Instructions for use

UV-Cell a photochemical Reactor for Determination of **Aflatoxin**

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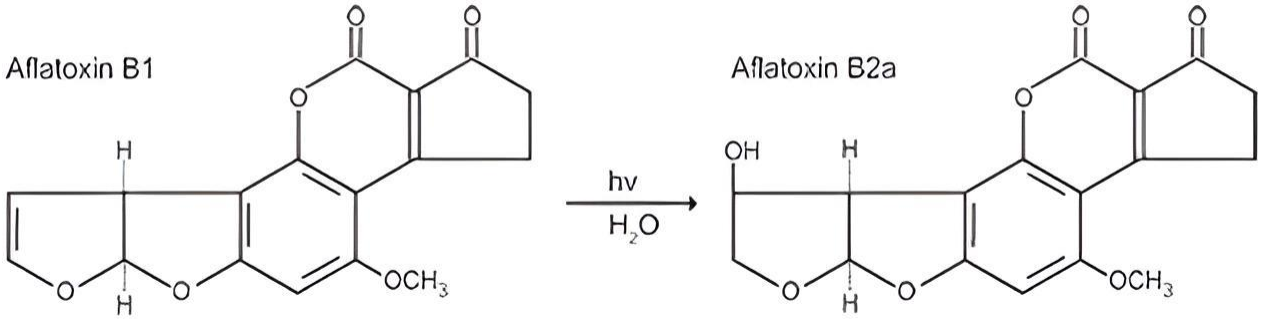
Description

Due to the low emission intensity of Aflatoxin B1 and G1 during the determination of this type of mycotoxin using a fluorescence detector, it becomes necessary to enhance the emission intensity through a derivatization process.

This process is facilitated by a UV-Cell.

The analyte molecule undergoes a derivatization process as it is exposed to UV light radiation within a reactor. During this process, Aflatoxins B1 and G1 undergo hydroxylation, optimizing the emission intensity of these analytes. As a result, sensitivity is increased.



UV-Cell offers various advantages over electrochemical bromination, as outlined below:

- No need for KBr or HNO_3 as reagents; instead, water present in the mobile phase serves as the reagent.
- The UV lamp has a prolonged operational life, lasting for several thousand hours.
- The simple reactor design eliminates the risk of blockages in the mobile phase path, preventing damage to the detector flow-cell.
- Achieves highly repeatable Retention times and peak areas within a good dynamic range.
- The instrument is user-friendly, requiring no specialized washing processes or maintenance procedures.

Instructions of use

The instrument is ready to use. After unpacking the instrument should be place between HPLC and FLD Detector.

Outlet 1/16" peek capillary tube from column should be connect to inlet of UV-Cell by a proper peek union and also outlet from the UV-Cell should be connect to inlet of FLD detector by 1/16" proper peek capillary tube and peek union.

Attention 1: Small silicon tubing placed under the instrument is designed for liquid discharge in case of leakage, so if this happens the tubing coil inside the instrument should be replaced.

Attention 2: It is very important to use appropriate (not damaged) fitting to avoid any high back pressure in internal tubing system. (Maximum pressure for inside tubing coil is 300 psi).

After installation switch on the instrument and after about 20 minutes for equilibration, the instrument is ready to use. The thermometer in front of the instrument shows the coil temperature and indicates that the UV lamp is on.

UV lamp and tubing coil replacement:

Remove the upper and front part of the case by unscrewing screws in two sides.

Inside the case, open the heatsink cap by unscrewing four screws. Pull back tubing coil and lamp and replace them.

Attention 3: Time of changing the lamp depends on working hours and it can be indicated by thermometer display. The temperature should be more than 33 Celsius.

