Supplementary Information：

Temperature-responsive ionic liquids to set up a method for the simultaneous extraction and in situ preconcentration of hydrophilic and lipophilic compounds from medicinal plan matrices

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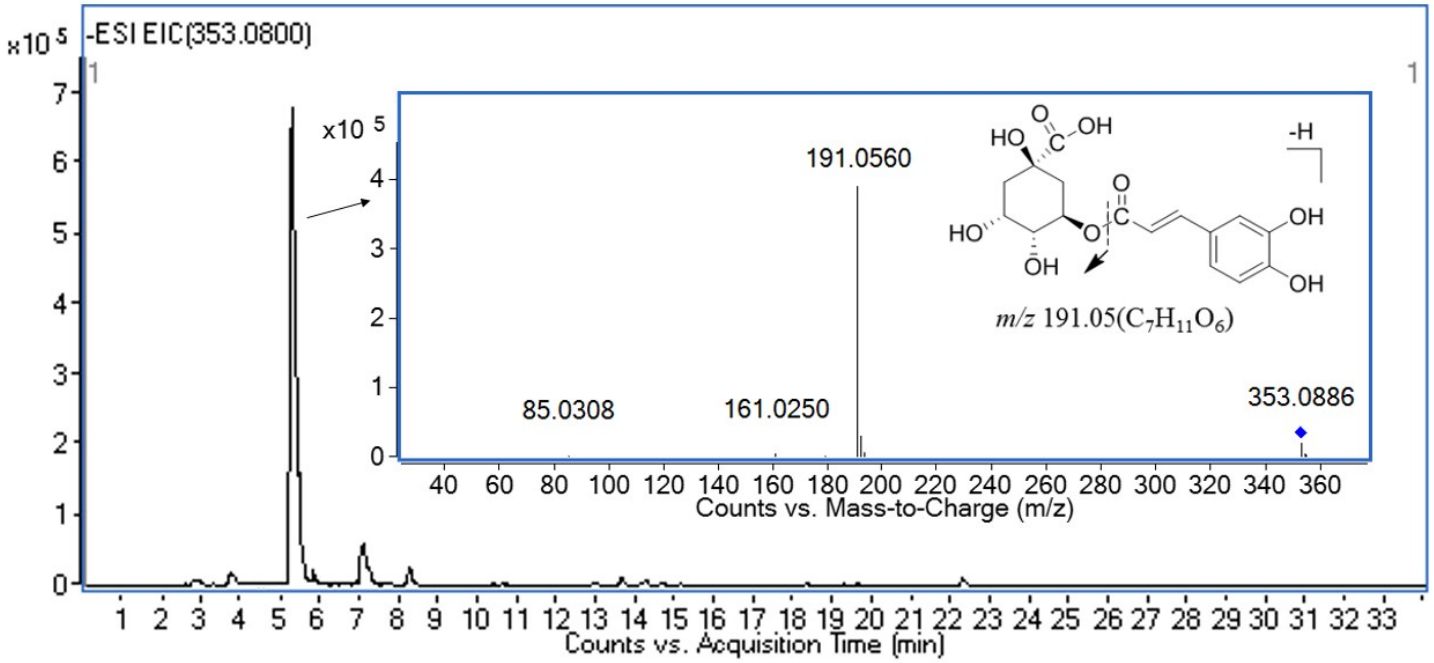
x10 5
-ESI EIC(353.0800)
1
1
x10 5
191.0560
85.0308
161.0250
353.0886
-H
m/z 191.05(C7H11O6)
Counts vs. Mass-to-Charge (m/z)
Counts vs. Acquisition Time (min)

Fig. S1 (A)

