Electronic Supplementary Material (ESI) for Analytical Methods.

Supplementray Material

Table S1

Box-Behnken experimental design matrix for UA-CPME method.

Run Number	BC	SA	ET	PN*
1	1	0	1	12.156
2	0	0	0	14.178
3	0	0	0	14.155
4	-1	0	-1	4.469
5	-1	1	0	5.861
6	0	1	-1	12.556
7	0	0	0	14.167
8	1	0	-1	9.458
9	1	-1	0	9.152
10	-1	0	1	5.666
11	0	-1	-1	8.789
12	0	-1	1	9.741
13	0	1	1	13.111
14	1	1	0	12.085
15	-1	-1	0	4.272

PN* : Multiplication of the rPN between consecutive peaks.

Supplementary Material

Table S2

Box-Behnken experimental design matrix for the developed HPLC method.

Run Number	MP1	MP2	FR	CT	PN*
1	-1	-1	0	0	5.243
2	-1	-1	0	0	5.276
3	-1	1	0	0	13.151
4	-1	1	0	0	13.157
5	0	0	-1	-1	14.155
6	0	0	1	-1	14.022
7	0	0	-1	1	14.237
8	0	0	1	1	14.076
9	-1	0	0	-1	11.056
10	1	0	0	-1	13.104
11	-1	0	0	1	11.092
12	1	0	0	1	13.044
13	0	-1	-1	0	12.124
14	0	1	-1	0	14.038
15	0	-1	1	0	12.110
16	0	1	1	0	14.119
17	-1	0	-1	0	11.024
18	1	0	-1	0	13.079
19	-1	0	1	0	11.013
20	1	0	1	0	13.173
21	0	-1	0	-1	12.127
22	0	1	0	-1	14.022
23	0	-1	0	1	12.178
24	0	1	0	1	14.126
25	0	-1	0	0	12.168
26	0	-1	0	0	12.175
27	0	-1	0	0	12.188

PN*: Multiplication of the rPN between consecutive peaks.

Supplementary Material

Table S3

ANOVA results of optimization of UA-CPME conditions.

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Model	9	177.566	19.7296	62.22	0.000
Linear	3	84.388	28.1294	88.71	0.000
BC	1	63.749	63.7490	201.05	0.000
SA	1	16.992	16.9915	53.59	0.001
ET	1	3.648	3.6477	11.50	0.019
Square	3	92.124	30.7079	96.84	0.000
BC*BC	1	82.192	82.1919	259.21	0.000
SA*SA	1	9.524	9.5243	30.04	0.003
ET*ET	1	8.434	8.4337	26.60	0.004
2-Way Interaction	3	1.054	0.3514	1.11	0.428
BC*SA	1	0.452	0.4516	1.42	0.286
BC*ET	1	0.563	0.5633	1.78	0.240
SA*ET	1	0.039	0.0394	0.12	0.739
Error	5	1.585	0.3171		
Lack-of-Fit	3	1.585	0.5284	3992.88	0.000
Pure Error	2	0.000	0.0001		
Total	14	179.152			

Supplementary Material

Table S4

ANOVA results of optimization of HPLC conditions.

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Model	14	134.721	9.6229	142.88	0.000
Linear	4	19.771	4.9427	73.39	0.000
MP1	1	12.225	12.2253	181.52	0.000
MP2	1	7.538	7.5378	111.92	0.000
FR	1	0.002	0.0017	0.03	0.875
CT	1	0.006	0.0059	0.09	0.772
Square	4	28.321	7.0803	105.13	0.000
MP1*MP1	1	9.754	9.7537	144.82	0.000
MP2*MP2	1	2.534	2.5342	37.63	0.000
FR*FR	1	0.043	0.0429	0.64	0.441
CT*CT	1	0.038	0.0384	0.57	0.465
2-Way Interaction	6	23.635	3.9391	58.49	0.000
MP1*MP2	1	23.627	23.6268	350.80	0.000
MP1*FR	1	0.003	0.0027	0.04	0.844
MP1*CT	1	0.002	0.0023	0.03	0.857
MP2*FR	1	0.002	0.0022	0.03	0.859
MP2*CT	1	0.001	0.0007	0.01	0.923
FR*CT	1	0.000	0.0002	0.00	0.957
Error	12	0.808	0.0674		
Lack-of-Fit	8	0.807	0.1009	500.00	0.000
Pure Error	4	0.001	0.0002		
Total	26	135.529			

Table S5. List of concentration levels of the calibration curve of p-hydroxybenzoic acid and parabens (n=6)

	Standard Analyte Solutions, μg mL^{-1} (mol L^{-1})				
	I	II	III	IV	V
p-OH BA	0.030 (2.00×10^{-7})	0.080 (6.00×10^{-7})	0.140 (1.00×10^{-6})	0.210 (1.50×10^{-6})	0.280 (2.00×10^{-6})
MP	0.030 (2.00×10^{-7})	0.090 (6.00×10^{-7})	0.150 (1.00×10^{-6})	0.230 (1.50×10^{-6})	0.300 (2.00×10^{-6})
EP	0.030 (2.00×10^{-7})	0.100 (6.00×10^{-7})	0.170 (1.00×10^{-6})	0.250 (1.50×10^{-6})	0.330 (2.00×10^{-6})
PP	0.040 (2.00×10^{-7})	0.110 (6.00×10^{-7})	0.180 (1.00×10^{-6})	0.270 (1.50×10^{-6})	0.360 (2.00×10^{-6})
BP	0.040 (2.00×10^{-7})	0.120 (6.00×10^{-7})	0.190 (1.00×10^{-6})	0.290 (1.50×10^{-6})	0.390 (2.00×10^{-6})

Table S6. The accuracy results of p-hydroxybenzoic acid and parabens (n=6) by using the standard addition method as stated in '*Method validation*' of the experimental section.

	Added, μg mL^{-1}, (mol L^{-1})	Found, μg mL^{-1}, (mol L^{-1})	Recovery% (RSD%)
p-OH BA	0.080 (6.00×10^{-7})	0.080 (5.97×10^{-7})	99.46 (1.46)
	0.140 (1.00×10^{-6})	0.139 (9.95×10^{-7})	99.52 (1.11)
	0.210 (1.50×10^{-6})	0.209 (1.50×10^{-6})	99.68 (0.73)
MP	0.090 (6.00×10^{-7})	0.089 (5.94×10^{-7})	98.36 (1.40)
	0.150 (1.00×10^{-6})	0.152 (1.02×10^{-6})	101.56 (1.65)
	0.230 (1.50×10^{-6})	0.231 (1.51×10^{-6})	100.43 (0.87)
EP	0.100 (6.00×10^{-7})	0.099 (5.96×10^{-7})	99.29 (1.46)
	0.170 (1.00×10^{-6})	0.172 (1.01×10^{-6})	101.04 (1.84)
	0.250 (1.50×10^{-6})	0.252 (1.51×10^{-6})	100.64 (1.26)
PP	0.110 (6.00×10^{-7})	0.110 (6.00×10^{-7})	99.99 (0.23)
	0.180 (1.00×10^{-6})	0.182 (1.01×10^{-6})	100.84 (1.01)
	0.270 (1.50×10^{-6})	0.277 (1.54×10^{-6})	102.41 (1.67)
BP	0.120 (6.00×10^{-7})	0.119 (5.96×10^{-7})	99.39 (1.70)
	0.190 (1.00×10^{-6})	0.190 (1.00×10^{-6})	100.06 (0.40)
	0.290 (1.50×10^{-6})	0.290 (1.50×10^{-6})	100.09 (0.81)