Supporting Information

For

Facile Dispersive Solid-phase Extraction Based on Humic Acid for the Determination of Aflatoxins in Various Edible Oils

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The Supporting Information includes following items:

Table S1. The investigated humic acids and their yields via treatment

Humic acid	Manufactory	Location	Yield%
HA1	Nanjing Chemical Reagent Co., Ltd	Nanjing, China	63.1
HA2	Guangfu Fine Chemical Research Institute	Tianjin, China	58.0
HA3	Yuanye Biotechnology Co., Ltd	Shanghai, China	68.0
HA4	J&K Scientific Co., Ltd	Beijing, China	61.2
HA5	Alfa Aesar Co., Ltd	Ward Hill, MA, USA	71.5
HA6	Sigma-Aldrich Co., Ltd	Beijing, China	64.0
HA7	Aladdin Co., Ltd	Shanghai, China	n/a
HA8	Adamas-beta Co., Ltd	Shanghai, China	n/a
HA9	Macklin Co., Ltd	Shanghai, China	n/a
HA10	Cool Chemistry Co., Ltd	Beijing, China	n/a
HA11	Bomei Biotechnology Co., Ltd	Hefei, China	n/a
HA12	Meilun Biotechnology Co., Ltd	Dalian, China	n/a

Table S2. Recoveries of four AFs in various edible oil matrices via HA-DSPE clean-up [a]

Edible oil	Recovery% (n=3)							
	AFB_1		AFB_2		AFG_1		AFG_2	
	Mean	RSD%	Mean	RSD%	Mean	RSD%	Mean	RSD%
Blended oil	87.5	3.2	89.6	1.3	92.0	0.3	91.8	1.0
Mixed olive oil	87.1	0.1	89.2	0.0	91.4	0.0	92.6	0.4
Tea oil	81.3	2.1	83.4	0.9	87.0	0.6	86.3	0.6
Sunflower seed oil	84.7	1.3	86.7	1.8	88.6	1.0	90.8	1.4
Rapeseed oil	84.0	4.0	82.1	1.8	88.3	0.3	85.1	0.8
Sesame oil	85.7	5.0	83.8	2.9	98.0	3.1	93.7	4.1
Soybean oil	94.6	0.8	95.6	0.7	104.8	0.2	102.3	0.1
Rice oil	88.9	0.5	86.2	0.1	94.0	2.9	91.0	0.1
Corn oil	97.0	1.5	94.6	0.9	106.2	1.0	102.6	1.7
Peanut oil	87.5	0.2	83.3	1.6	91.1	1.0	87.6	0.5

[a] Each AF was spiked into ten blank oils at 20.0 μg/kg.

Table S3. Recoveries of four AFs via DSPE using six treated HAs as the sorbent [a]

Humic acid	Recovery% (n=3)							
	AFB_1		AFB_2		AFG_1		AFG_2	
	Mean	RSD%	Mean	RSD%	Mean	RSD%	Mean	RSD%
HA1	95.9	2.0	103.0	2.1	81.5	0.2	84.1	1.1
HA2	87.5	3.2	89.6	1.3	92.0	0.3	91.8	1.0
HA3	82.7	1.2	84.1	3.0	82.9	1.1	85.6	2.5
HA4	95.2	1.9	94.7	0.8	93.7	0.5	84.5	0.7
HA5	100.1	0.9	96.4	0.2	93.8	0.2	87.9	0.3
HA6	94.4	1.3	90.6	1.0	89.0	0.6	90.6	0.7

[a] Each AF was spiked into a blank blended oil at 20.0 μg/kg.

Table S4. Matrix effect for AFs in various edible oil matrices via HA-DSPE clean-up [a]

Edible oil	Matrix effect% (n=3)							
	AFB_1		AFB_2		AFG_1		AFG_2	
	Mean	RSD%	Mean	RSD%	Mean	RSD%	Mean	RSD%
Blended oil	109.4	1.6	92.0	0.7	93.8	6.9	93.7	10.0
Mixed olive oil	106.2	0.5	96.8	7.4	101.7	10.1	112.9	1.2
Tea oil	105.9	0.3	92.5	0.1	107.6	2.0	100.9	10.5
Sunflower seed oil	99.2	1.8	100.9	9.7	105.3	9.5	110.9	3.1
Rapeseed oil	105.6	2.3	101.4	2.4	104.3	9.4	108.1	2.4
Sesame oil	101.4	2.4	93.1	0.5	105.6	2.0	93.8	1.1
Soybean oil	93.6	0.4	97.5	0.9	107.6	2.0	96.2	9.8
Rice oil	104.4	6.1	106.8	8.6	98.7	2.1	103.3	7.8
Corn oil	94.2	0.6	90.3	3.7	101.2	4.4	99.1	7.6
Peanut oil	97.9	7.3	89.3	10.4	93.2	2.8	98.6	9.6

[a] Each AF was spiked into ten blank oils at 5.00 μg/kg. The samples were subjected to LC-MS/MS analysis and the matrix effects were calculated by the following equation: matrix effect (%) = mean peak area of standard in blank oil matrix/mean peak area of standard in blank solvent ×100.

