Supporting Information

Aqueous solution of ionic liquid is an efficient substituting solvent system for extraction of alginate from *Sargassum tenerrimum*

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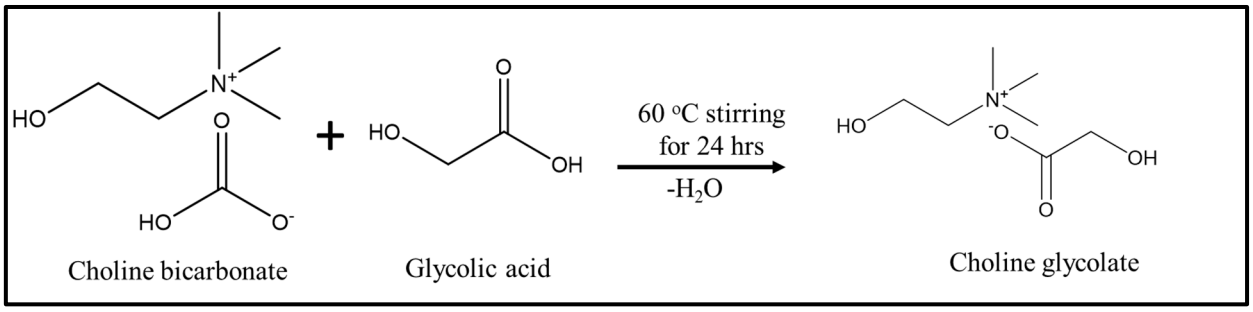
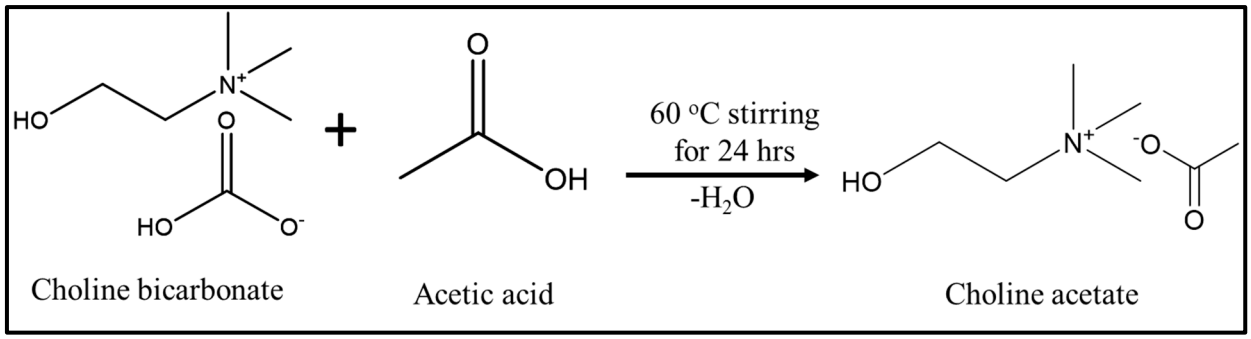
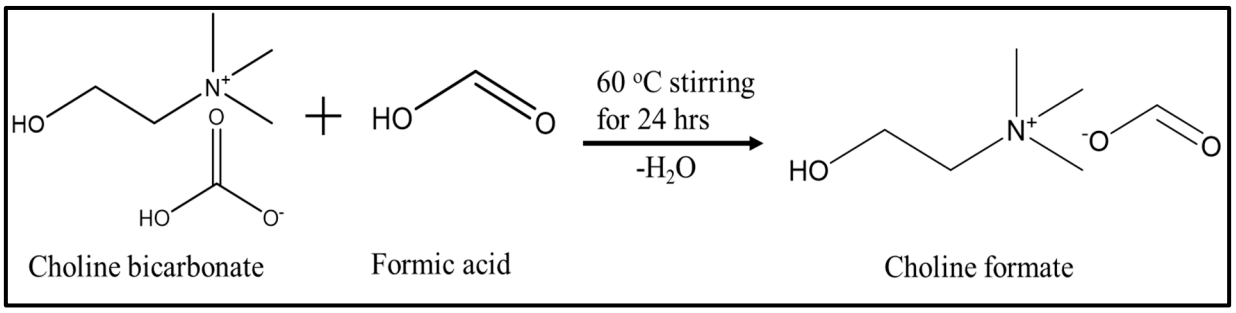


Scheme S1. Reaction Scheme for the synthesis of choline glycolate.



Scheme S2. Reaction Scheme for the synthesis of choline glycolate.



Scheme S3. Reaction Scheme for the synthesis of choline formate.