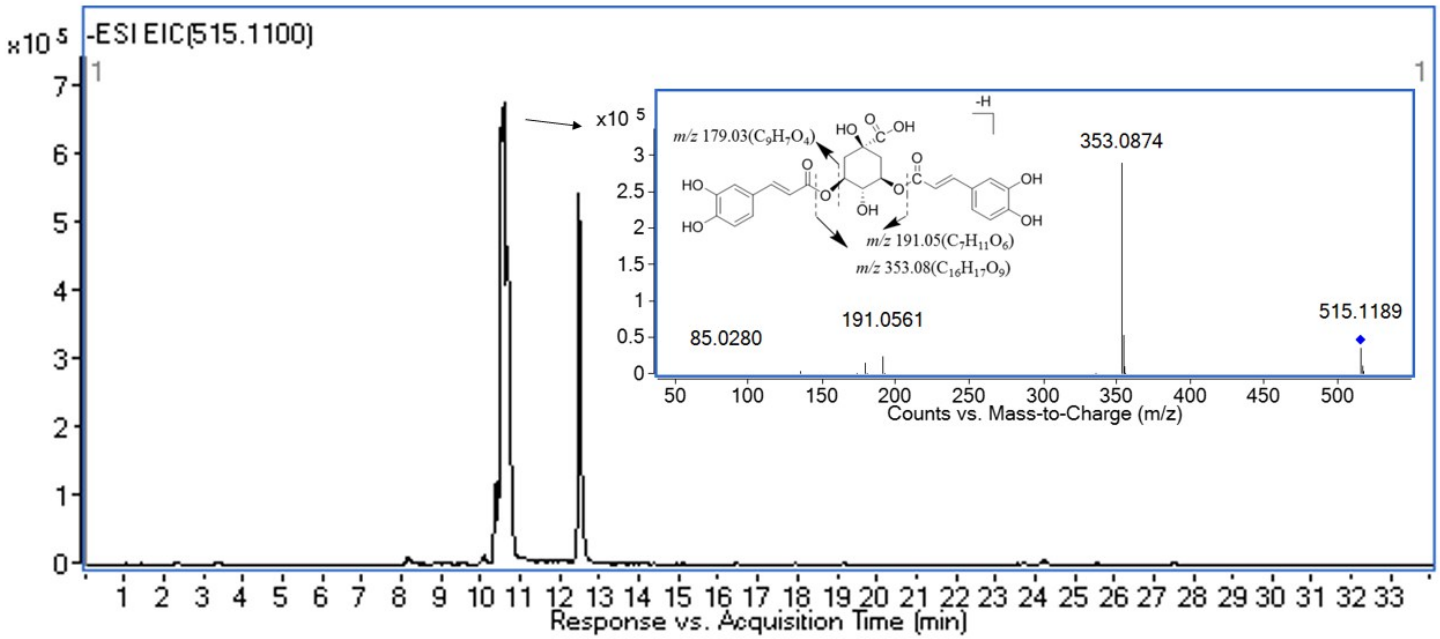
x10 5
-ESI EIC(515.1100)
1
1
7
6
5
4
3
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
Response vs. Acquisition Time (min)
x10 5
-H
m/z 179.03(C9H7O4)
m/z 191.05(C7H11O6)
m/z 353.08(C16H17O9)
353.0874
515.1189
191.0561
85.0280
3
2.5
2
1.5
1
0.5
0
50 100 150 200 250 300 350 400 450 500
Counts vs. Mass-to-Charge (m/z)

Fig. S1 (B)

