Supplementary Information (SI) for Soft Matter.
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Supporting Information: Engineering Bacterial Polymers for Biomanufacturing: Characterization and Manipulation of *Sphingomonas sp. LM7* Extracellular Polysaccharide

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1 Supporting Figures

1.1 Uniaxial Tensile Tests

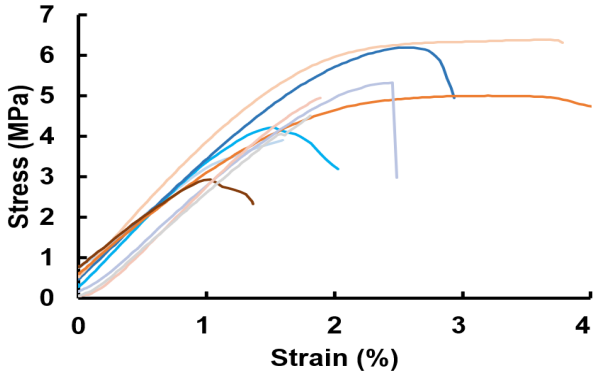

Figure S1: Tensile testing trials for films showing variation in the fracture strength of the material. Young's Modulus is consistent among tests.

1.2 The Effect of Water Content on Rheological Properties: Strain Sweep

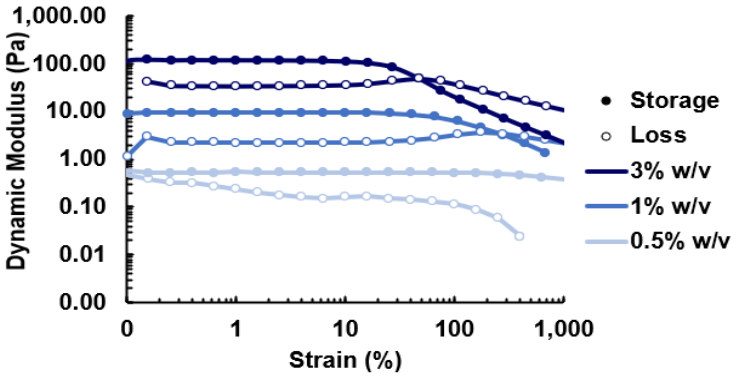

Figure S2: Strain sweep results comparing sample water content showing the gel-like behavior. Dynamic moduli increase for higher w/v ratios.

1.3 How Bivalent and Monovalent Ions alter Rheological Properties: Strain Sweep

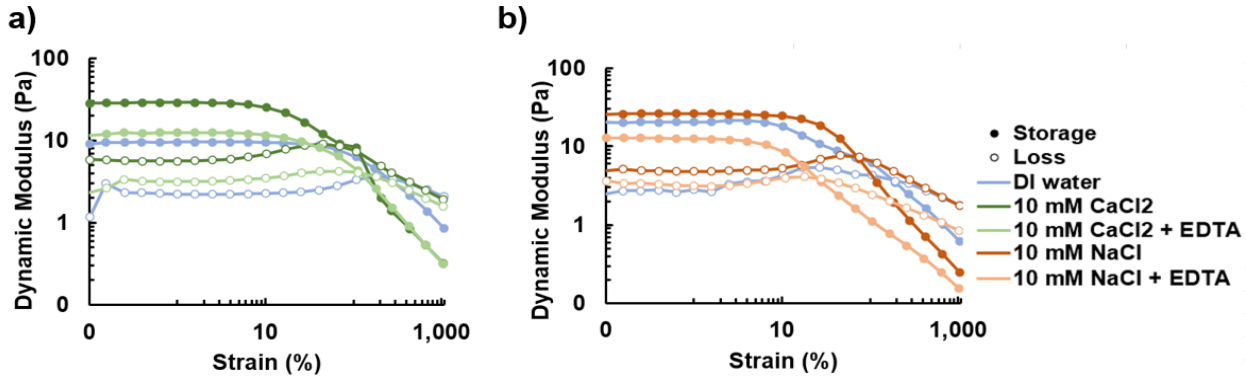

Figure S3: Strain sweep results comparing the addition of a) bivalent ions and b) monovalent ions.

