

Direct conversion of shrimp shells to O-acylated chitin with antibacterial and anti-tumor effect by natural deep eutectic solvent

Supporting Information

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Characterization of NADES

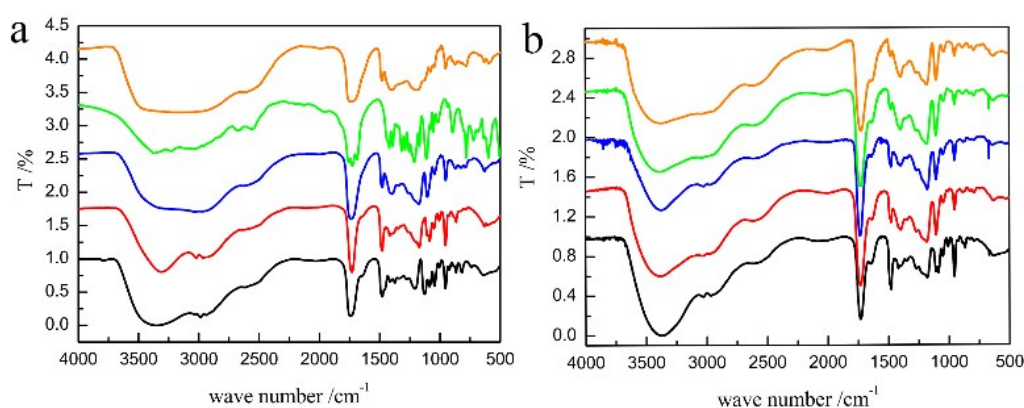


Fig. S1 The FT-IR of the (a) ChCl 1-Lac 2 (black), ChCl 2-Citr 1 (red), ChCl 1-Citr 2 (blue),

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ChCl 2-L Mal 1 (green), and ChCl 1-L Mal 2 (orange) (b) ChCl 1- DL Mal 1 (black), ChCl 1- DL Mal 2 (red), ChCl 1- DL Mal 3 (blue), ChCl 1- DL Mal 4 (green), and ChCl 1- DL Mal 5 (orange)

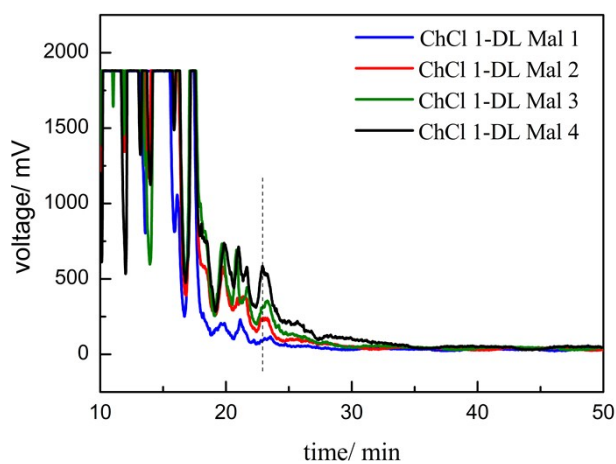


Fig S2. The HPLC pictures of the upper liquid from ChCl 1-DL Mal 1, ChCl 1-DL Mal 2, ChCl 1-DL Mal 3, and ChCl 1-DL Mal 4

Table S1 The pH and molecular size of the NADESs

NADES	pH	Molecular size/ Å
ChCl 1-L Lac 2	3.0	13.4×10.5×8.17
ChCl 2-Citr 1	2.5	15.7×14.4×7.6
ChCl 1-Citr 2	2.0	22.1×11.3×8.0
ChCl 2-L Mal 1	2.0	13.7×10.5×8.4
ChCl 1-L Mal 2	1.5	15.6×13.4×5.9
ChCl 1-D Mal 2	2.0	17.4×14.7×6.2
ChCl 1- DL Mal 1	2.5	12.4×10.7×5.9
ChCl 1-DL Mal 2	2.0	17.9×13.6×7.2
ChCl 1-DL Mal 3	2.0	19.1×13.2×7.1
ChCl 1-DL Mal 4	1.5	17.4×14.3×10.0
ChCl 1-DL Mal 5	1.0	23.6×14.9×8.8

Characterization of the shrimp shells

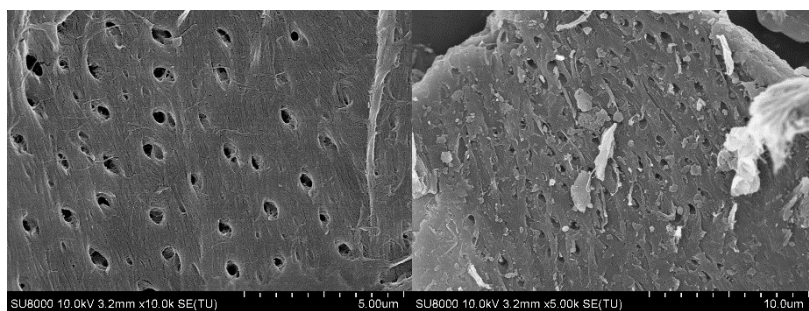


Fig. S3 The SEM figures of the shrimp shells

The mechanism of decalcification, deproteinization and acylation of chitin

Table S2 The amino acids content of raw supernatant and supernatant treated with acid

Amino acid	Supernatant / wt%	Supernatant treated with acid / wt %
Asp	5.77	9.02
Glu	5.59	9.34
Hyp	0.41	0.13
Ser	8.01	8.45
Thr	7.96	6.73
Gly	12.63	12.47
Pro	13.6	5.24
Arg	4.71	4.78
Ala	4.48	7.33
Val	6.31	6.36
Met	3.94	3.26
Ile	4.94	4.69
Leu	6.71	8.33
Trp	0.24	0.05
His	10.97	6.92
Cys	0.15	0.04
Lys	1.43	4.89
Tyr	2.13	1.96

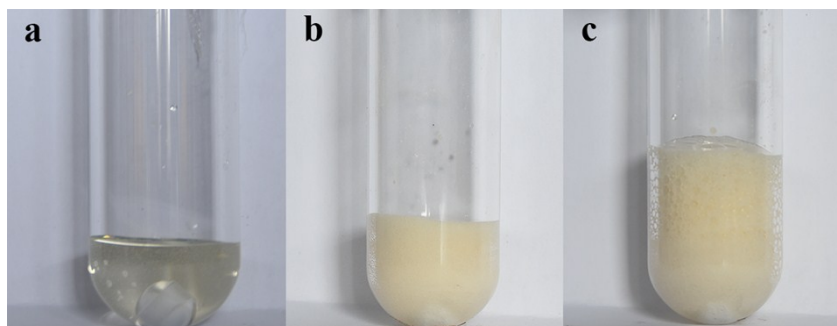


Fig. S4 The pictures of (a) raw ChCl 1-DL Mal 2. Reaction after (b) 5 min and (c) 10 min.