Additional Data provided

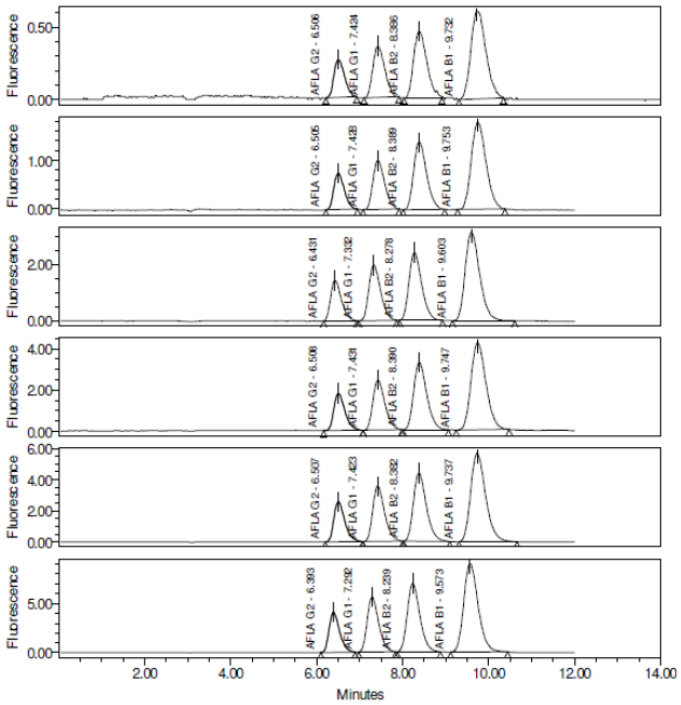


Fig. 1 – Aflatoxin B and G standards Chromatograms (0.4, 1.2, 2, 2.8, 3.6 and 5.6 ppb)

Aflatoxin B1

C (ng/ml)	Mass (ng)	Area	Re-cal Mass	% difference
5.60	0.560	209545	0.558	0
3.60	0.360	137700	0.368	2
2.80	0.280	101807	0.273	-2
2.00	0.200	74230	0.200	0
1.20	0.120	42647	0.117	-3
0.40	0.040	14876	0.043	8

R	0.99960
R^2	0.9992018
Slope	377747
Intercept	-1413

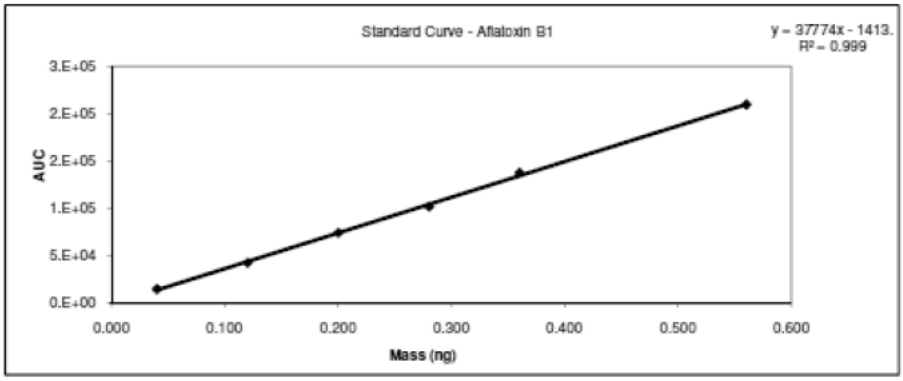


Fig. 2 – Aflatoxin B and G standards Calibration Curve (0.4, 1.2, 2, 2.8, 3.6 and 5.6 ppb)

