Matrix of the Month

September 2020

Aflatoxins B/G in Turmeric
~ 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: info@LCTech.de

Sample Preparation

MYCOTOXINS

Turmeric

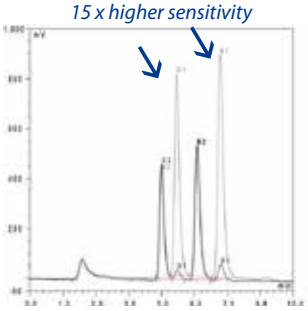
Turmeric - the Golden Root and Superfood. The turmeric plant does not only resembles the ginger root in appearance, but also belongs to the ginger family. For more than 4000 years the turmeric root has been used for medical purposes or in naturopathy e.g. Ayurveda, an Indian healing art.

The plant can have a positive effect on human health. It is rich in antioxidants and has an anti-inflammatory effect. The ingredient diferuloylmethane is responsible for the yellow colour of the root. Thereby it is also used in the food industry as a colorant but also as a flavour carrier. Turmeric is still very popular in India today and is an integral part of the country's typical cuisine. India is one of the largest producers and exporters of turmeric.

Derivatisation of Aflatoxins in Food with UV Light

Moulds can form in turmeric and other spices due to incorrect storage conditions or during drying. The fluorescence spectrometric measurement is often difficult due to the low limit values for aflatoxins in food and the low intrinsic fluorescence of aflatoxins B1 and G1. For this reason, the fluorescence of the aflatoxins must be optimised, e.g. by derivatisation.

15 x higher sensitivity



LCTech offers a **cost-effective solution** with the photochemical reactor UVE. When exposed to UV light, the aflatoxins B1 and G1 are hydroxylated photochemically at 254 nm and become brighter in fluorescence.

UVE Photochemical Reactor

Compared to the electrochemical bromination **no further (toxic) reagents** are required. In addition, you can use the UVE for **any HPLC** and the **simple plug & play installation** is convincing. **Install** the UVE in the flow between HPLC column and detector - **switch it on** - and your instrument is **ready for use**.

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Processing Protocol

Homogenise 5 g of turmeric with 1 g of sodium chloride. Extract the sample with 50 mL methanol/water (80/20/ (v/v)) and 25 mL n-hexane in order to remove fat and oil. For high extraction efficiencies, continue the extraction (depending on extraction device) for at least 10 minutes.

Filtrate the raw extract and dilute 3 mL with 18 mL PBS (contains 8 % Tween20). Load a maximum of 14 mL of the sample (corresponds to 0.2 g matrix) onto an AflaCLEAN column. Wash the column with 2 x 5 mL deionized water and use the washing solution to rinse the sample reservoir. Dry the column by flushing air through it.

Elute the toxin with 2 mL methanol. Ensure that the methanol acts in the column bed for 5 minutes to completly denaturate the antibodies and release the toxin. Dilute the eluate to HPLC conditions by adding HPLC water and acetonitrile. Inject up to 100 µL into the HPLC.

The use of photochemical post-column derivatisation (UVE) takes fluorescence analysis to a new „level". The fluorescence of the aflatoxins B1 and G2 can be increased by a factor of 15. Due to the effective clean-up, the sample can also be analysed by LC-MS/MS ESI.

HPLC-Conditions

Aflatoxins B/G

HPLC:	isocratic
Column Oven:	36 °C
Separation Column:	RP C-18 (P/N 10522)
Flow Rate/ Eluent:	1.2mL/min; HPLC-water/methanol/ acetonitrile (60/30/15 (v/v/v)
Flourescence Detection:	Derivatisation with UVE Photochemical Reactor
Excitation Wavelength:	365 nm
Emission Wavelength:	460 nm

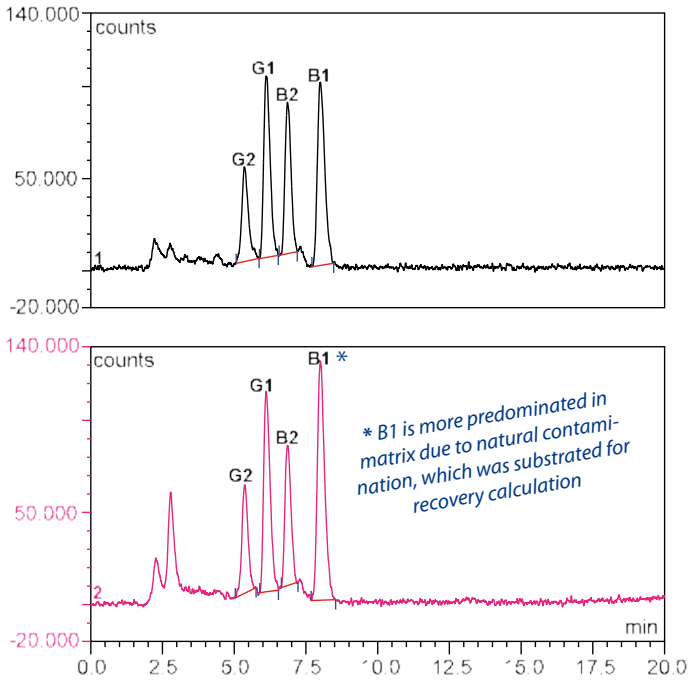
Recovery Rates

Content of Aflatoxins B1, B2, G1 and G2 in Turmeric

Aflatoxin	**B1**	**B2**	**G1**	**G2**
Standard*	100	100	100	100
Recovery Rate** Turmeric 20 ppb	100	96	96	92

*** Standard was set = 100% , ** Corrected with non-spiked sample / The results are in accordance with the performance specifications of the EC 401 / 2006 (section 4.3.1).**

Chromatogram



Black: Standard corresponds 8 ng aflatoxin B1/G1 and 2 ng aflatoxin B2/G2
Red: Turmeric spiked with aflatoxin

These LCTech Products were used:

AflaCLEAN Immunoaffinity Columns for Aflatoxin B/G
P/N 10514 / 11721

HPLC Separation Column RP C-18
P/N 10522

Precolumn holder for mycotoxin analysis
P/N 10750

Guard Column, Reversed Phase, C18
P/N 10523

UVE Photochemical Reactor
P/N 10519

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