Supporting Information

Monolith dip-it: a bifunctional device for improving the sensitivity of direct analysis in real time mass spectrometry

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Table SI Results comparison before and after monolith dip-it extraction in positive mode

Name	Formula	$[M+H]^+$	C (μg/mL)	T (℃)	S/N(before)	S/N(after)
Sudan Ⅰ	$C_{16}H_{12}N_2O$	249.102	0.1	350	<1	61.9
Sudan Ⅱ	$C_{18}H_{16}N_2O$	277.1335	0.1	350	<1	31.0
Sudan Ⅲ	$C_{22}H_{16}N_4O$	353.1397	0.1	350	<1	25.1
Sudan Ⅳ	$C_{24}H_{20}N_4O$	381.171	0.1	350	<1	21.9
Sudan Red 7B	$C_{24}H_{21}N_5$	380.187	0.1	400	<1	18
Rhodamine B	$C_{28}H_{31}ClN_2O_3$	443.2335	1	400	<1	65.9
6,9-Dichloro-2-methoxyacridine	$C_{14}H_9Cl_2NO$	278.01	1	400	25.9	76.2
Acridine	$C_{13}H_9N$	180.0808	1	400	52.5	594.4
2-Aminoanthraquinone	$C_{14}H_9NO_2$	224.0706	1	400	<1	4.9
4-Amino-3,5-dimethyl-1,2,4-triazole	$C_4H_8N_4$	113.0822	1	350	1.3	413.3
minoacrinine	$C_{13}H_{10}N_2$	195.0917	1	400	<1	291.3
Simazine	$C_7H_{12}ClN_5$	202.0854	0.1	400	<1	13.6
Propazine	$C_9H_{16}ClN_5$	230.1167	0.1	350	<1	31.3
Prometon	$C_{10}H_{19}N_5O$	226.1662	0.1	400	1.5	40.9
Gesatamine	$C_9H_{17}N_5O$	212.1506	0.1	400	3.2	50.5
Melamine	$C_3H_6N_6$	127.0727	1	400	9.7	254
Dodecanamine	$C_{12}H_{27}N$	186.2216	1	350	1.5	269.1
Quinine	$C_{20}H_{24}N_2O_2$	325.1919	1	350	<1	12.3
Sulfadoxine	$C_{12}H_{14}N_4O_4S$	311.0809	1	400	<1	168.3
Amitriptyline	$C_{20}H_{23}N$	278.1903	1	350	<1	50.7
Methyltestosterone	$C_{20}H_{30}O_2$	303.2319	1	350	<1	28.8
Sulfadiazine	$C_{10}H_{10}N_4O_2S$	251.0597	1	350	<1	15.2
Guanosine	$C_{10}H_{13}N_5O_5$	284.0989	1	350	<1	12.2
Sulfamerazine	$C_{11}H_{12}N_4O_2S$	265.0754	1	400	<1	72.6
Uridine	$C_9H_{12}N_2O_6$	245.0768	1	350	1.9	2.7

Table S2 Results comparison before and after monolith dip-it extraction in negative mode

Name	Formula	$[M-H]^-$	C (μg/mL)	T (℃)	S/N(before)	S/N(after)
p-Chlorobenzoicacid	$C_7H_5ClO_2$	155.5592	1	350	7.1	76.1
Erucic acid	$C_{22}H_{42}O_2$	338.3185	1	350	<1	5.4
2, 5-Dihydroxybenzoic acid	$C_7H_6O_4$	154.0266	1	400	3.4	14.1
Nalidixic acid	$C_{12}H_{12}N_2O_3$	232.0848	1	350	1.9	43.9
Cholic acid	$C_{24}H_{40}O_5$	408.2876	1	350	<1	6.4
Arachidic acid	$C_{20}H_{40}O_2$	312.3028	1	350	<1	4.5
m-Hydroxybenzoicacid	$C_7H_6O_3$	138.0317	1	350	<1	11.1
α-Naphthoic acid	$C_{11}H_8O_2$	172.0524	1	350	2.9	34.3
Aurintricarboxylic Acid	$C_{22}H_{14}O_9$	422.0638	1	350	<1	25.1
Carbazole	$C_{12}H_9N$	167.0735	1	350	1.5	24.5
Tetradecanoicacid	$C_{14}H_{28}O_2$	228.2089	1	350	1	96.2
3-Indolebutyric acid	$C_{12}H_{13}NO_2$	203.0946	1	350	<1	14.8
Vanillic acid	$C_8H_8O_4$	168.0423	1	350	2.1	33.5
N-Phenylanthranilic acid	$C_{13}H_{11}NO_2$	213.079	1	350	2.1	10.1
5-Sulfosalicylic acid	$C_7H_{10}O_8S$	254.0096	1	350	<1	32.9

Table S3 Comparison of the mass spectrometry based methods used for determination of Sudan dyes

Analyte	Real samples	Sample preparation	Detection	LODs	Precision（%RSD）	Ref.
Sudan Ⅰ	Chili foods	Ethanol extraction	LC-APCI-MS	3000 ng/g	< 3	1
Sudan Ⅰ~Ⅳ	Chili and curry food	DMSO extraction	LC-ESI-MS	1.5~5.5 ng/mL	< 8.2	2
Sudan Ⅰ~Ⅳ	Paprika paste	Acetone extraction	GC-MS	0.3~7.7 ng/g	10.2~16	3
Sudan Ⅰ~Ⅳ	Chili products	Silica solid-phase extraction	ESI-MS	1.1–4.3 ng/g	< 8.6	4
Sudan Ⅰ~Ⅳ	Chili products	Acetone extraction	LC-ESI-MS	3~11 ng/g	1~13	5
Sudan Ⅰ~Ⅳ	Chili powders	Acetonitrile extraction	LC-ESI-MS	5-50 ng/g	1.7~13.6	6
Sudan Ⅰ~Ⅳ	Spices powders.	Acetone extraction	TLC-MS	108.9~98 0.4 ng/g	1.48~2.50	7
Sudan Ⅰ~Ⅳ	Food samples	QuEChERS extraction	LC-ESI-MS	1.50~4.04 ng/g	1.42~5.30	8
Sudan Ⅰ~Ⅳ	Cosmetics and foodstuffs	No	Paper spray-MS	5~20 ng/g	No	9
Sudan Ⅰ~Ⅳ	Chili powder tomato sauce	Hexane extraction	LC-APPI-MS	5~18 ng/mL	< 8	10
Sudan Ⅰ~Ⅳ	Chili powder	Hexane extraction	DART-MS	80~100 ng/mL	6~25	11
Sudan Ⅰ~Ⅳ	Chili oil and powder	Carbon nanotube film microextraction	DCBI-MS	1.4~21 ng/g	9.9~19.2	12
Sudan Ⅰ~Ⅳ	Chili powder	Hexane extraction	DART-MS	5~10 ng/mL	8.5~13.8	This work

Notes and references

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