Electronic Supplementary Material (ESI) for Analytical Methods.

Supplementary Materials

Deep eutectic solvent-based emulsification liquid-liquid microextraction coupled with gas chromatography for the determination of thiophenols in water samples

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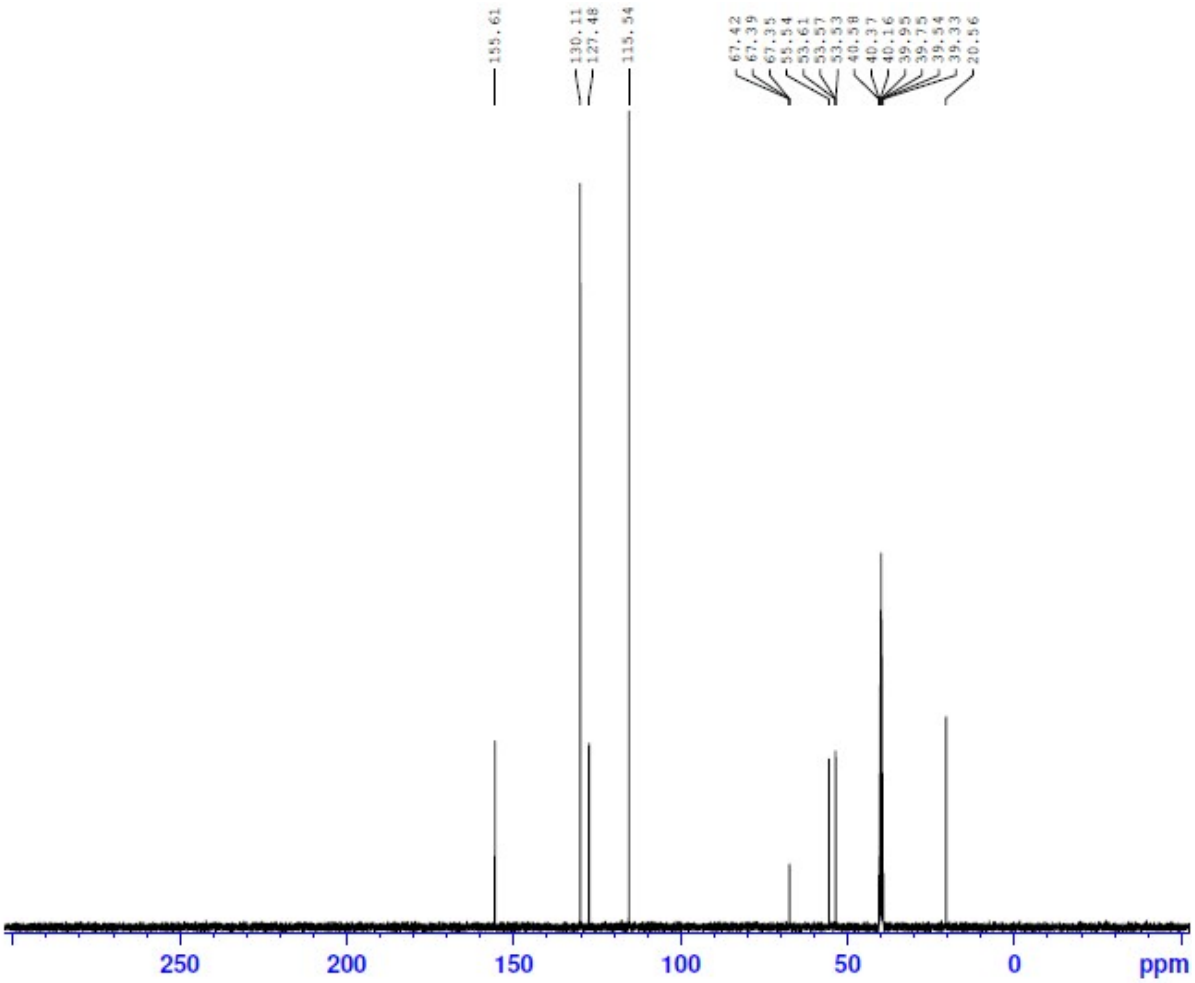

155.61
130.11
127.48
115.54
67.42
67.39
67.35
55.54
53.61
53.57
53.53
40.58
40.37
40.16
39.95
39.75
39.54
39.33
20.56
250
200
150
100
50
0
ppm

