settings: heated ESI, 3500 V positive / 1500 V negative ion voltage. Ion transfer tube temperature 325 °C, evaporator temperature 350 °C.
At least one quantifier and two qualifier product ions were selected for all analytes.

Time (min)	Eluent A (%)	Eluent B (%)	Curve
0-2	95	5	5
2-5	15	85	5
5-11	5	95	5
11-13	95	5	5
13-16	95	5	5

Results

The recoveries of spiked and naturally contaminated matrices were analysed. To demonstrate the suitability of the CrossTOX® column, some matrices were spiked with additional toxins, and the natural contamination was measured without spiking and subtracted for the calculation of recovery rates. The spiking values were chosen according to the prescribed values and 50% of them to show the suitability of CrossTOX® cartridges for food and feed analysis.

	Rice	Almonds	Dried figs	Corn silage
Aflatoxin B1	99	110	96	85
Aflatoxin B2	102	102	100	105
Aflatoxin G1	98	96	115	98
Aflatoxin G2	94	104	83	75
Ochratoxin A	98	98	93	89
Sterigmatocystin	95	81	88	85
Deoxynivalenol	100			95
Fumonisin B1	104			100
Fumonisin B2	99			102
T2 toxin	82			71X
HT-2 toxin	88			70X
Citrinin	96		86	

** all data according to EC 406/2001 performacne criteria for mycotoxin analysis (not determined as not relevant in this matrix) X (internal standard necessary for correction)

Conclusion

CrossTOX® has shown better analytical results than dilute and shoot and as a positive side effect saves column longevity and LC-MS/MS.

These *LCTech products* were used:

17900 CrossTOX® (100 cartridges per box)

Do you have a special request as to which matrix we should test for you?
Contact us by e-mail at: info@LCTech.de

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