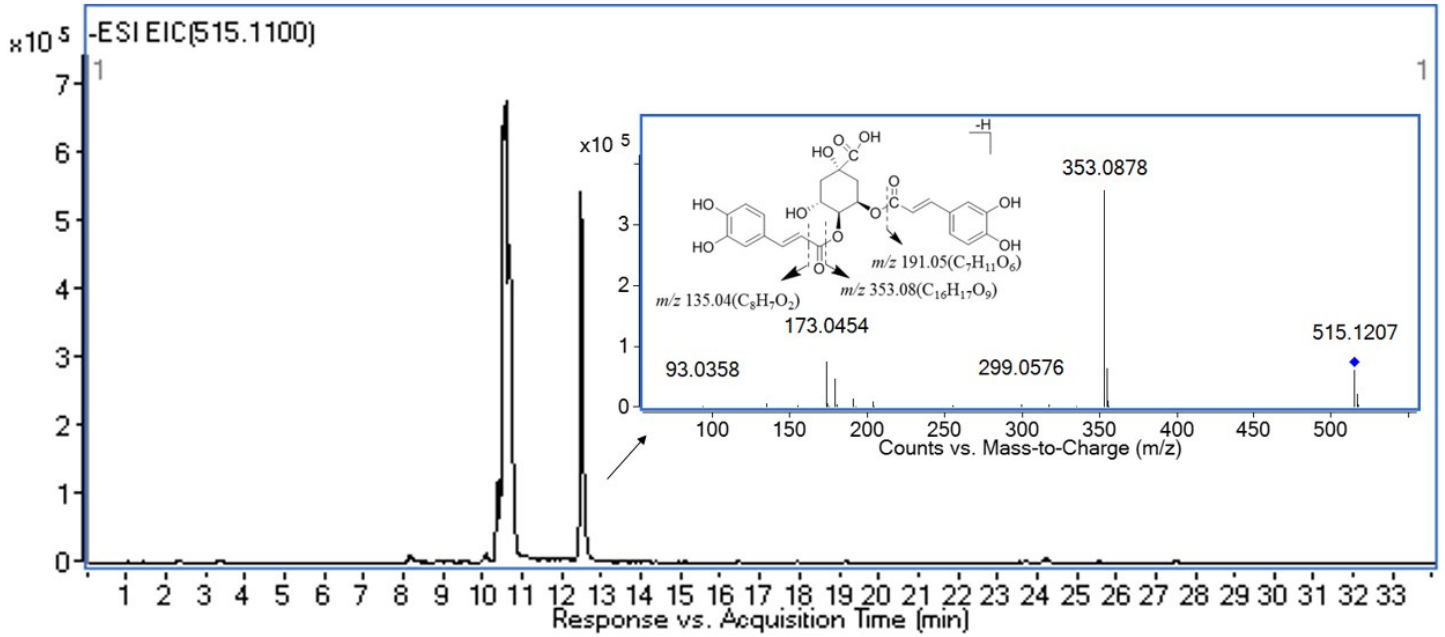
-ESI EIC(515.1100)
x10 5
Response vs. Acquisition Time (min)
x10 5
353.0878
515.1207
173.0454
93.0358
299.0576
m/z 191.05(C7H11O6)
m/z 353.08(C16H17O9)
m/z 135.04(C8H7O2)
-H
Counts vs. Mass-to-Charge (m/z)

Fig. S1 (C)

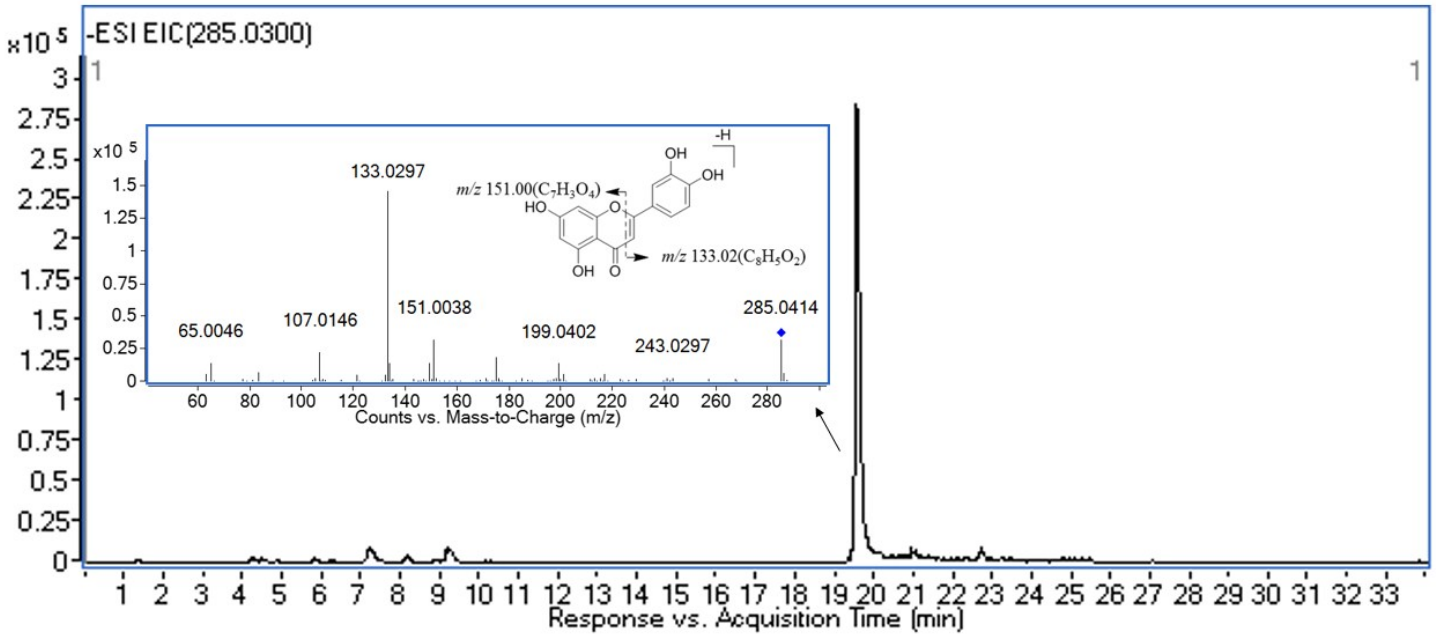
-ESI EIC(285.0300)
x10 5
Response vs. Acquisition Time (min)
133.0297
151.0038
107.0146
65.0046
199.0402
243.0297
285.0414
Counts vs. Mass-to-Charge (m/z)
m/z 151.00(C7H3O4)
m/z 133.02(C8H5O2)
-H