Figure (S1)

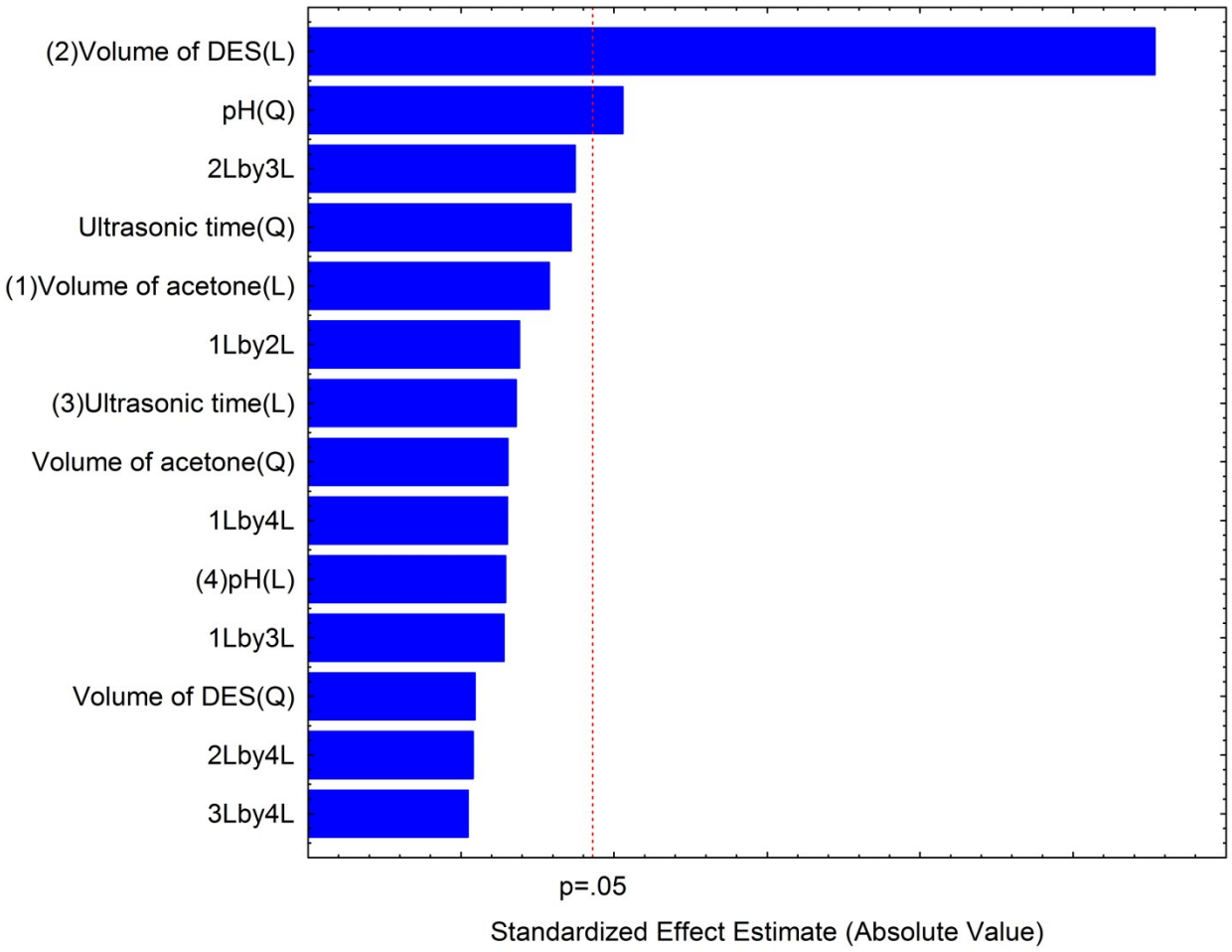
