

*Supporting information*

**Comprehensive evaluation of deep eutectic solvents in extraction of bioactive  
natural products**

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Supplementary Table S1. Experimental orders and levels of coded and uncoded variables used for the BBD method.

Run	Variable			
	A <sup>a</sup>	B <sup>b</sup>	C <sup>c</sup>	D <sup>d</sup>
1	30	50	20	40
2	30	40	10	40
3	30	40	30	40
4	50	50	10	40
5	30	50	20	40
6	50	40	20	40
7	50	50	20	20
8	30	50	10	60
9	30	50	30	20
10	10	50	20	60
11	10	40	20	40
12	30	50	20	40
13	30	50	20	40
14	10	50	10	40
15	30	40	20	20
16	50	50	30	40
17	30	50	30	60
18	10	50	20	20
19	30	50	20	40
20	30	60	10	40
21	30	60	30	40
22	10	50	30	40
23	30	60	20	60
24	10	60	20	40
25	30	60	20	20
26	30	50	10	20
27	50	50	20	60
28	30	40	20	60
29	50	60	20	40

<sup>a</sup> water content (%)

<sup>b</sup> Temperature (°C)

<sup>c</sup> Extraction time (min)

<sup>d</sup> solid/liquid ratio (mg/mL)

Supplementary Table S2. ANOVA results of the model for alkaloids.

Source	Sum of squares	df	Mean Square	F Value	p-value	prob > F	Significance
Model	0.525	14	0.0375	12.838	<0.0001		significant
A	0.0791	1	0.0791	27.043		0.0001	
B	0.0113	1	0.0113	3.881		0.0689	
C	0.0186	1	0.0186	6.351		0.0245	
D	0.170	1	0.170	58.048	< 0.0001		
AB	7.225E-05	1	7.225E-05	0.0247		0.877	
AC	0.0223	1	0.0224	7.645		0.0152	
AD	8.1E-05	1	8.1E-05	0.0277		0.870	
BC	0.0016	1	0.0016	0.547		0.472	
BD	0.000841	1	0.000841	0.288		0.600	
CD	0.00198	1	0.00198	0.677		0.424	
A <sup>2</sup>	0.170	1	0.170	58.226	<0.0001		
B <sup>2</sup>	3.685E-05	1	3.684E-05	0.0126		0.912	
C <sup>2</sup>	0.00166	1	0.00166	0.567		0.464	
D <sup>2</sup>	0.0181	1	0.0181	6.205		0.0259	
Residual	0.0409	14	0.00292				
Lack of Fit	0.0366	10	0.00366	3.418		0.124	Not significant
Pure Error	0.00429	4	0.00107				
R <sup>2</sup>	0.928						

Supplementary Table S3 Method validation

Analytes	Linear range ( $\mu\text{g/ml}$ )	Calibration curve	$r^2$	LOD ( $\mu\text{g/ml}$ )	LOQ ( $\mu\text{g/ml}$ )	Precision (RSD, %)		Repeatability (RSD, %)	Stability (12h) (RSD, %)	Recovery (mean $\pm$ SD, %)
						intra-day	inter-day			
Jatrorrhizine hydrochloride	3.25-208	y=14537x-11940	0.9999	0.14	0.45	0.77	1.35	1.27	0.69	104.58 $\pm$ 1.57
Palmatine hydrochloride	0.656-42	y = 13434x-1343	0.9998	0.16	0.54	0.83	1.51	1.29	1.92	107.72 $\pm$ 1.64
Berberine hydrochloride	8.5-544	y=13782x-35222	0.9999	0.22	0.69	0.64	1.58	1.11	1.83	93.82 $\pm$ 1.02