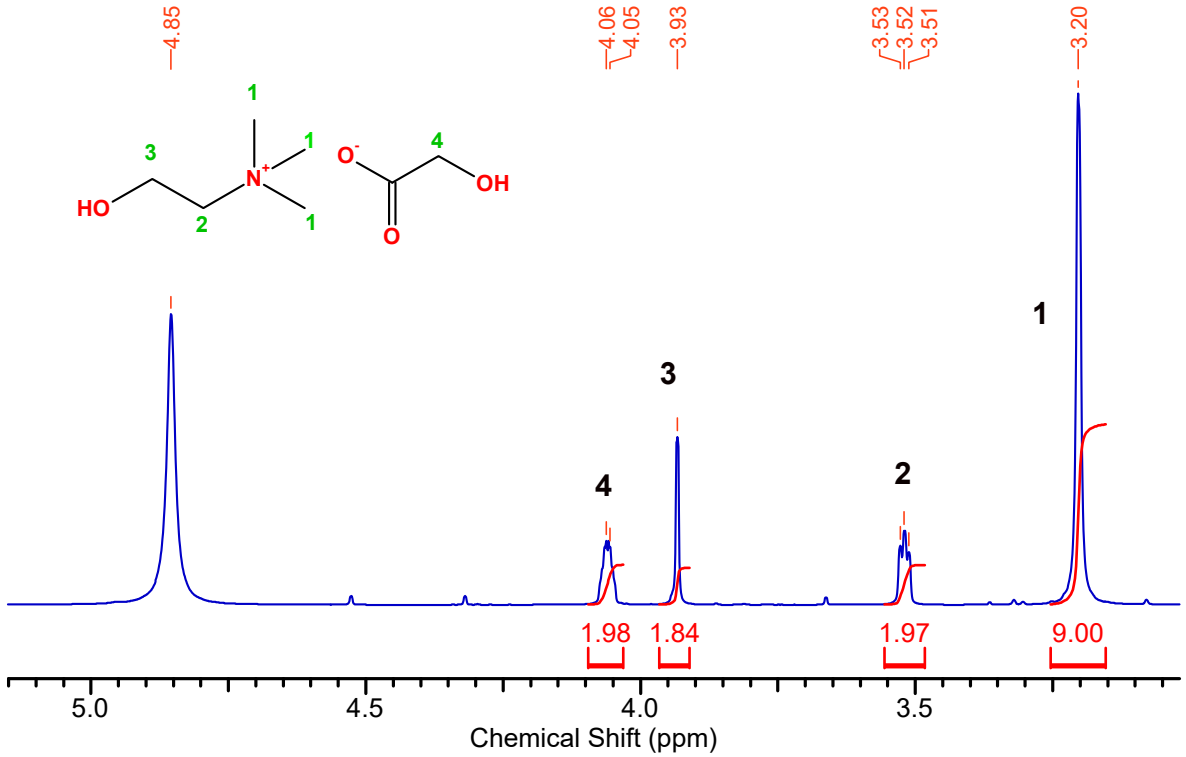


Figure S1. ^{1}H NMR of choline glycolate.

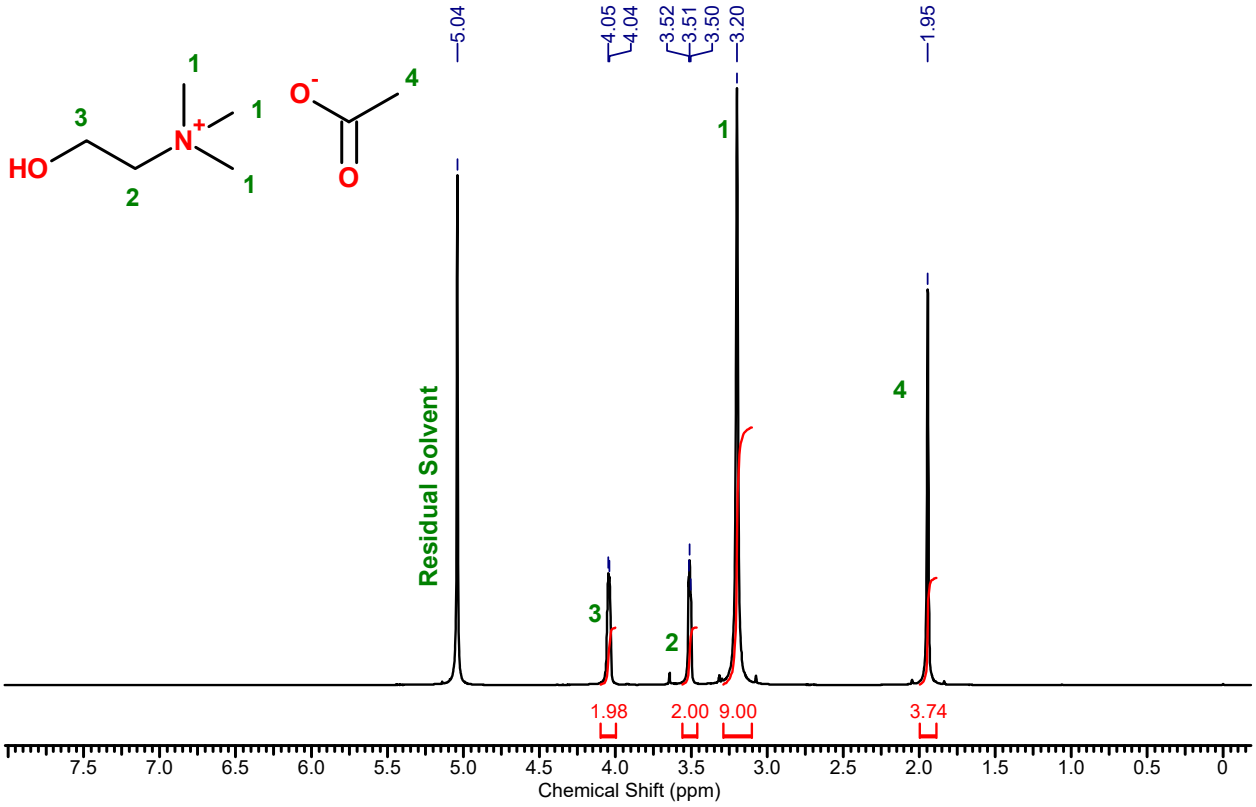


Figure S2. [1]H NMR of choline acetate.