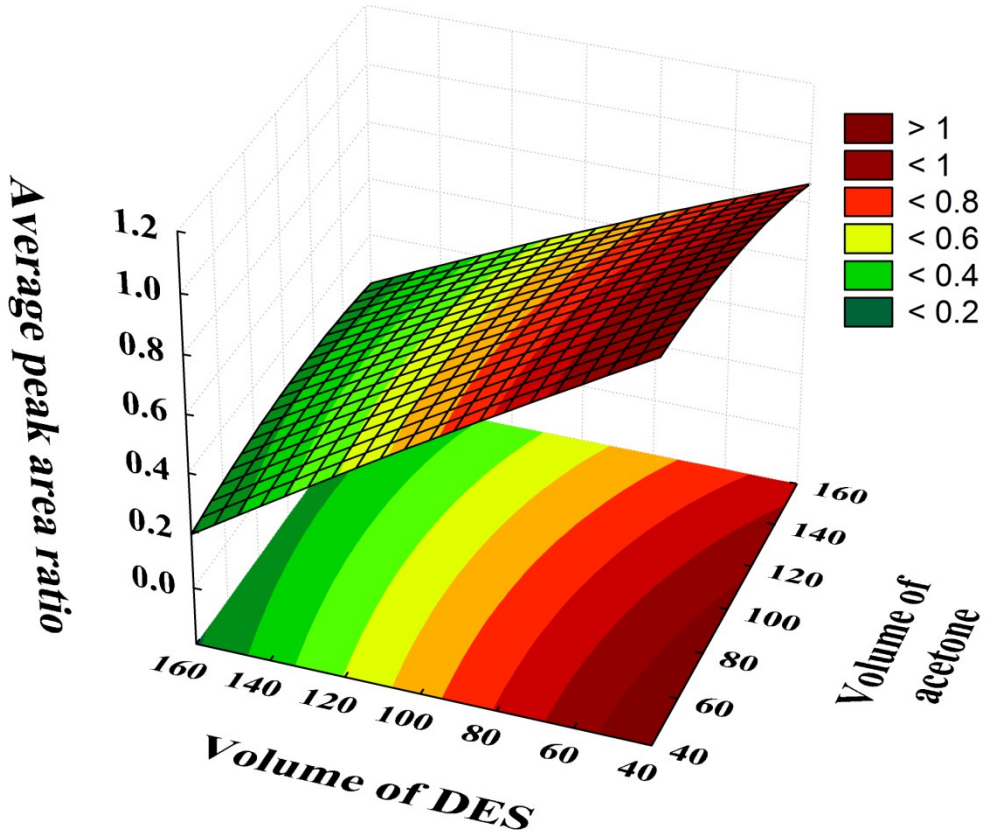
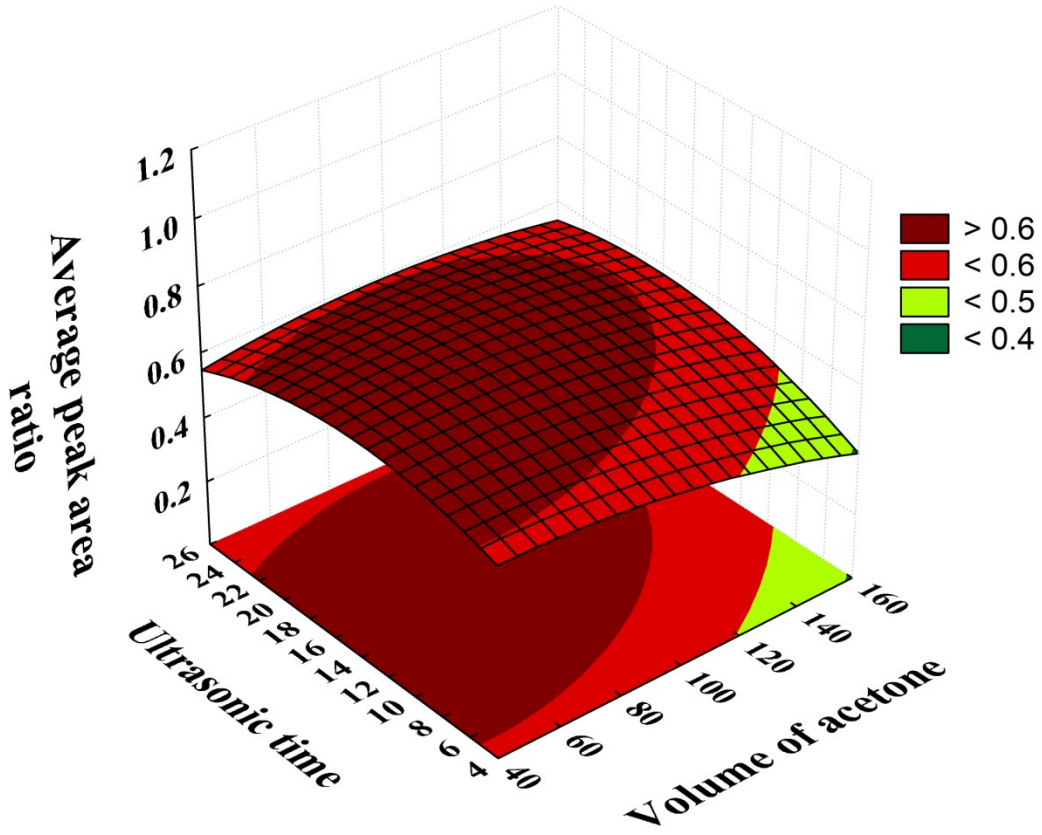

