Highly efficient extraction of alkaloids via bio-derived ionic liquids for complex wound repair

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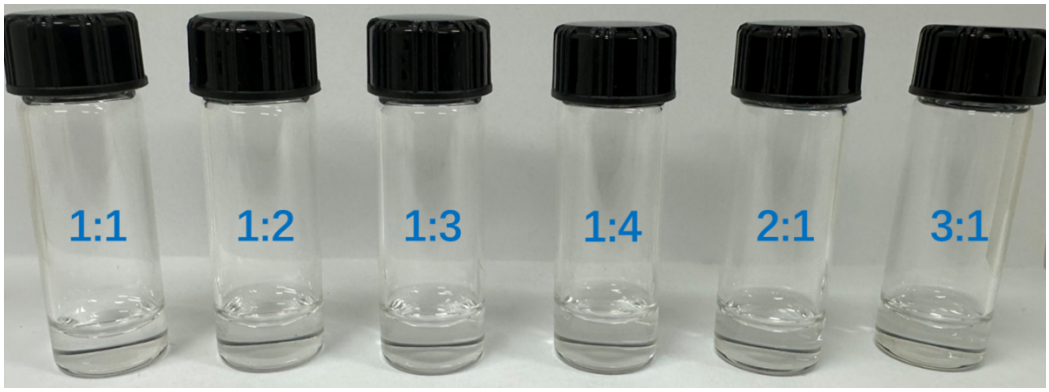
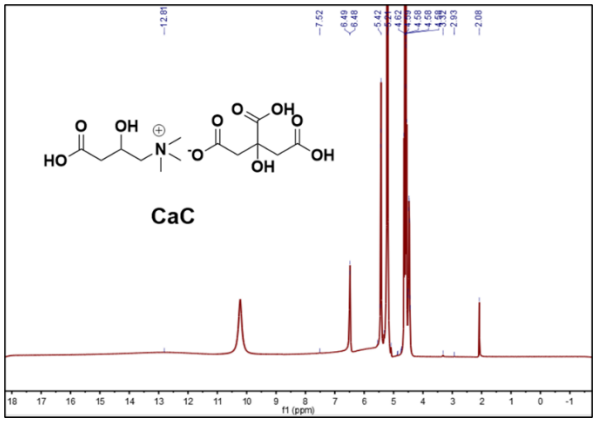


Figure S1. Physical view of CaCs.

a



b

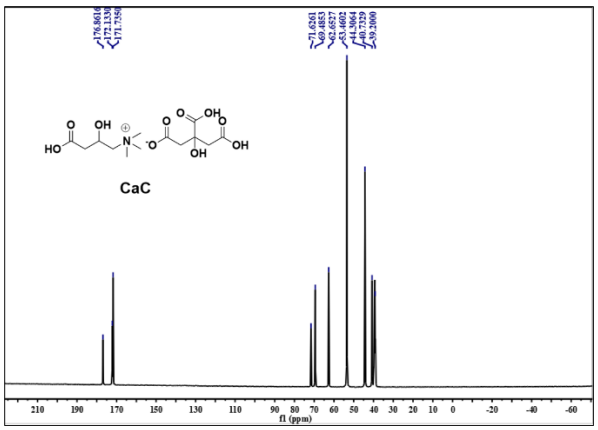


Figure S2. (a) ^{1}H NMR spectrum of CaC samples. (b) ^{13}C NMR spectrum of CaC samples.