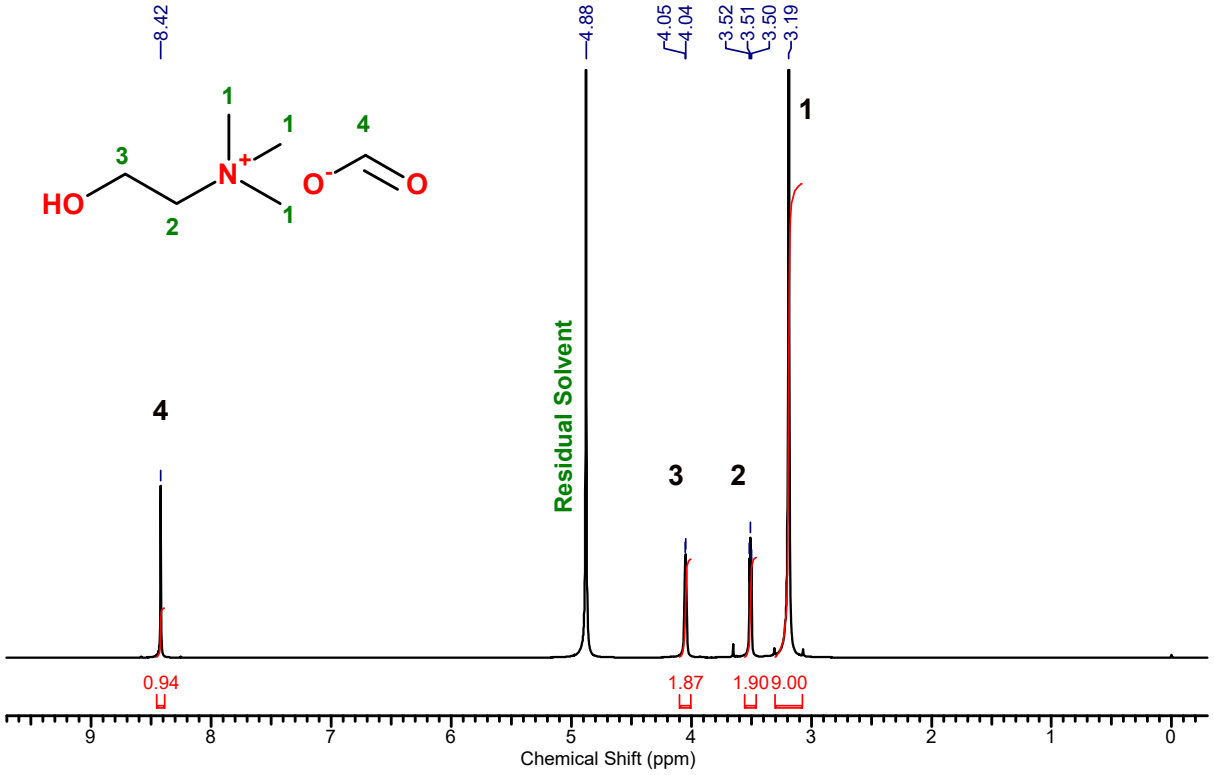


Figure S3. [1]H NMR of choline formate.

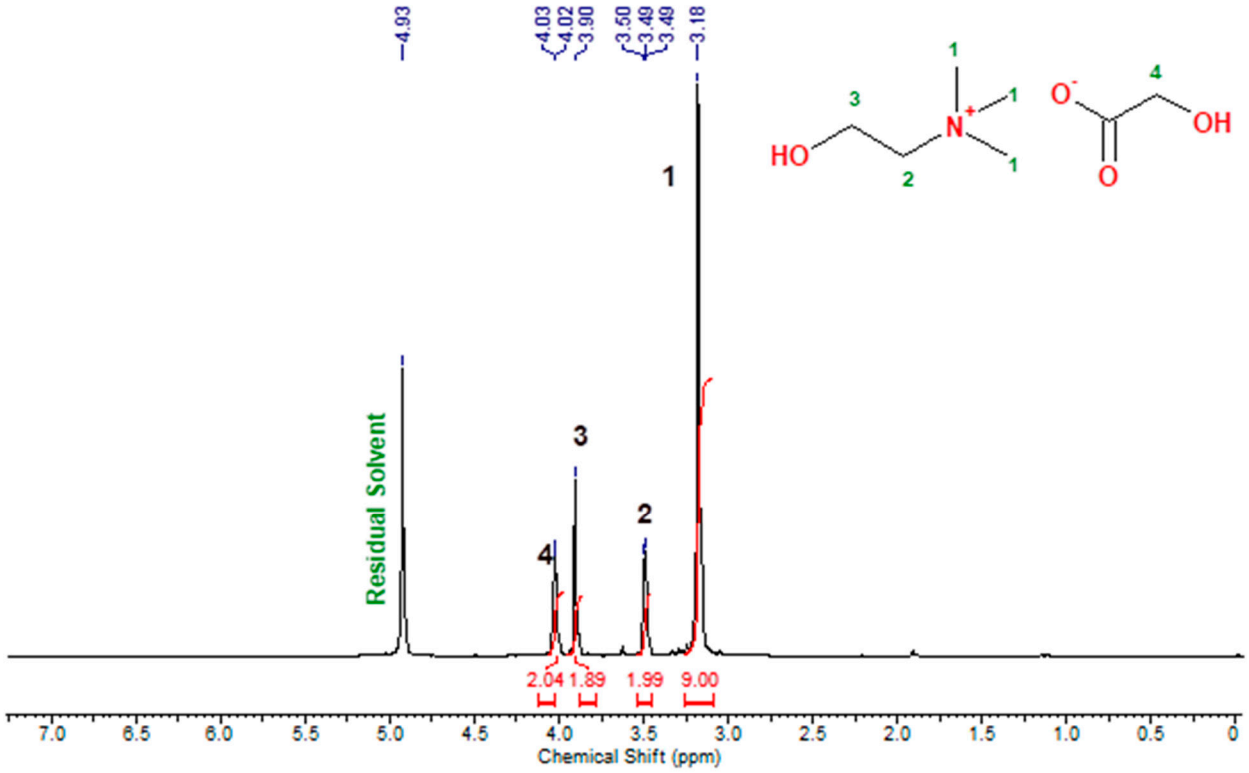


Figure S4. ^{1}H NMR of Recovered choline glycolate.