(2)Volume of DES(L)
pH(Q)
2Lby3L
Ultrasonic time(Q)
(1)Volume of acetone(L)
1Lby2L
(3)Ultrasonic time(L)
Volume of acetone(Q)
1Lby4L
(4)pH(L)
1Lby3L
Volume of DES(Q)
2Lby4L
3Lby4L
p=.05
Standardized Effect Estimate (Absolute Value)

Figure (S2)

27


Average peak area ratio
1.2
1.0
0.8
0.6
0.4
0.2
0.0
160
140
120
100
80
60
40
Volume of DES
Volume of acetone
> 1
< 1
< 0.8
< 0.6
< 0.4
< 0.2

28

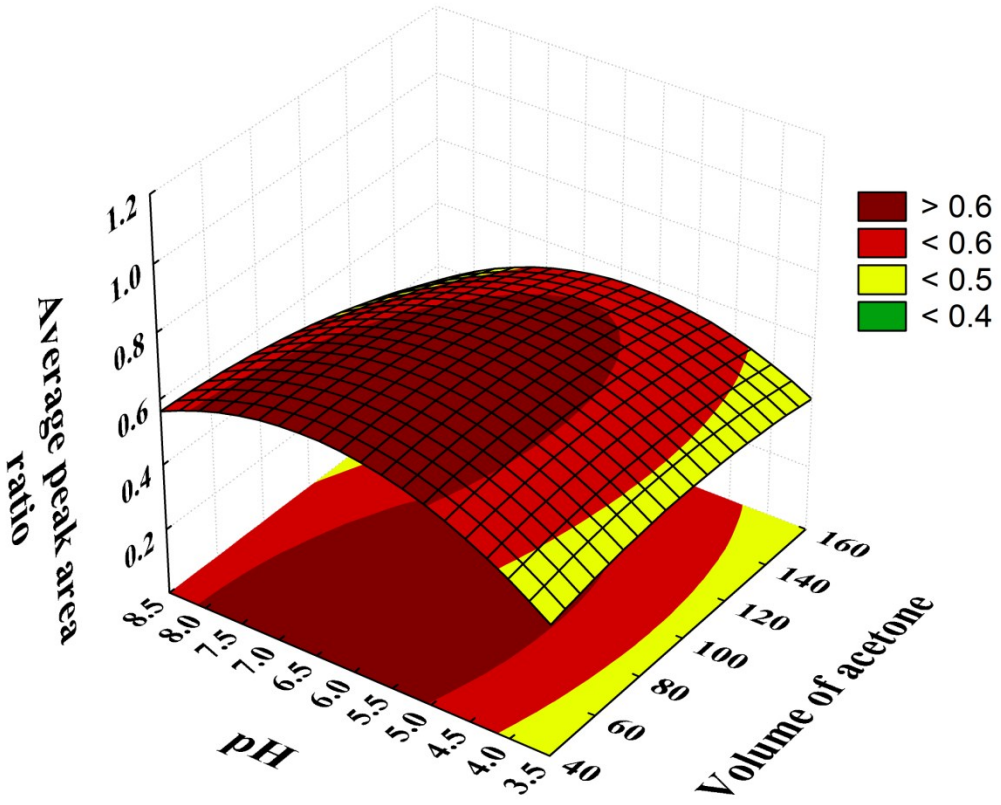

Average peak area ratio
1.2
1.0
0.8
0.6
0.4
0.2
Ultrasonic time
26
24
22
20
18
16
14
12
10
8
6
4
Volume of acetone
40
60
80
100
120
140
160
> 0.6
< 0.6
< 0.5
< 0.4

