

Certificate of Analysis

Product Name: Aflatoxin G₁-¹³C₁₇ solution
~0.5 µg/mL in acetonitrile, analytical standard

Product Number: 32772

Batch Number: BCCM2725

CAS Number: 1217444-07-9

Formula: ¹³C₁₇H₁₂O₇

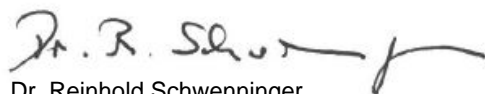
Formula Weight: 345.15

Storage Temperature: -20 C

Expiration Date: OCT 2025

Quality Release Date: 17 SEP 2024

TEST	SPECIFICATION	RESULT
CONCENTRATION COMP1	~ 0.5 UG/ML	0.502 UG/ML
MEASURING TOLERANCE P±	≤ 0.05 UG/ML	± 0.008 UG/ML
SOLVENT	ACETONITRILE	ACETONITRILE
PURITY (HPLC) COMP1	≥ 97.0 %	98.0 %
MEASURING TOLERANCE P±	≤ 1.0 %	0.6 %
COMP1		



Dr. Reinhold Schwenninger

Quality Assurance

Buchs, Switzerland

Sigma-Aldrich warrants that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

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U-[¹³C₁₇]-Aflatoxin G1 solution, analytical standard 0.5 µg/mL in acetonitrile

1. General information

This document is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO 33401:2024 [1] and Eurachem / CITAC Guides [2,3].

2. Description of the Reference Material (RM)

Name:	U-[¹³ C ₁₇]-Aflatoxin G1 solution, analytical standard 0.5 µg/mL in acetonitrile
Catalog number:	32772-1ML-BULK
Batch / Lot #:	BCCM2725
Date of production / Expiry date:	11.10.2022 / 10.10.2025
Starting material 1:	U-[¹³ C ₁₇]-Aflatoxin G1, Lot # IS18223G, Romer Labs Diagnostic GmbH
Physical description of RM:	Solution of U-[¹³ C ₁₇]-Aflatoxin G1 in acetonitrile
Packaging of RM:	Amber glass ampoules fitted with teflon faced butyl septa and aluminium crimp cap
Name and address of the supplier:	Sigma-Aldrich International GmbH c/o Sigma-Aldrich Production GmbH Industriestrasse 25 9470 Buchs Switzerland

2.1 Intended use of the RM

- for laboratory use only
- internal standard [4]

2.2 Instruction for the correct use of the RM

The ampoules should be stored at approximately -18°C in a dark place. Before usage of the RM, the ampoules should be allowed to warm to room temperature. The recommended minimum sub-sample amount for all kinds of application is 0.1 mL. The expiry date of this RM is based on the current knowledge and holds only for proper storage conditions in the originally closed flasks/packages.

2.3 Hazardous situation

The normal laboratory safety precautions should be observed when working with this RM. Further details for the handling of this RM are available as safety data sheet.

Hazardous Ingredients	Concentration in %	Pictograms	Signal word	Hazard statement(s)
Acetonitrile	> 99.9		Danger	H225, H302, H312, H319, H332



3. Certified values and their uncertainties

U-[¹³ C ₁₇]-Aflatoxin G1 solution, analytical standard 0.5 µg/mL in acetonitrile		
Compound	Mass concentration ^a	
U-[¹³ C ₁₇]-Aflatoxin G1, 99.0 atom % ¹³ C	Certified value ^b	Uncertainty ^c
	0.502 µg/mL	± 0.007 µg/mL
^a Values are based on preparation data and confirmed experimentally by HPLC-UV		
^b Mass concentration based on weighed amount, purity and dilution step		
^c Expanded uncertainty U (k = 2) of the value u _c according to GUM [5]		

3.1 Calculation of uncertainty

After the concentration of the gravimetric prepared solution was confirmed by HPLC-UV, the uncertainty of the calibrant solution was calculated on the basis of preparation [6].