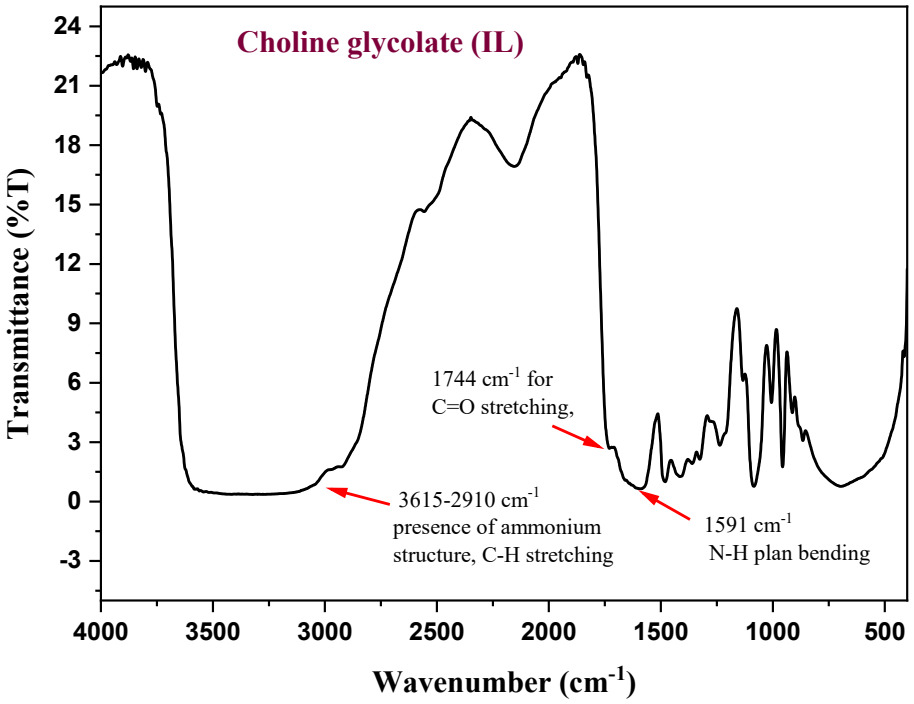


Figure S5. FT-IR spectrum of synthesized choline glycolate.

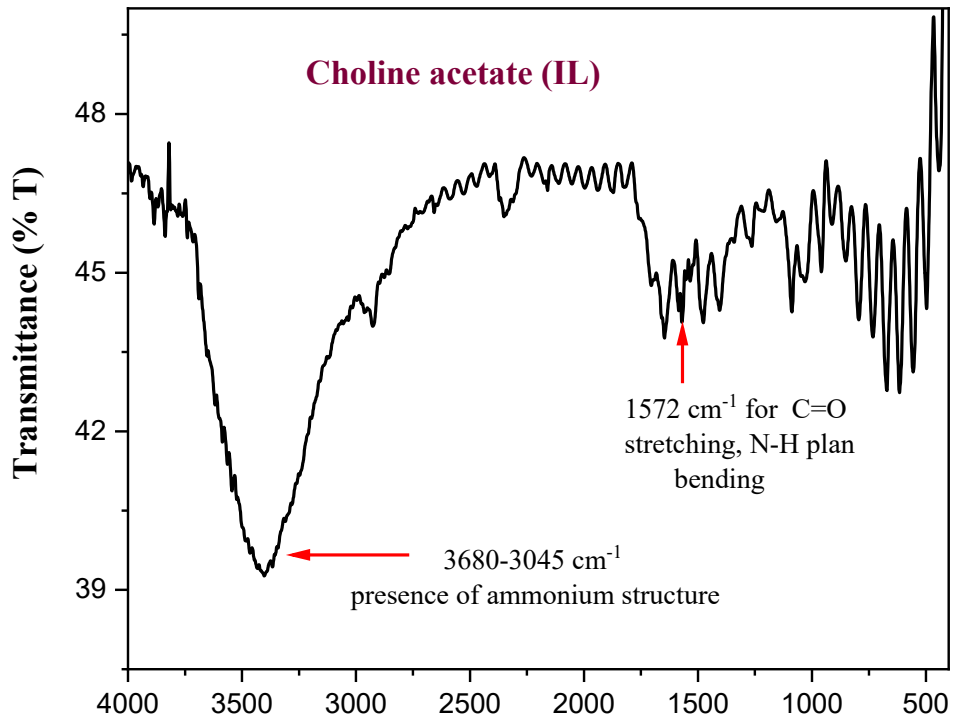


Figure S6. FT-IR spectrum of synthesized choline acetate.