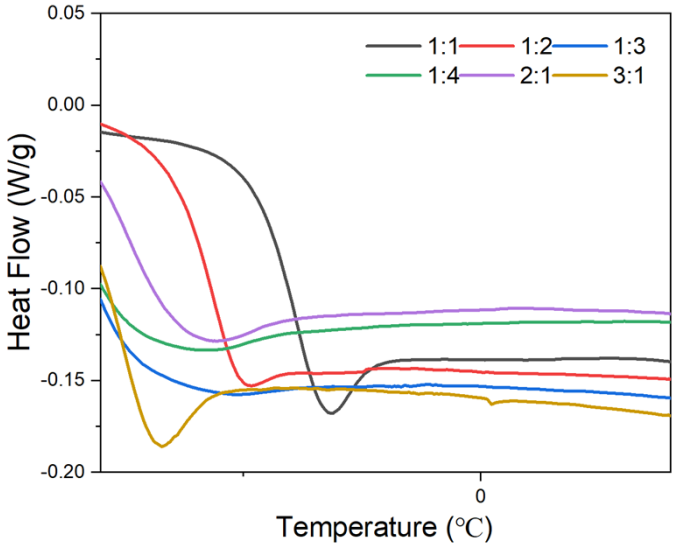


Figure S3. DSC curves of CaC samples.

Table S1. Centre composite design experimental groups and results

Groups	Concentration of ILs (wt%)	Time(min)	Solid-liquid ratio (mg/g)	Alkaloid yield (mg/g)
1	25	13.18	30	104.53
2	15	40	40	113.62
3	15	40	20	105.76
4	35	20	40	112.37
5	25	30	46.82	120.67
6	41.82	30	30	108.92
7	8.18	30	30	103.21
8	15	20	40	110.55
9	25	30	30	116.32
10	25	30	30	118.93
11	25	30	30	118.41
12	25	30	30	118.53
13	35	40	40	114.43
14	25	30	13.18	104.73
15	25	30	30	119.07

16	15	20	20	100.23
17	35	40	20	106.41
18	35	20	20	103.45
19	25	46.82	30	110.25
20	25	30	30	117.69

The simulation of the experimental data by the Design-Expert 8.0 software can be represented by second order polynomial equations in coded form as follows:

Alkaloid yield =10.90630+2.41440* Concentration of ILs +2.66592*time+1.74992* solid-liquid ratio -4.47500E-003* Concentration of ILs *time-1.55000E-003* Concentration of ILs * solid-liquid ratio -4.20000E-003*time* solid-liquid ratio -0.042315* Concentration of ILs $^{\wedge 2}$-0.037631*time$^{\wedge 2}$-0.018862* solid-liquid ratio $^{\wedge 2}$

The variables and responses related to CCD are shown in Table 2 and the ANOVA predictions are shown in Table 3. The results showed that the model was significant with $p < 0.0001$.

In addition, the coefficient of determination (R2) for the response variable was 0.9891 and the adjusted coefficient of determination (adjusted R2) was 0.9792, indicating that the model accurately predicted the upcoming results. The lack of fit term of $p > 0.05$ indicates that it is not significant, which suggests that the predictive model is accurate enough to represent the data.The linear parameters including A, B, and C were statistically significant ($p < 0.05$).

Table S2. Centre composite design variables and responses

Response	**1**	**Alkaloid yield**				
	Sum of		Mean	F	p-value	
Source	Squares	df	Square	Value	Prob > F	
Model	783.24	9	87.03	100.47	< 0.0001	significant
A-Concentration of ILs	18.99	1	18.99	21.92	0.0009	
B-time	39.55	1	39.55	45.66	< 0.0001	

C- solid-liquid ratio	280.82	1	280.82	324.2	< 0.0001	
AB	1.6	1	1.6	1.85	0.2037	
AC	0.19	1	0.19	0.22	0.6477	
BC	1.41	1	1.41	1.63	0.2307	
A^2	258.14	1	258.14	298.01	< 0.0001	
B^2	204.16	1	204.16	235.7	< 0.0001	
C^2	51.29	1	51.29	59.22	< 0.0001	
Residual	8.66	10	0.87			
Lack of Fit	3.43	5	0.69	0.66	0.6719	not significant
Pure Error	5.23	5	1.05			
Cor Total	791.9	19				

Table S3. variance prediction

Std. Dev.	0.93	R-Squared	0.9891
Mean	111.4	Adj R-Squared	0.9792
C.V. %	0.84	Pred R-Squared	0.957
PRESS	34.09	Adeq Precision	31.316