



March 2019

## Deoxynivalenol in Muesli, Corn and Millet ~ Manual and Automated ~

Do you have a special matrix that we should test for mycotoxins? Please let us know and write an e-mail to: [mycotoxins@LCTech.de](mailto:mycotoxins@LCTech.de)

### Sample Preparation

MYCOTOXINS

#### Start Fit into the Day

A good start to the day begins with a delicious breakfast. Many people can't renounce their muesli. The oat flakes and nuts contained in müsli deliver some nutrients, like fiber to make you feel full and also unsaturated fatty acids, which provide the body with a lot of energy - a good refreshment for the day.

However, the main ingredient in every muesli is cereal. Deoxynivalenol can be formed in cereals due to various fungi of the *Fusarium* genus. In agriculture, especially livestock farming, the impact of DON is as an economic factor, as the toxin causes considerable productivity losses due to deterioration in animal health.\*

The intake of DON in animals can lead to loss of appetite, refusal to feed, vomiting and reduced growth, as the toxicological symptoms resemble a bacterial infection. For this reason, the maximum levels of mycotoxins are strictly regulated by law. The examination of more complex matrices, such as muesli, can often become a challenge.

\*Source: Federal Institute for Risk Assessment, Evaluation of the mould toxin deoxynivalenol (DON) in oat products

#### SPE Clean-up Columns for Deoxynivalenol Analysis

Deoxynivalenol, also known as vomitoxin, is generally analysed with an HPLC / UV detector or alternatively with HPLC / post-column derivatisation and fluorescence detector or with LC/MS.

Good sample preparation ensures that in all three procedures the service life of the analysis system and also the life of the HPLC column is raised and the sample throughput is increased. Especially with more complex matrices, sample preparation is usually more expensive (muesli). The DONeX clean-up column developed by LCTech cleans common matrices like corn as well as more complex matrices like muesli with low matrix interferences.

Thereby related long chromatographies with interfering matrix peaks can be reduced. The result are better and shorter chromatograms and thus an optimization of the analysis time.



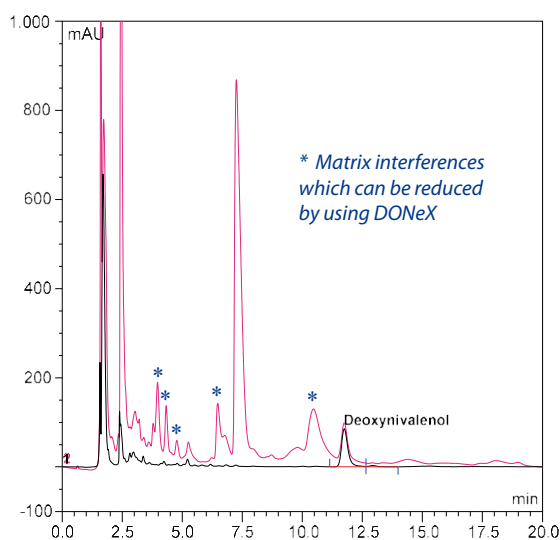
## Processing Protocol

Homogenise 20 g of millet, corn or muesli and extract it with 100 mL acetonitrile/water (84/16 (v/v)). To ensure high extraction efficiencies, continue the extraction for at least 20 minutes.

Filtrate the raw extract with a glass fibre filter and load 20 mL onto the DONeX column. Then collect the flow-through, which is free of matrix interferences. Wash the column with 10 mL of acetonitrile/water (84/16 (v/v)) and collect the rinsing solution afterwards. Combine both the flowthrough fraktion and the washing fraktion.

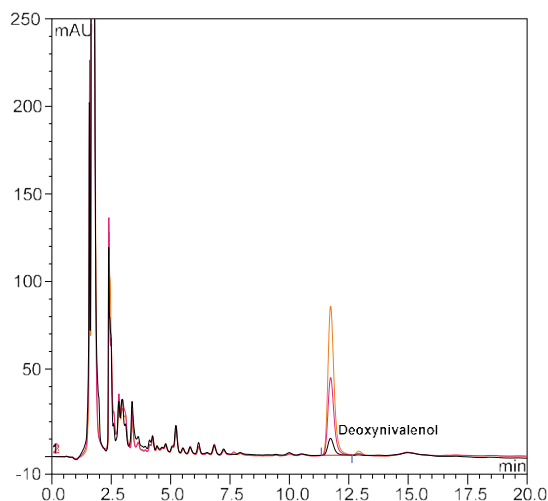
Concentrate 7.5 mL of the collected samples (equivalent to 1 g matrix) and dissolve it with 500 µL of solvent (95 % water; 5 % acetonitrile).

## Chromatogram



**Black** = 10 ppm Muesli cleaned-up with DONeX

**Rot** = 10 ppm Muesli not cleaned



**Black** = 1 ppm Muesli cleaned-up with DONeX

**Rot** = 5 ppm Muesli cleaned-up with DONeX

**Orange** = 10 ppm Muesli cleaned-up with DONeX

## HPLC-Conditions

(Deoxynivalenol)

Mycotoxin:	Deoxynivalenol (DON)
HPLC:	isocratic
Column Oven:	33°C
Separation Column:	RP C-18 (P/N 10544)
Flow Rate:	1.0 mL/min
Eluent:	HPLC-water/ acetonitrile (95/5 (v/v/))
Absorption Wavelength	218 nm

## Recovery Rates

Content of Deoxynivalenol  
in Millet/ Corn/ Muesli

Mycotoxin:	Deoxynivalenol (DON)
Standard*	100
Recovery Rate** Millet, 5 ppb	100
Recovery Rate** Millet 10 ppb	88
Recovery Rate** Corn, 5 ppb	107
Recovery Rate** Corn, 10 ppb	94
Recovery Rate** Muesli, 5 ppb	103
Recovery Rate** Muesli, 10 ppb	102

\*Standard is set = 100 %, \*\*Corrected with non-spiked sample /  
The results comply with the performance specifications of EC 401/2006 (Section 4.3.1)

## These LCTech products were used:

DONeX, SPE Column for DON-Analysis  
P/N 12792 / 12793

HPLC Separation Column RP C-18  
P/N 10522

EluVac Vacuum Manifold  
P/N 12415