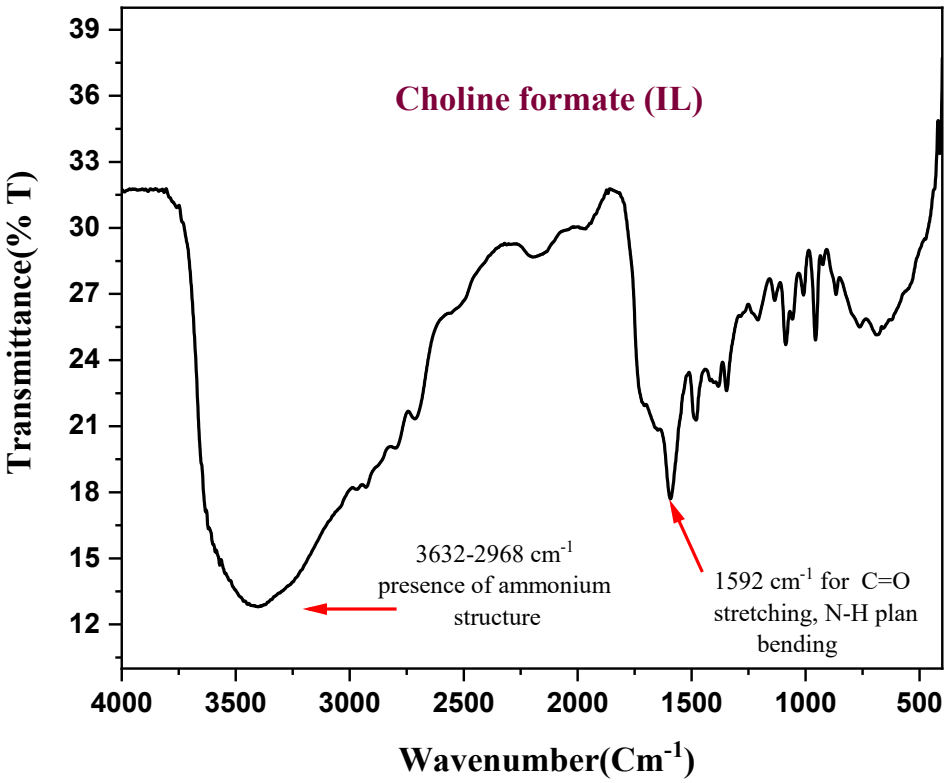


Figure S7. FT-IR spectrum of synthesized choline formate.

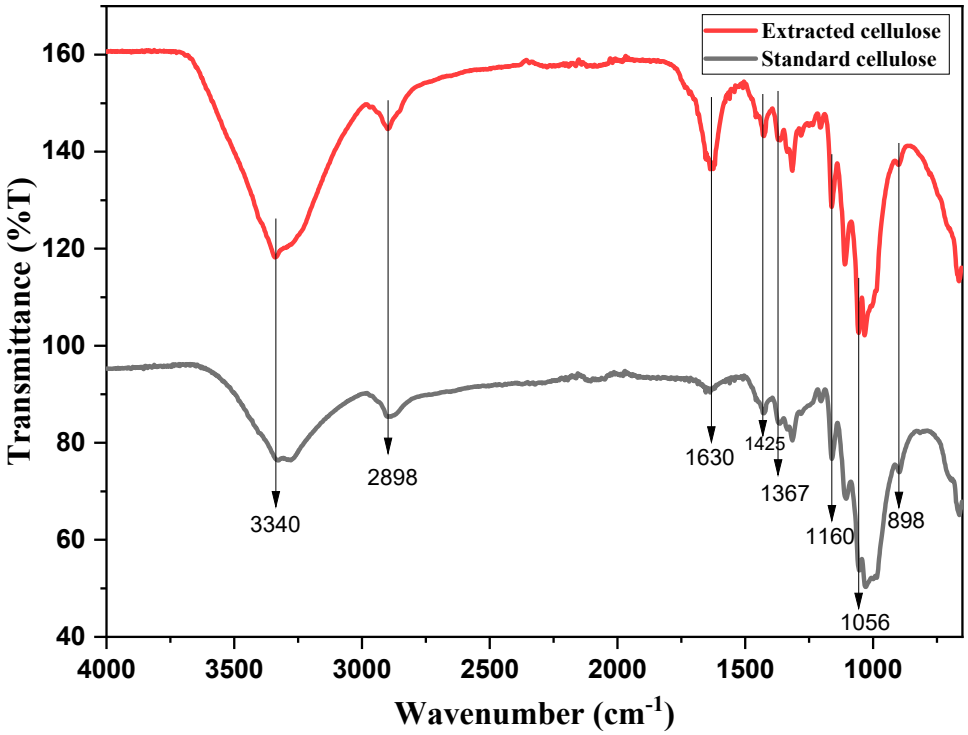


Figure S8. FT-IR spectra of cellulose extracted and standard.

Table S1. Docking affinity energy predicted by AutoDock Vinna for Alginate-Ligands (ILs ions and corresponding Deep Eutectic Solvents (HBA and HBD).

Ligand	Affinity (kcal/mol)	Type of interaction	From	To	Distance (Å)
[Ch]$^+$	-2.0	Electrostatic	[Ch]$^+$	Alginate	5.56
		Hydrogen Bond	Alginate	[Ch]$^+$	3.02
			[Ch]$^+$	Alginate	3.59
					3.59
Cl$^-$	-0.4		Alginate	Cl$^-$	3.67
[Acetate]$^-$	-1.6			[Acetate]$^-$	3.43
Acetic acid	-1.9			Acetic acid	2.24
			Acetic acid	Alginate	2.63
[Formate]$^-$	-1.5		[Formate]$^-$		3.01
			Alginate	[Formate]$^-$	3.46
Formic acid	-1.7			Formic acid	2.72
					2.06
			Formic acid	Alginate	2.53
					2.18
			Alginate	Formic acid	3.79
[Glycolate]$^-$	-2.1			[Glycolate]$^-$	2.72
					2.12
					2.57
Glycolic acid	-2.2			Glycolic acid	2.12
					1.88
			Glycolic acid	Alginate	2.49
					2.56
					2.55