Fig. S1 (D)

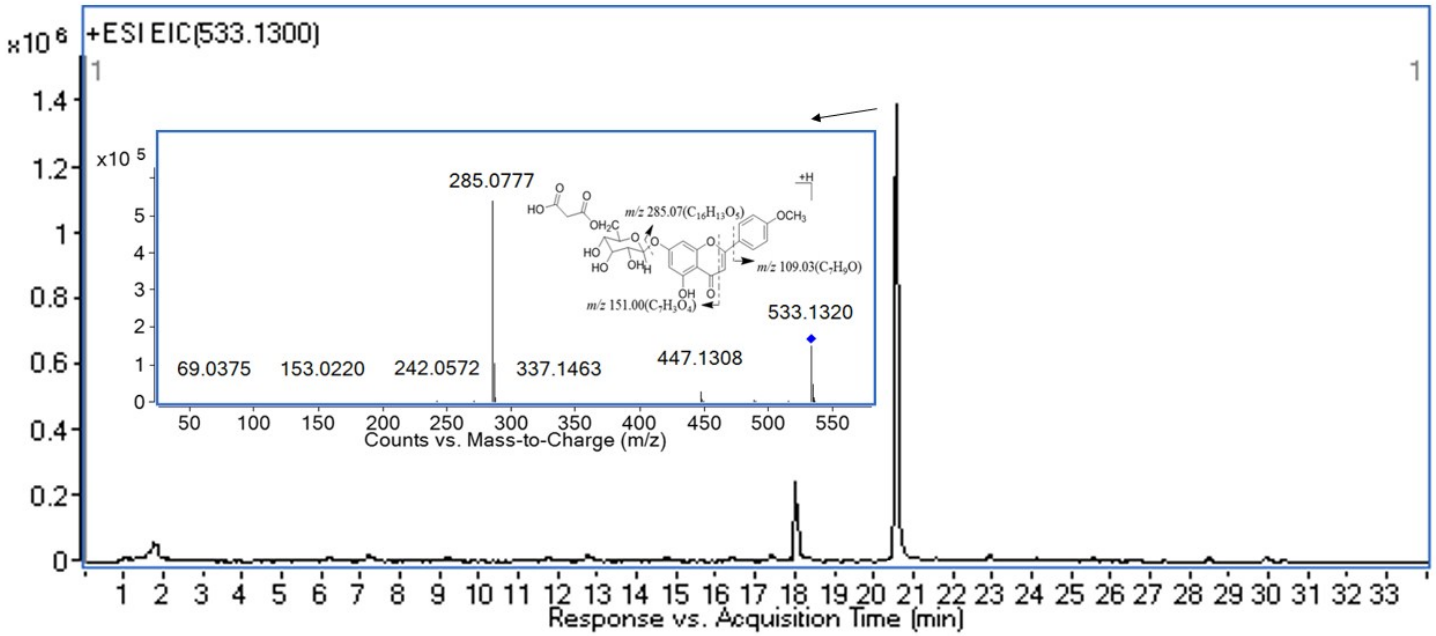
+ESI EIC(533.1300)
x10 6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
Response vs. Acquisition Time (min)
x10 5
5
4
3
2
1
0
285.0777
533.1320
447.1308
69.0375
153.0220
242.0572
337.1463
50 100 150 200 250 300 350 400 450 500 550
Counts vs. Mass-to-Charge (m/z)
m/z 285.07(C16H13O5)
m/z 109.03(C7H9O)
m/z 151.00(C7H3O4)