Uncertainty components	Description	Standard uncertainty (u)
Minimum Purity (P) of solid U-[¹³ C ₁₇]-Aflatoxin G1, 99.0 atom % ¹³ C (the uncertainty of the purity corresponds to the standard deviation of repeated measurements)	P = 98.0 %	u (P) = 0.58 %
Weighing procedure weighed sample: m _{ws} = 1.268 mg	U(m) = 0.0019 mg + 9.20 * 10 ⁻⁶ * m _{Toxin} u(m) = U(m)/2	u (m) = 0.001 mg
Dilution procedure steps	volumetric flask 1: V _{f1} = 250 mL	u (V1) = 0.59 mL

4. Isotopic enrichment and isotope pattern

Isotope pattern ^a	
Compound	Isotopic distribution
[¹³ C ₁₇]-Aflatoxin G1	84.9 %
[¹³ C ₁₆]-Aflatoxin G1	13.5 %
[¹³ C ₁₅]-Aflatoxin G1	1.7 %
Calculated isotopic enrichment level ^a : 99.0 atom % ¹³C	
^a Approximation based on LC-MS/MS data	

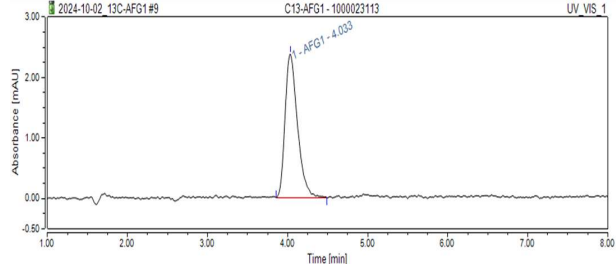
5. Discussion of traceability

This calibrant is certified on the basis of gravimetric preparation [6]. Thus the certified value (mass concentration of U-[¹³C₁₇]-Aflatoxin G1, 99.0 atom % ¹³C) is based on the weighed amount of the starting material and is therefore traceable to the stated purity of the solid mycotoxin. High purity material represents a practical realization of concentration units, through conversion of mass to molar quantity.



6. Confirmation of certified value by HPLC-UV

The certified concentration of U-[¹³C₁₇]-Aflatoxin G1, 99.0 atom % ¹³C of the gravimetric prepared solution was confirmed by HPLC-UV against an independently prepared reference batch of unlabeled Aflatoxin G1 calibrant.

column	Phenomenex Kinetex C18, 100x 3mm, 2.6µmm			
injection volume	25 µL sample			
solvent A	water / acetonitrile / methanol 57/17/26			
oven	35°C			
flow rate	0.5 mL / min			
DAD settings	365 nm			
sample dilution	1:5 with solvent A			
	time [min]	area	concentration	
			[µg/mL]	
U-[¹³ C ₁₇]-Aflatoxin G1	4.033	0.426	0.498 ± 0.02	

^a Mean of 6 replicate measurements against reference batch, confidence interval with P = 95 %

Figure 1: HPLC-UV chromatogram of U-[¹³C₁₇]-Aflatoxin G1

Figure 1: HPLC-UV chromatogram of U-[¹³C₁₇]-Aflatoxin G1

^a Mean of 6 replicate measurements against reference batch, confidence interval with P = 95 %

7. Further information

The purchaser must determine the suitability of this product for its particular use. Sigma-Aldrich International GmbH makes no warranty of any kind, express or implied, other than its products meet all quality control standards set by Sigma-Aldrich International GmbH. We do not guarantee that the product can be used for a special application.

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References:

- [1] ISO 33401:2024 - 1-10, "Reference materials – Contents of certificates, labels and accompanying documentation"
- [2] Eurachem / CITAC Guide, 1-37, (2003), "Traceability in Chemical Measurement"
- [3] Eurachem / CITAC Guide CG-4, 1-133, (QUAM:2012.P1), "Quantifying Uncertainty in Analytical Measurement", 3rd Ed.
- [4] G. Häubl, F. Berthiller, R. Krška, R. Schuhmacher, "Suitability of a fully ¹³C isotope labelled internal standard for the determination of the mycotoxin deoxynivalenol by LC-MS/MS without clean-up", Anal. Bioanal. Chem. **384** (3), (2006), 692-696
- [5] International Organization for Standardization (ISO), (1995), "Guide to the Expression of Uncertainty in Measurement", 1st Ed. Geneva, Switzerland
- [6] R.D. Josephs, R. Krška, S. MacDonald, P. Wilson, H. Pettersson, J. AOAC Int. **86**, 50-60, (2003), "Preparation of a Calibrant as Certified Reference Material for Determination of the Fusarium Mycotoxin Zearalenone"

