Aflatoxins B/G in Turmeric

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.

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. 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.

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.

Find more details, recovery rates, HPLC-conditions and chromatograms here.

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