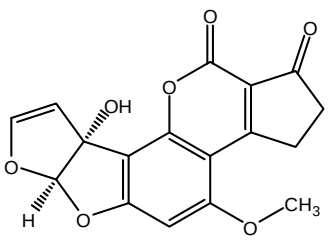
Analysis Example of Aflatoxin M1

Food-contaminating mycotoxins include aflatoxin, ochratoxin, deoxynivalenol/nivalenol, and patulin. Aflatoxin is toxic to the liver and is said to be the strongest natural carcinogen. Aflatoxin B1, B2, G1, and G2 are naturally occurring, and B1 is a strong carcinogen. It is known that aflatoxin B1 is partly metabolized to aflatoxin M1 in the body. Therefore, when a dairy cow eats fodder contaminated with aflatoxin B1, aflatoxin M1 may be excreted into milk.
In the U.S. and China, test methods for aflatoxin M1 in milk and milk products have been established under national standards. There is also a movement to establish an official method in Japan and the Evaluation Committee of Mycotoxin Methodology is investigating the method.
Presented here is the analysis of aflatoxin M1 by an HPLC-fluorescence detection method, which is method 2 described under "GB 5413.37-2010: Determination of Aflatoxin M1 in Milk and Milk Products," National Food Safety Standard of the People's Republic of China.

◆ Regulation Values of Aflatoxin M1 in Milk and Milk Products in Each Countries◆

	Japan (*1) under review	China (*2)	U.S. (*3)
Regulation value	NMT 0.5 µg/kg	NMT 0.5 µg/kg	NMT 0.5 µg/kg

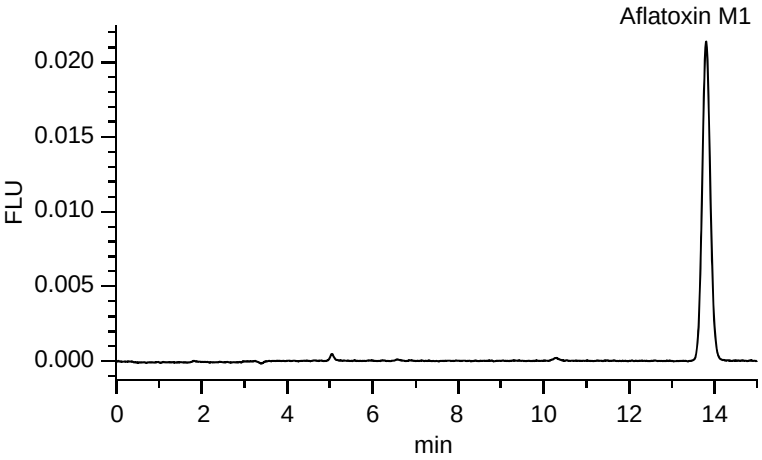
(*1) : Collaborative Study Protocol by the Evaluation Commitee of Mycotoxin Methodology "Analysis Method for Aflatoxin M1 in Milk"
(*2) : Method 2, GB 5413.37-2010: Determination of Aflatoxin M1 in Milk and Milk Products
(*3) : AOAC Official Method 2000.8, Aflatoxin M1 in Liquid Milk, Immumoaffinity Column by Liquid Chromatography.



$C_{17}H_{12}O_7$ = 328.3

[Structural Formula of Aflatoxin M1]

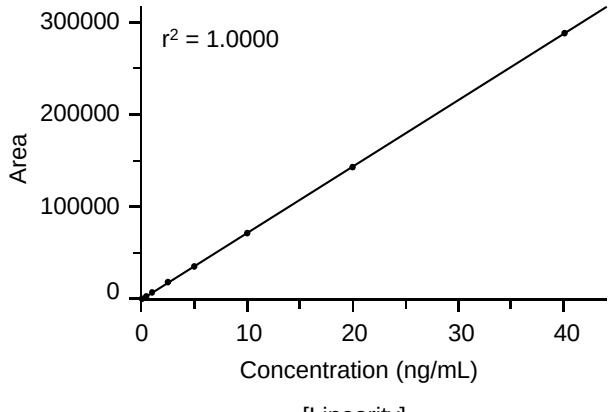
■ Analysis Example of Aflatoxin M1



[Analysis Example of Standard Sample (20 ng/mL)]

<Analytical Conditions>

Column	:	HITACHI LaChrom C18 (5 µm) 4.6 mm I.D. × 250 mm
Eluent	:	Acetonitrile / Water = 25 / 75 (v/v)
Flow rate	:	1.0 mL/min
Column temperature	:	30°C
Detection wavelength	:	FL Ex 365 nm, Em 435 nm
Injection vol.	:	10 µL



[Linearity]

A good linearity with a coefficient of determination of 1.000 was obtained over a range of 0.1 - 40 ng/mL.

The lower detection limit was less than 0.02 ng, which is less than the lower detection limit described in the GB, which confirms sufficient sensitivity.
In addition, when the measurement was repeated 6 times at 20 ng/mL, the peak retention time reproducibility (%RSD) and peak area reproducibility (%RSD) were respectively 0.064% and 0.80%, indicating good reproducibility.

Main instrument configuration: Chromaster 5110 pump, 5210 autosampler, 5310 column oven, 5440 fluorescence detector

NOTE: These data are an example of measurement; the individual values cannot be guaranteed.