29

30

31

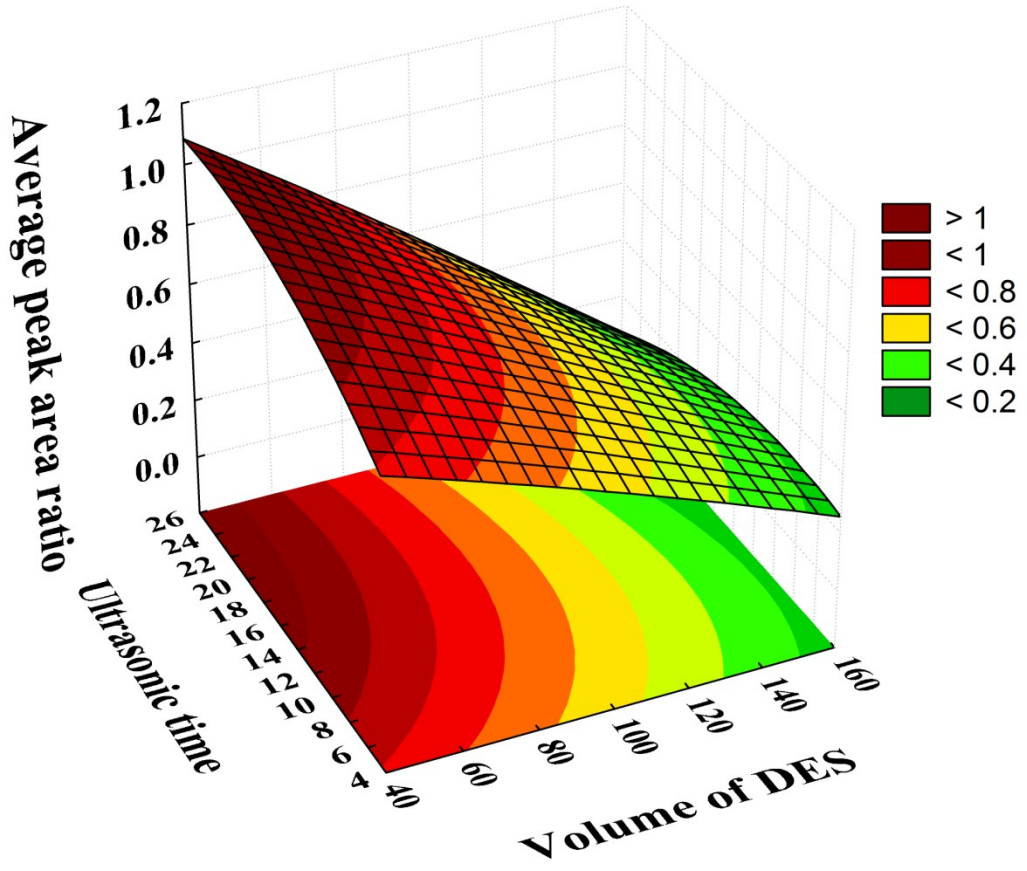
32


Average peak area ratio
1.2
1.0
0.8
0.6
0.4
0.2
pH
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
Volume of acetone
160
140
120
100
80
60
40
> 0.6
< 0.6
< 0.5
< 0.4