Fig. S1 (E)

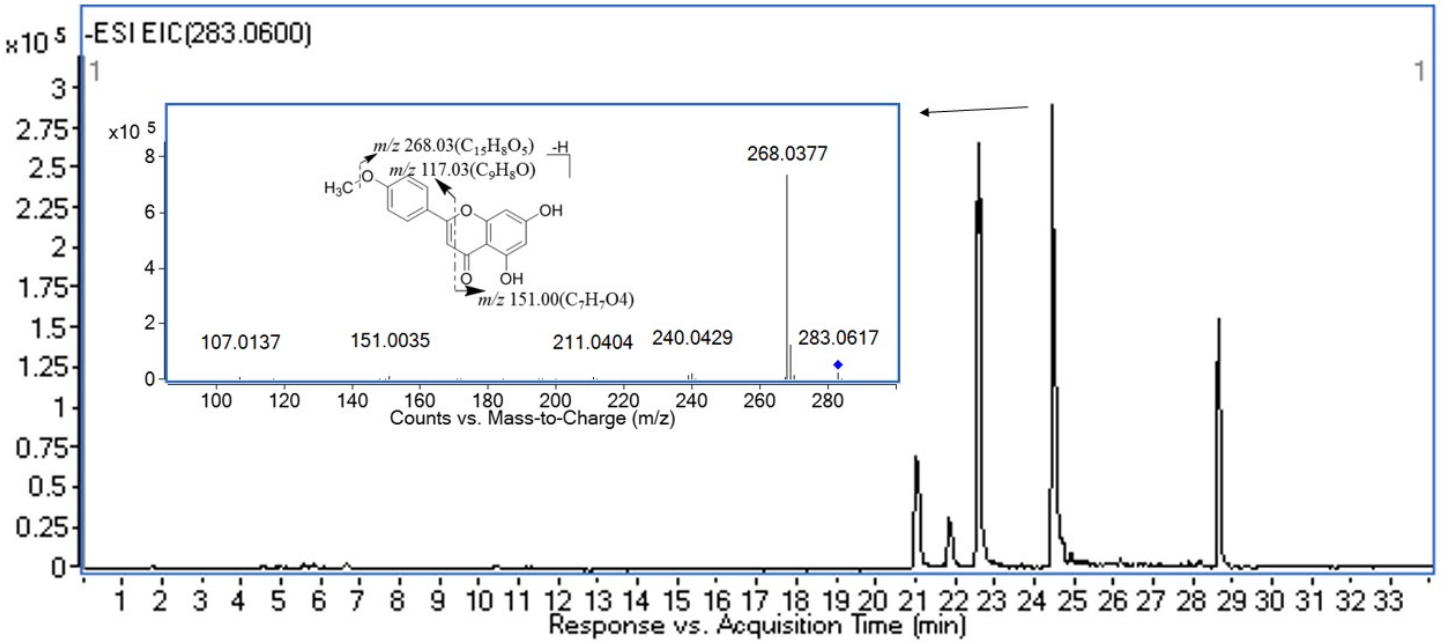
-ESI EIC(283.0600)
x10 5
Response vs. Acquisition Time (min)
m/z 268.03(C15H8O5) -H
m/z 117.03(C9H8O)
m/z 151.00(C7H7O4)
268.0377
107.0137
151.0035
211.0404
240.0429
283.0617
Counts vs. Mass-to-Charge (m/z)

Fig. S1 (F)