Table S5. Comparison of clean-up methods between IAC and HA-DSPE on recovery and matrix effect [a]

Analyte	Recovery% (n=3)		Matrix effect% (n=3)	
	IAC	HA-DSPE	IAC	HA-DSPE
AFB_1	89.0 ± 2.4	87.5 ± 3.2	99.4 ± 9.9	109.4 ± 1.8
AFB_2	84.3 ± 4.6	89.6 ± 1.3	103.4 ± 3.4	92.0 ± 0.6
AFG_1	86.5 ± 6.0	92.0 ± 0.3	103.9 ± 2.3	93.8 ± 6.5
AFG_2	94.4 ± 4.9	91.8 ± 1.0	91.8 ± 7.4	93.7 ± 9.4

[a] Each AFs was spiked into a blank blended oil at 20.0 μg/kg.

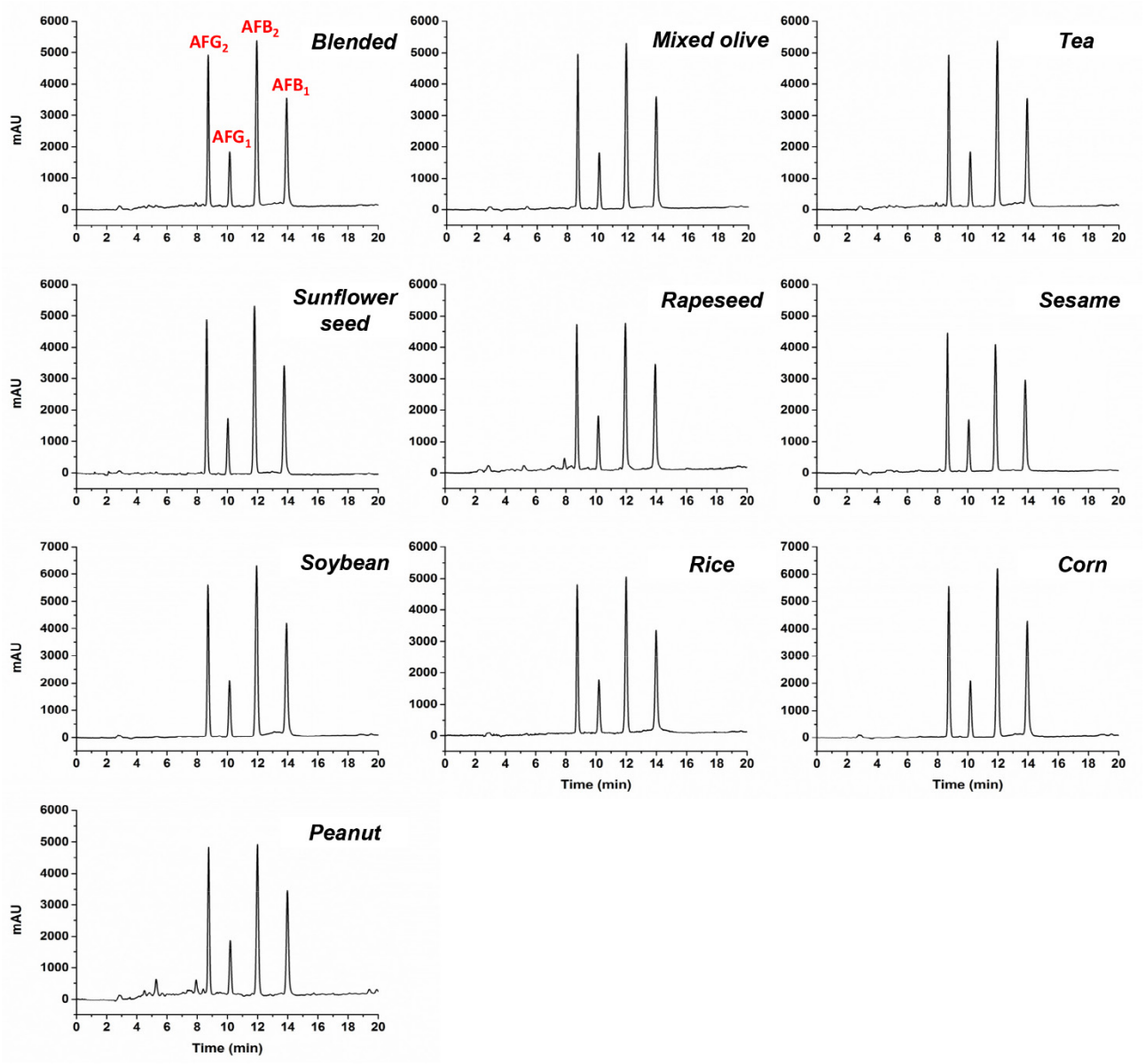
AFG2
AFB2
AFB1
AFG1
Blended
Mixed olive
Tea
Sunflower seed
Rapeseed
Sesame
Soybean
Rice
Corn
Peanut
mAU
Time (min)

Figure S1