33

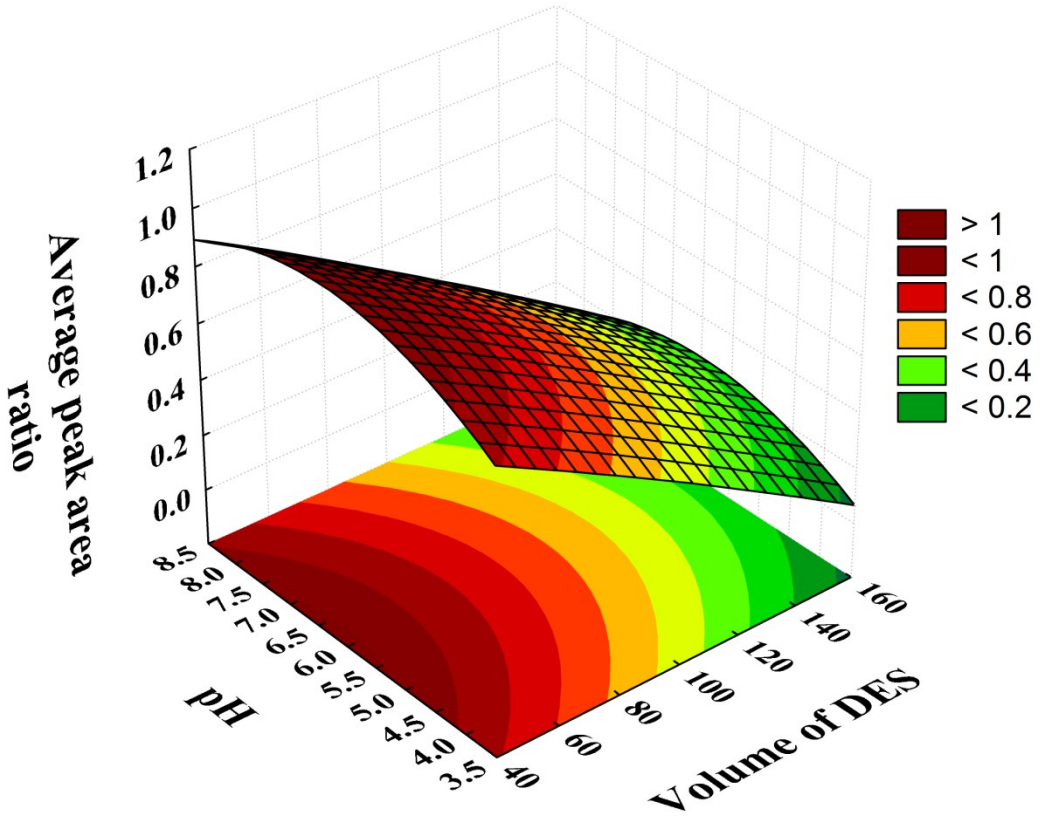
34

35


Average peak area ratio
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Ultrasonic time
26
24
22
20
18
16
14
12
10
8
6
4
Volume of DES
40
60
80
100
120
140
160
> 1
< 1
< 0.8
< 0.6
< 0.4
< 0.2