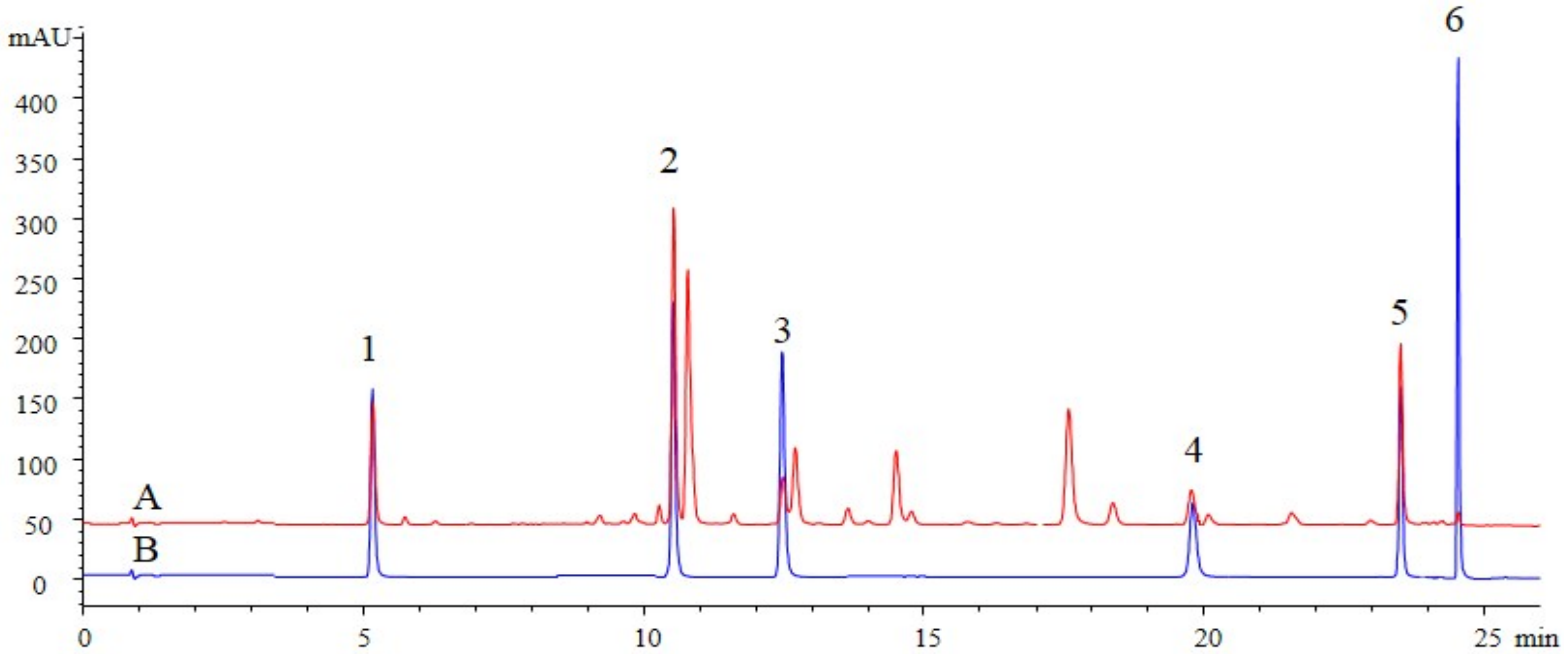

Fig. S2

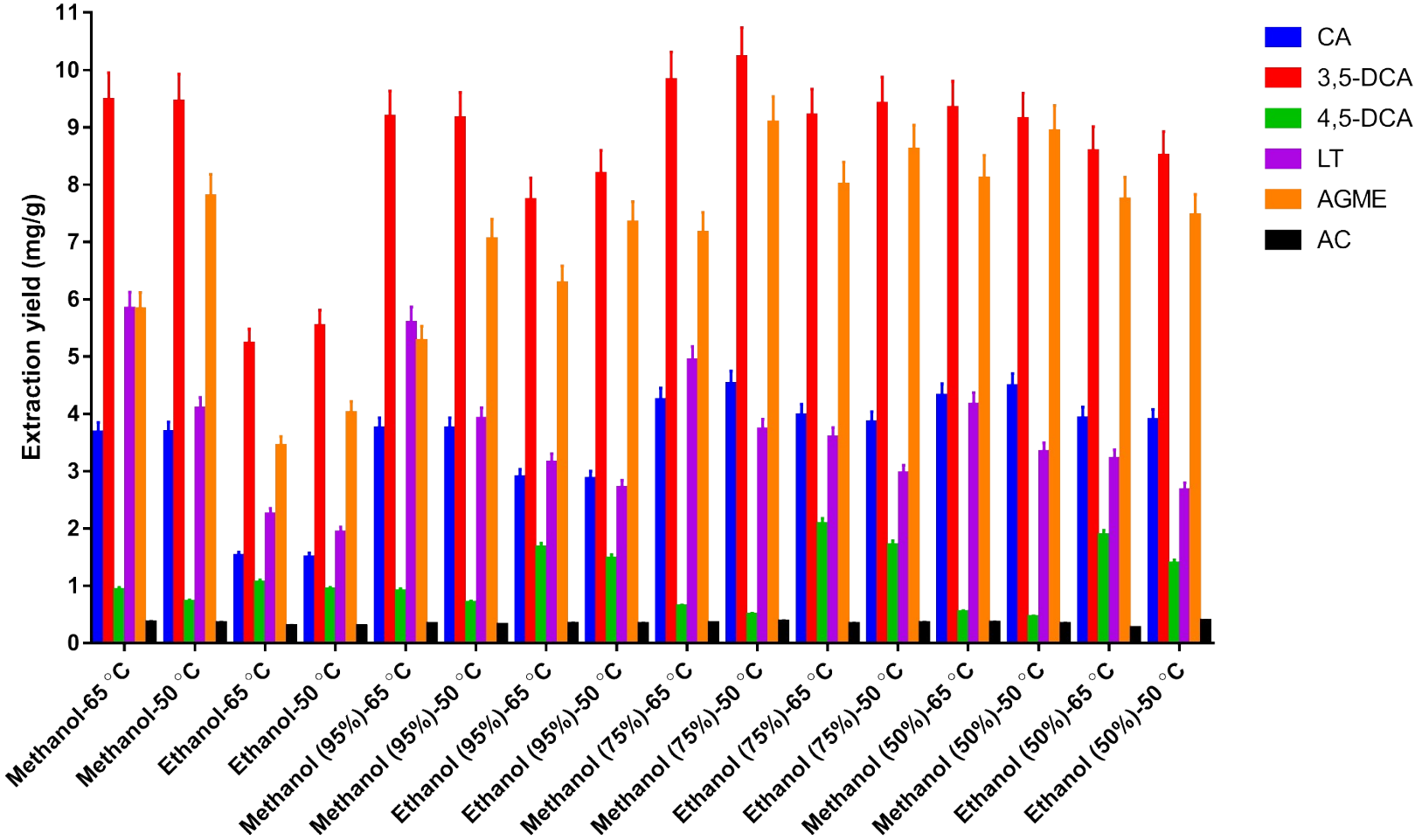
Extraction yield (mg/g)
0
1
2
3
4
5
6
7
8
9
10
11
CA
3,5-DCA
4,5-DCA
LT
AGME
AC
Methanol-65 °C
Methanol-50 °C
Ethanol-65 °C
Ethanol-50 °C
Methanol (95%)-65 °C
Methanol (95%)-50 °C
Ethanol (95%)-65 °C
Ethanol (95%)-50 °C
Methanol (75%)-65 °C
Methanol (75%)-50 °C
Ethanol (75%)-65 °C
Ethanol (75%)-50 °C
Methanol (50%)-65 °C
Methanol (50%)-50 °C
Ethanol (50%)-65 °C
Ethanol (50%)-50 °C