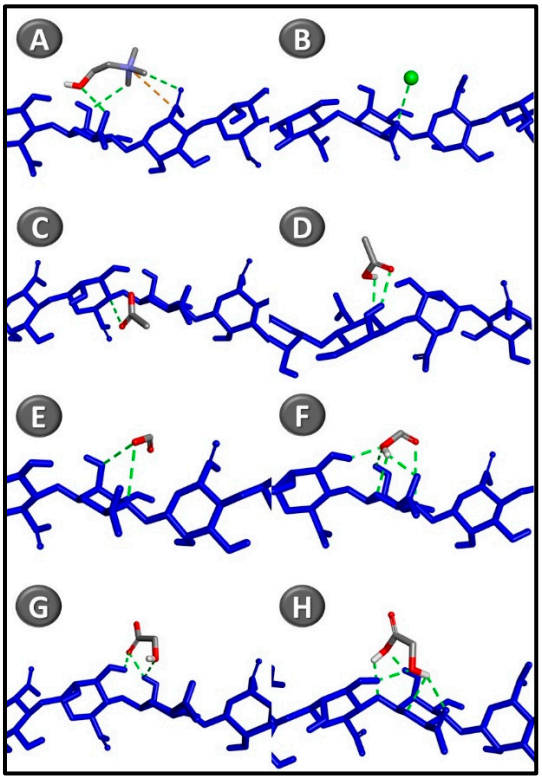


Figure S9. Docking pose with the lowest absolute value of affinity (kcal/mol) for Alginate with (a) [Ch]$^+$, (b) Cl$^-$, (c) [Acetate]$^-$, (d) Acetic acid, (e) [Formate]$^-$, (f) Formic acid, (g) [Glycolate]$^-$ and (h) Glycolic acid.

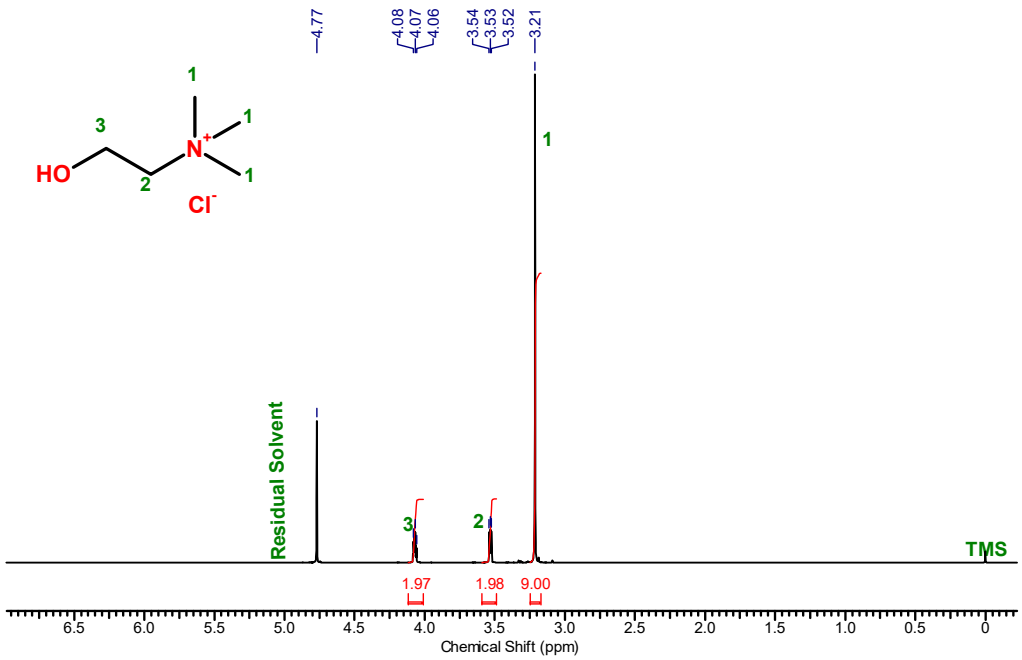


Figure S10. ^{1H} NMR of choline chloride.

