Matrix of the Month

May 2017

Aflatoxins B/G Quinoa Seeds ~ 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

Sample Preparation

MYCOTOXINS

Aflatoxins B/G in Food

In order to ensure that imported food meets our quality requirements, it has to be tested for impurities such as bacteria, pesticides, heavy materials and mycotoxins. The consumption of food contaminated with mycotoxins can be very harmful to health even in low concentrations, for example it can cause chronic diseases or even organ failure. Therefore, the legislation has set maximum permissible limit values for mycotoxins. If food exceeds these levels, it may not be imported. Recently, for example, high concentrations of aflatoxins B/G have been found in quinoa seeds.

Precise, Simple and Fast with LCTech Products: Our Solutions for Your Laboratory

LCTech offers a broad product range around sample preparation. It is our goal to facilitate your daily routine in the laboratory with our high quality semi- and fully-automated systems and devices as well as with our useful and cost effective consumables.

Immunoaffinity Columns for Clean-up of Aflatoxins B/G

The immunoaffinity columns AflaCLEAN, AflaCLEAN Select and AflaCLEAN SMART are suitable for sample preparation in routine analysis using HPLC with fluorescence detection or LC-MS. They are designed for the purification of aflatoxins B/G in food and feed and achieve very good recovery rates in difficult matrices. The columns possess a very high matrix tolerance and are able to bind the aflatoxins highly specific. The columns are available in a convenient 3 mL polypropylene format or additionally as 1 mL version and can be processed either manual or automated e.g. with the robotic system FREESTYLE SPE.

For a faster processing of your samples LCTech offers SMART columns in a small 3 cm format. For example, emptying of the column is not necessary and sample loading and washing of the column only takes 4 minutes at the most with a 10 mL sample volume and a flow rate of 3 mL/min. Since a maximum of only 400 µL are used for elution, processing time will be reduced even further.

Immunoaffinity columns AflaCLEAN

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Protocol of Manual Processing

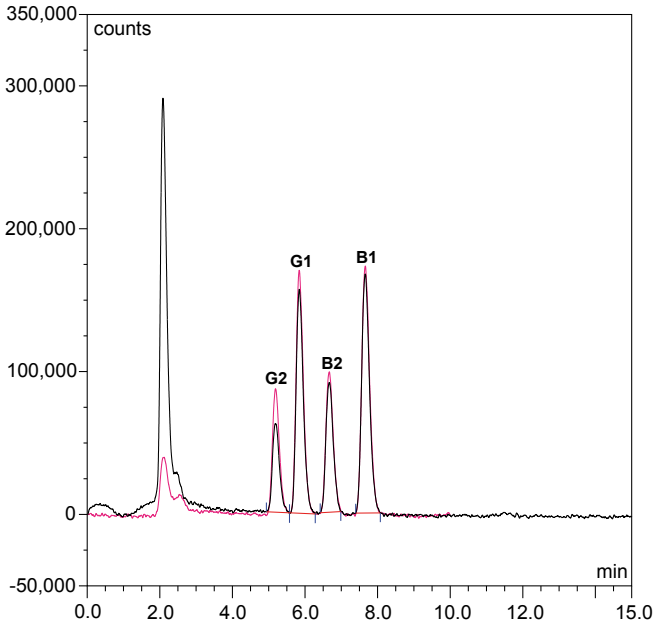
Homogenise 10 g of quinoa seeds and add 1 g sodium chloride, 100 mL 80/20 (methanol/water 80/20 (v/) and 50 mL n-hexane. The extraction should be performed for 10 - 15 minutes. Filtrate the extract and centrifuge it for the phase separation between the aqueous (lower) phase and the n-hexane (upper) phase with 2000 x g for 10 minutes. Dilute 10.5 mL of the aqueous (lower) phase with 64.5 mL PBS-buffer.

Load 25 mL extract onto the AflaCLEAN / AflaCLEAN Select immunoaffinity column. Afterwards wash the column with 10 mL deionised water and load this solution onto the IAC-column, too.

Dry the column and elute the toxin with 2 mL methanol. Keep in mind, that the methanol incubates for 5 minutes into the column bed, in order to dissolve the antibody toxin bond completely.

Dilute and measure the eluate to HPLC conditions.

Chromatograms



Overlay of Chromatograms:
Red = standard 3.5 ng / 2 mL (equates to 10 ppb)
Black = quinoa-seeds 10 ppb

HPLC-Conditions
(Aflatoxins B/G)

HPLC:	isocratic
Column Oven:	36 °C
Separation Column:	RP C18 (P/N 10522)
Flow Rate:	1.2 mL/min
Eluent:	HPLC-water/methanol/ acetonitrile (60/30/15 (v/v/v))
Fluorescence Detection:	Derivatisation with UVE photochemical reactor
Excitation Wavelength:	365 nm
Emission Wavelength:	460 nm

Automated via FREESTYLE SPE

SPE-gripper with immunoaffinity column

Recovery Rates
Content of Aflatoxins B/G in Quinoa-Seeds

Aflatoxin	B1	B2	G1	G2
Standard*	100	100	100	100
Recovery Rate Quinoa Seeds, 10 ppb**	96	95	92	71

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

These LCTech products were used:

AflaCLEAN / AflaCLEAN Select,
Immunoaffinity Columns for Aflatoxins B/G
P/N 10514 / 12058

UVE, Photochemical Reactor
P/N 10519

FREESTYLE SPE, Robotic System
for Automated Sample Preparation
P/N 12663 / 12668

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