Fig. S3

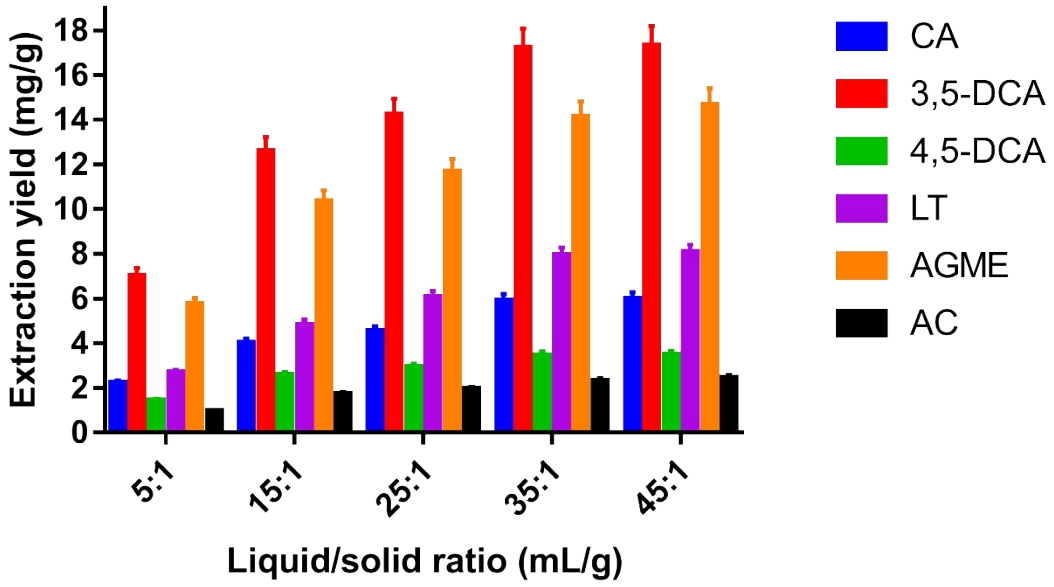
Extraction yield (mg/g)
0
2
4
6
8
10
12
14
16
18
5:1
15:1
25:1
35:1
45:1
Liquid/solid ratio (mL/g)
CA
3,5-DCA
4,5-DCA
LT
AGME
AC

Fig. S4

Figure captions:

Fig. S1. Extracted ion chromatograms and mass spectra for the identified compounds in the methanol extracts by the UHPLC-Q-TOF-MS analysis: A, the chlorogenic acid (CA); B, 3,5-dicaffeoyl quinic acid (3,5-DCA); C, 4,5-dicaffeoyl quinic acid (4,5-DCA); D, luteolin (LT); E, Acacetin-7-O-glucoside-6''-O-malonyl ester (AGME) and F, acacetin (AT) .

Fig. S2. The Chromatograms of reference standards and *chrysanthemum* extracts: 1, chlorogenic acid (CA); 2, 3,5-dicaffeoyl quinic acid (3,5-CA); 3, 4,5-dicaffeoyl quinic acid (4,5-CA); 4, luteolin (LT); 5, Acacetin-7-O-glucoside-6''-O-malonyl ester (AGME) and 6, acacetin (AT); The retention time of target compounds: CA: 5.162 min, 3,5-CA: 10.54 min, 4,5-CA: 12.48 min, LT: 19.68 min, AGME: 20.50 min and AT: 24.53 min.

Fig. S3. Extraction yields for CA, 3,5-DCA, 4,5-DCA, LT, AGME and AC various traditional organic solvents at different temperatures.

Fig. S4. The extraction yields of target compounds under different liquid/solid ratios: 5mL, 15mL, 25mL, 35mL and 45mL extraction solvents were added to 100 mg *chrysanthemum* powder respectively.

Table S1

Recoveries of chlorogenic acid (CA), 3,5-dicaffeoyl quinic acid (3,5-DCA), 4,5-dicaffeoyl quinic acid (4,5-DCA), luteolin (LT), Acacetin-7-O-glucoside-6’’-O-malonyl ester (AGME), acacetin (AT).

Analyte	Original level	Recovery (n = 3)					
		Spiked level (mg)	Recovery (%)	Spiked level (mg)	Recovery (%)	Spiked level (mg)	Recovery (%)
CA	0.87	0.435	101.1	0.87	98.2	1.74	95.5
3,5-DCA	0.74	0.37	98.6	0.74	99.7	1.48	96.2
4,5-DCA	0.64	0.32	99.1	0.64	98.4	1.28	97.6
LT	1.01	0.505	100.3	1.01	97.9	2.02	96.9
AGME	0.56	0.28	99.3	0.56	98.2	1.12	98.0
AT	0.26	0.13	98.9	0.26	99.1	0.52	96.3

Table S2

Precision, Stability and Standard deviations of standard curves.

Analyte	Precision (RSD)		Stability (n = 3)	S [a]
	Intra-day (n=5)	Inter-day (n=3)	RSD	
CA	1.03	1.68	3.01	12.8
3,5-DCA	1.17	1.89	2.21	21.2
4,5-DCA	1.34	2.01	1.98	18.7
LT	0.98	1.58	2.01	10.2
AGME	0.88	1.65	1.21	20.1
AT	0.93	1.35	1.17	13.4

[a] : Standard deviation of residuals.