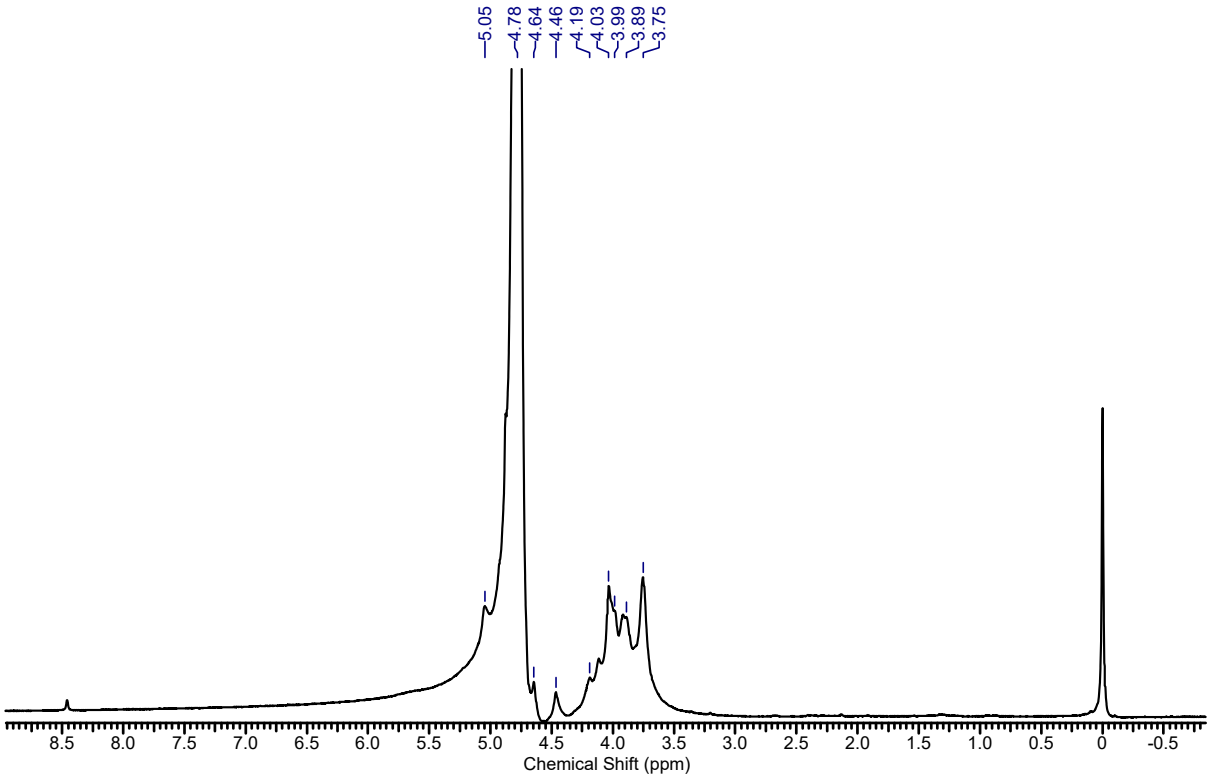


Figure S11. ^{1}H NMR of sodium alginate.

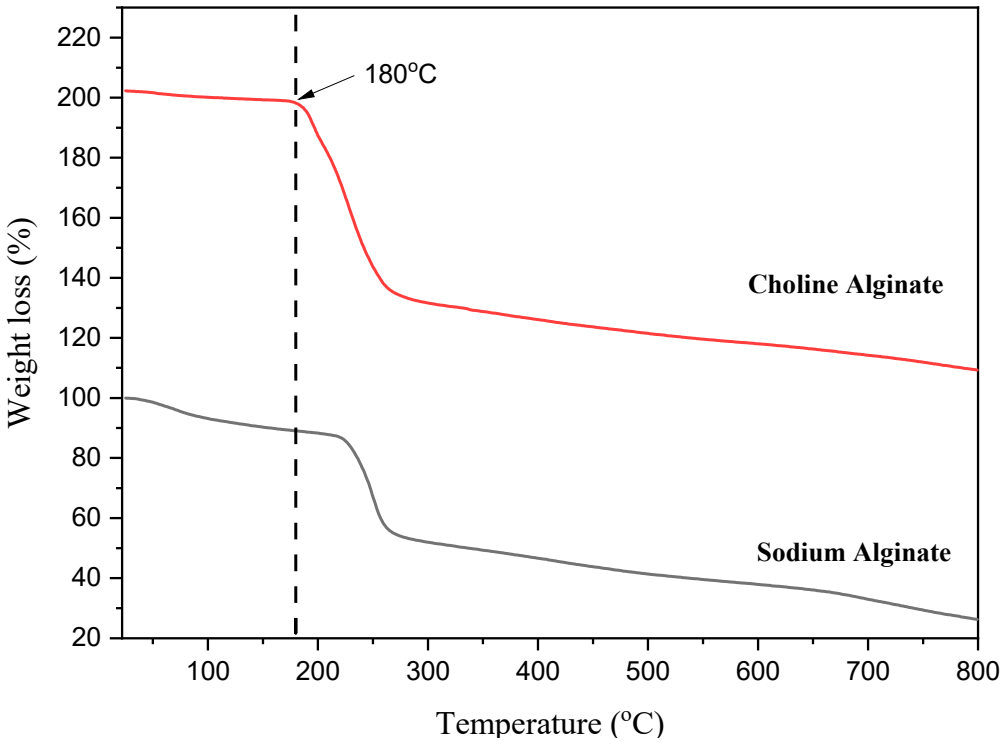


Figure S12. TGA curves of sodium alginate and choline alginate.