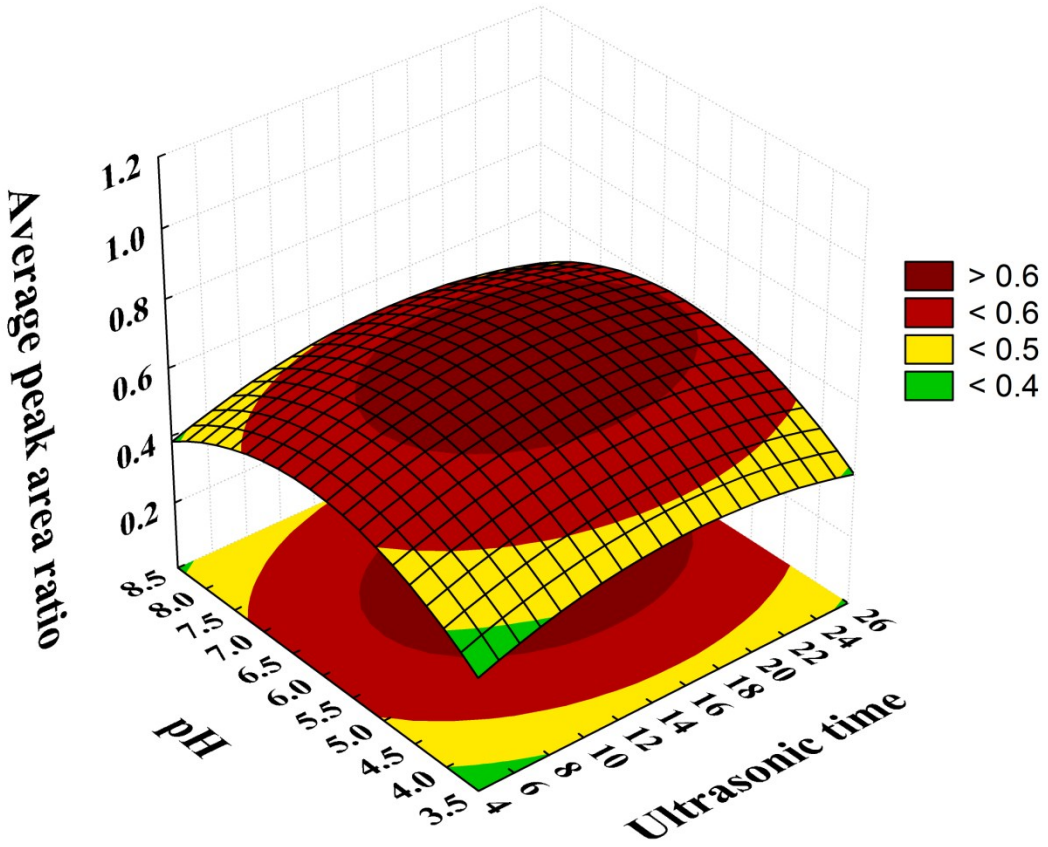
36

37


Average peak area ratio
1.2
1.0
0.8
0.6
0.4
0.2
0.0
pH
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
Volume of DES
40
60
80
100
120
140
160
> 1
< 1
< 0.8
< 0.6
< 0.4
< 0.2

38

39



40

41 **Figure (S3)**

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Table S1 Actual and coded values of factors used in Box-Behnken for the extraction of Thiophenols.

			Levels		
Factors		Low (-1)	Central (0)	High (+1)	
(X_1) Volume of acetone (µL)		50	100	150	
(X_2) Volume of DES (µL)		50	100	150	
(X_3) Ultrasonic time (min)		5	15	25	
(X_4) pH		4	6	8	
Run	X_1	X_2	X_3	X_4	P[a]
1	-1	-1	0	0	1.025
2	+1	-1	0	0	0.83
3	-1	+1	0	0	0.401
4	+1	+1	0	0	0.394
5	0	0	-1	-1	0.52
6	0	0	+1	-1	0.511
7	0	0	-1	+1	0.508
8	0	0	+1	+1	0.521
9 CP	0	0	0	0	0.627
10	-1	0	0	-1	0.514
11	+1	0	0	-1	0.42
12	-1	0	0	+1	0.639
13	+1	0	0	+1	0.395
14	0	-1	-1	0	0.713
15	0	+1	-1	0	0.219
16	0	-1	+1	0	1.067
17	0	+1	+1	0	0.205
18 CP	0	0	0	0	0.626
19	-1	0	-1	0	0.544
20	+1	0	-1	0	0.499
21	-1	0	+1	0	0.458
22	+1	0	+1	0	0.551
23	0	-1	0	-1	0.818
24	0	+1	0	-1	0.107
25	0	-1	0	+1	0.912
26	0	+1	0	+1	0.162
27 CP	0	0	0	0	0.712

[a]Average peak area ratio

Table S2 ANOVA results obtained by Box-Behnken.

Factors	Sum of Square (SS)	Degree of Freedom (DF)	Mean Square (MS)	F-value	p-Value
X_1 (L+Q)	0.025834	2	0.012917	5.3004	0.158720
X_2 (L+Q)	1.253097	2	0.626548	257.0982	0.003874
X_3 (L+Q)	0.039544	2	0.019772	8.1132	0.109731
X_4 (L+Q)	0.073327	2	0.036664	15.0446	0.062326
X_1X_2	0.008836	1	0.008836	3.6258	0.197197
X_1X_3	0.004761	1	0.004761	1.9536	0.297052
X_1X_4	0.005625	1	0.005625	2.3082	0.268040
X_2X_3	0.033856	1	0.033856	13.8925	0.065038
X_2X_4	0.000380	1	0.000380	0.1560	0.730983
X_3X_4	0.000132	1	0.000132	0.0543	0.837467
Lack of Fit	0.095611	10	0.009561	3.9233	0.220110
Pure Error	0.004874	2	0.002437		
Total SS	1.526883	26			
R-squared	93.4				
R-adjusted	85.7				