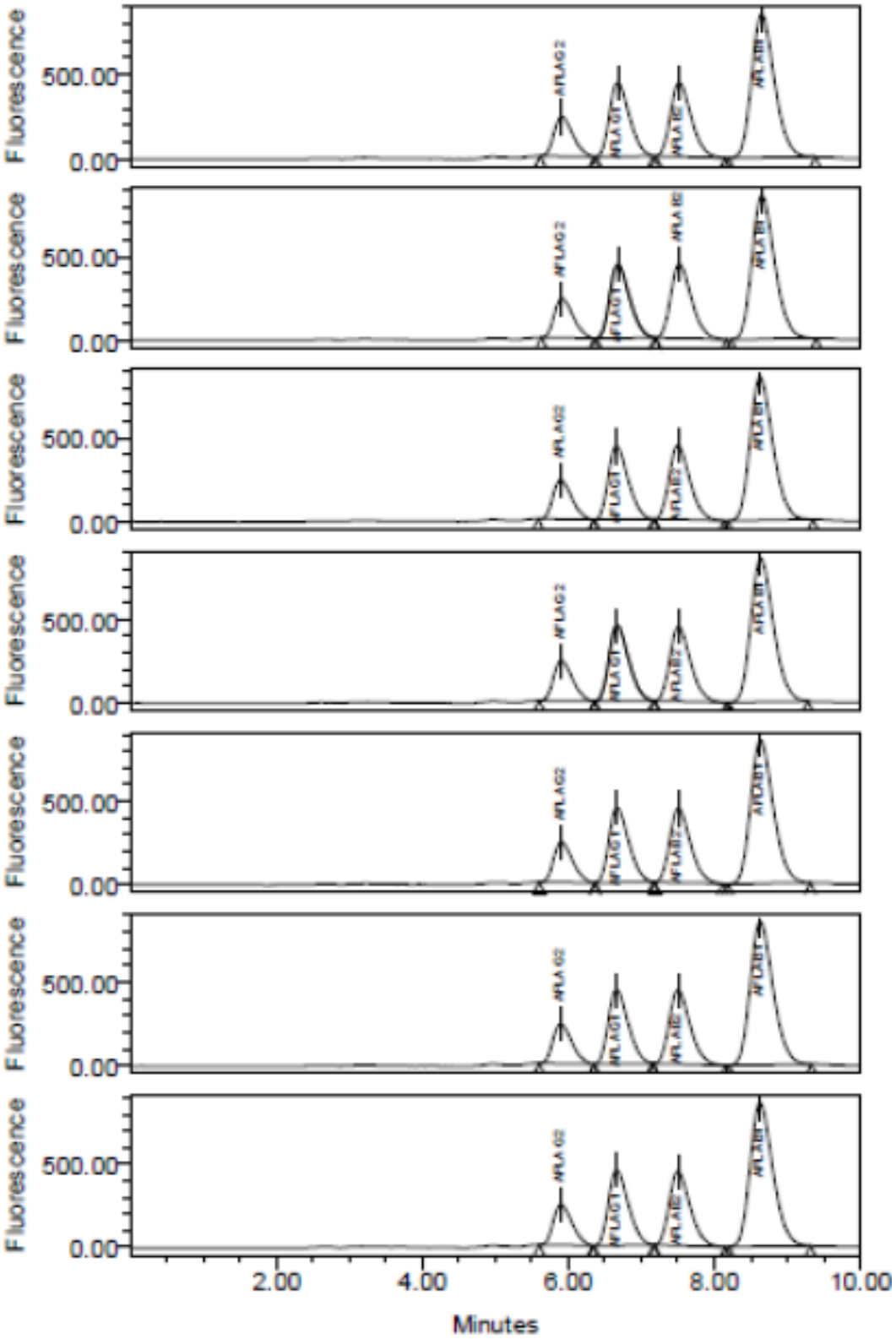


Fig. 3 – Repeatability of 6 injection of Aflatoxin B and G (3.6 ppb)

Component Summary Table: **AFLA B1**

	Sample Name	Vial	Inj	Channel	Name	RT	Area	Height
1	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B1**	8.648	18523289	854502
2	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B1**	8.652	18533204	858316
3	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B1**	8.636	18552459	859945
4	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B1**	8.629	18593476	855799
5	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B1**	8.626	18704974	864253
6	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B1**	8.633	18564969	861665
7	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B1**	8.627	18504029	857507
Mean						8.636	18568057	858855
Std. Dev.						0.010	67037	3382
% RSD						0.1	0.4	0.4

Fig. 4 – Repeatability of 6 injection of Aflatoxin B1 (3.6 ppb). Data results with % RSD

Component Summary Table: **AFLA B2**

	Sample Name	Vial	Inj	Channel	Name	RT	Area	Height
1	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B2**	7.519	8734699	440621
2	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B2**	7.502	8856059	446557
3	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B2**	7.503	8808649	441771
4	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B2**	7.509	8796114	445419
5	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B2**	7.509	8826859	445337
6	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B2**	7.501	8754559	442813
7	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA B2**	7.521	8800754	442957
Mean						7.509	8796814	443639
Std. Dev.						0.08	41256	2172
% RSD						0.1	0.5	0.5

Fig. 5 – Repeatability of 6 injection of Aflatoxin B2 (3.6 ppb). Data results with % RSD

Component Summary Table: **AFLA G1**

	Sample Name	Vial	Inj	Channel	Name	RT	Area	Height
1	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G1**	6.677	8315849	438713
2	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G1**	6.664	8567969	451695
3	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G1**	6.662	8398019	440420
4	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G1**	6.670	8428884	446123
5	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G1**	6.661	8317971	436779
6	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G1**	6.671	8522814	451060
7	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G1**	6.681	8326449	437814
Mean						6.669	8411137	443229
Std. Dev.						0.007	102051	6332
% RSD						0.1	1.2	1.4

Fig. 6 – Repeatability of 6 injection of Aflatoxin G1 (3.6 ppb). Data results with % RSD

Component Summary Table: **AFLA G2**

	Sample Name	Vial	Inj	Channel	Name	RT	Area	Height
1	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G2**	5.910	4225845	235208
2	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G2**	5.900	4368005	243666
3	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G2**	5.905	4347270	242467
4	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G2**	5.895	4214185	235260
5	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G2**	5.896	4267053	236337
6	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G2**	5.905	4298575	240452
7	AFLA / 3.6 ppb / H004	5	1	474 Ch1	**AFLA G2**	5.913	4207620	235270
Mean						5.904	4275507	238380
Std. Dev.						0.07	64736	3710
% RSD						0.1	1.5	1.6

Fig. 7 – Repeatability of 6 injection of Aflatoxin G2 (3.6 ppb). Data results with % RSD