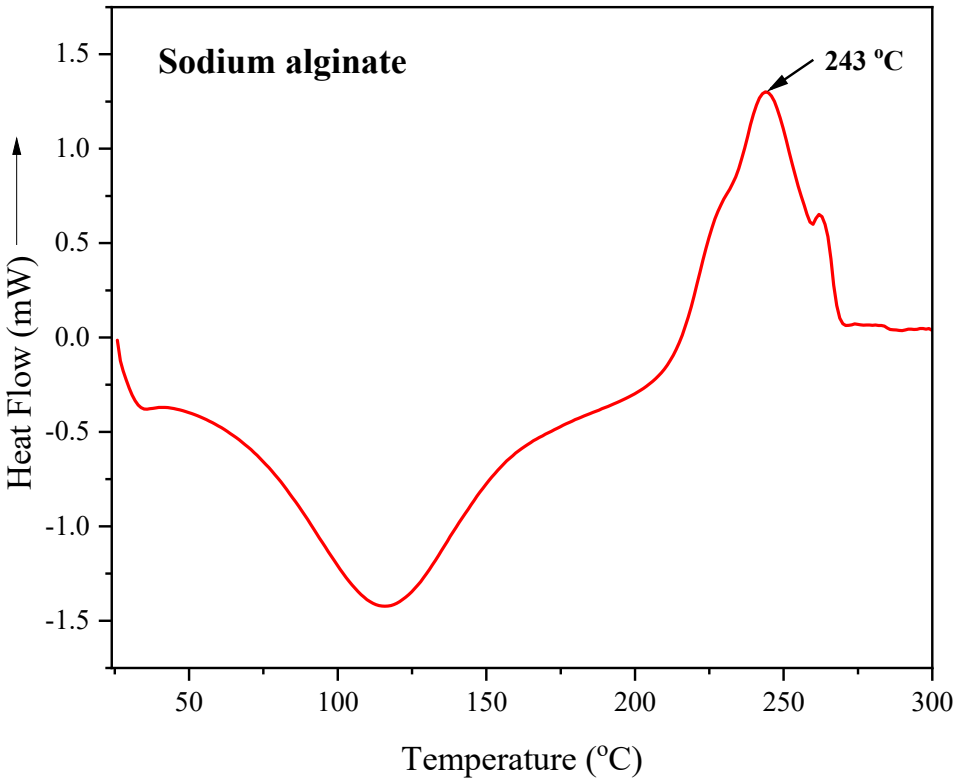


Figure S13. DSC curve of sodium alginate.

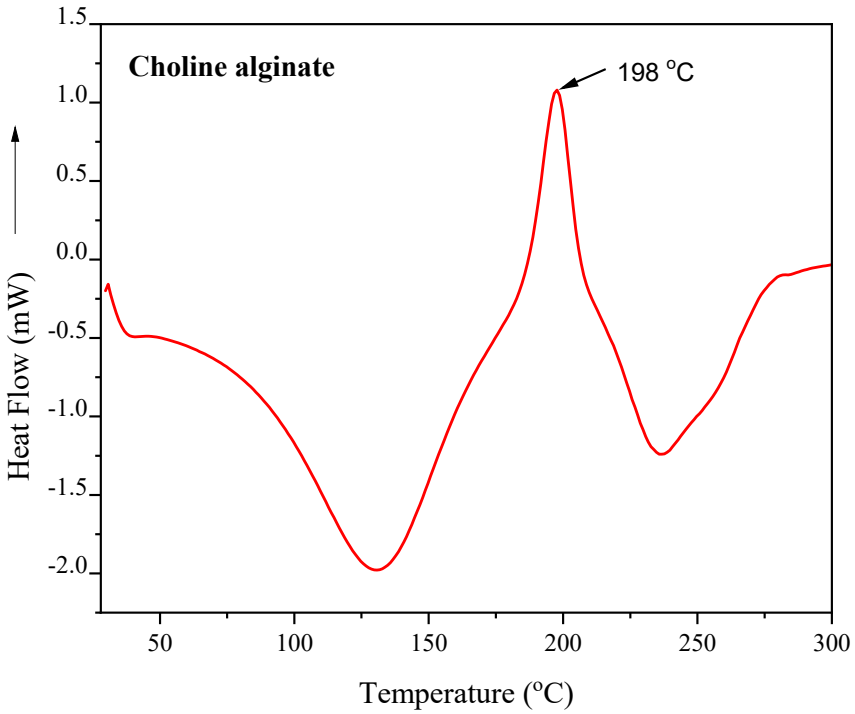


Figure S14. DSC curve of Choline alginate.

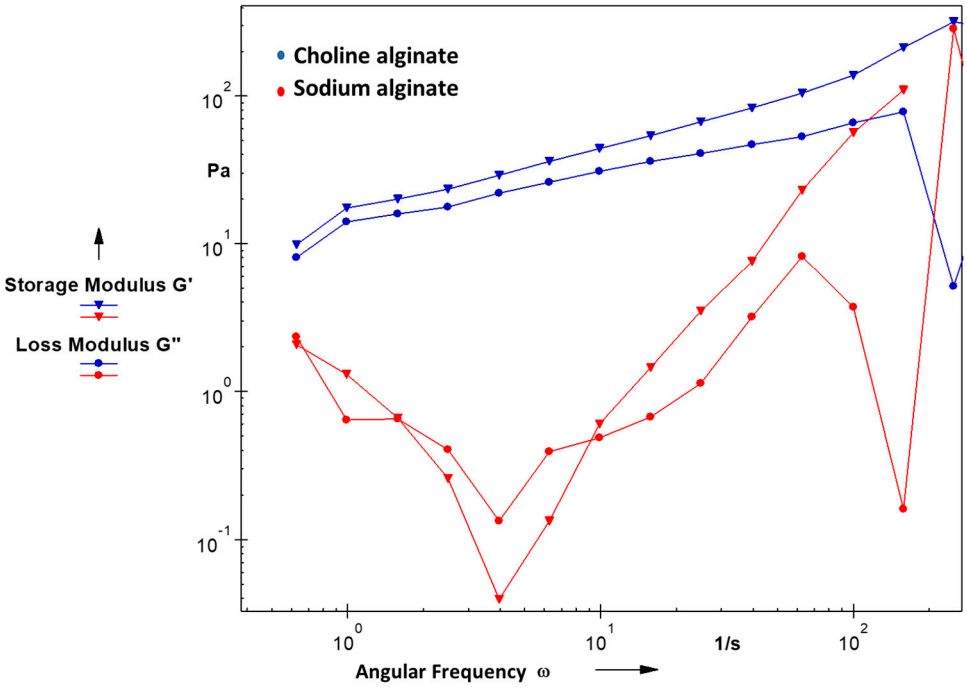


Figure 15. Frequency dependence of G′ and G′′ for alginate prepared conventional and greener approach.