1.4 Dialysis-Based Purification Process

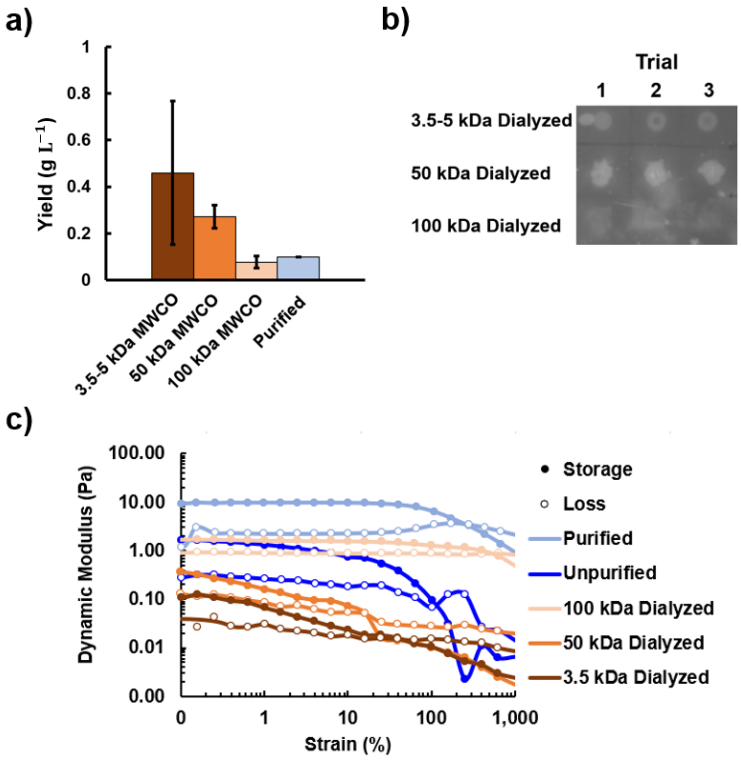

Figure S4: a) Magnified view of sample yields from varying dialysis MWCO values compared to the yield of the full enzymatic purification process. b) A dot blot showing lectin-glycan binding for dialysis groups confirming the presence of polysaccharide c) Strain sweep of samples at various levels of purification.

1.5 The Effect of Ultracentrifugation on Lectin Binding and Rheological Properties

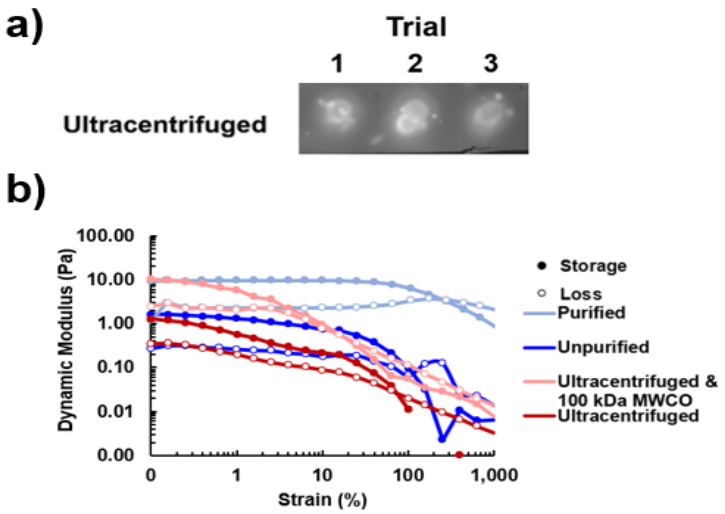

Figure S5: a) A dot blot showing lectin-glycan binding in the sample confirming the presence of polysaccharide post ultracentrifugation. b) Strain sweep of purified, unpurified, and ultracentrifuged samples.

1.6 Rheological Properties of Protein Knockout Material

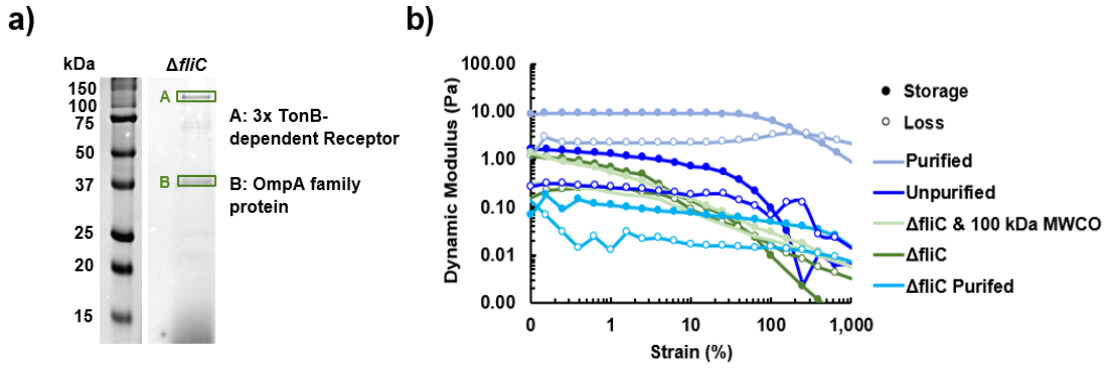

Figure S6: a) Secreted proteins from the Δ*prmJ* Δ*fliC* strain b) Strain sweep of purified, unpurified, and protein knockout material samples.

1.7 Extracellular DNA Analysis

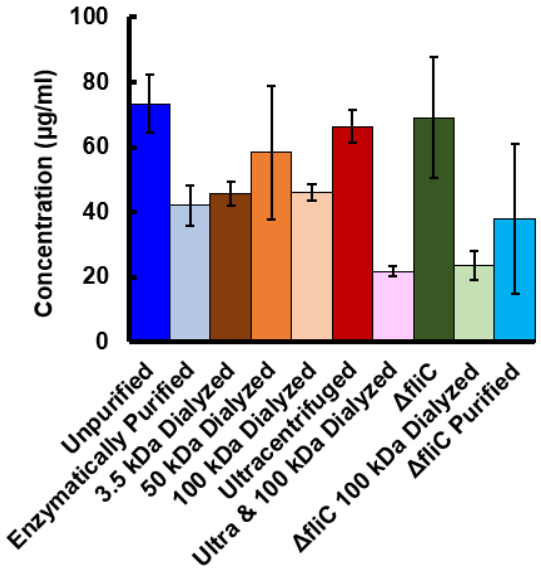

Figure S7: Extracellular DNA abundance in samples tested.

1.8 Thermogravimetric Analysis

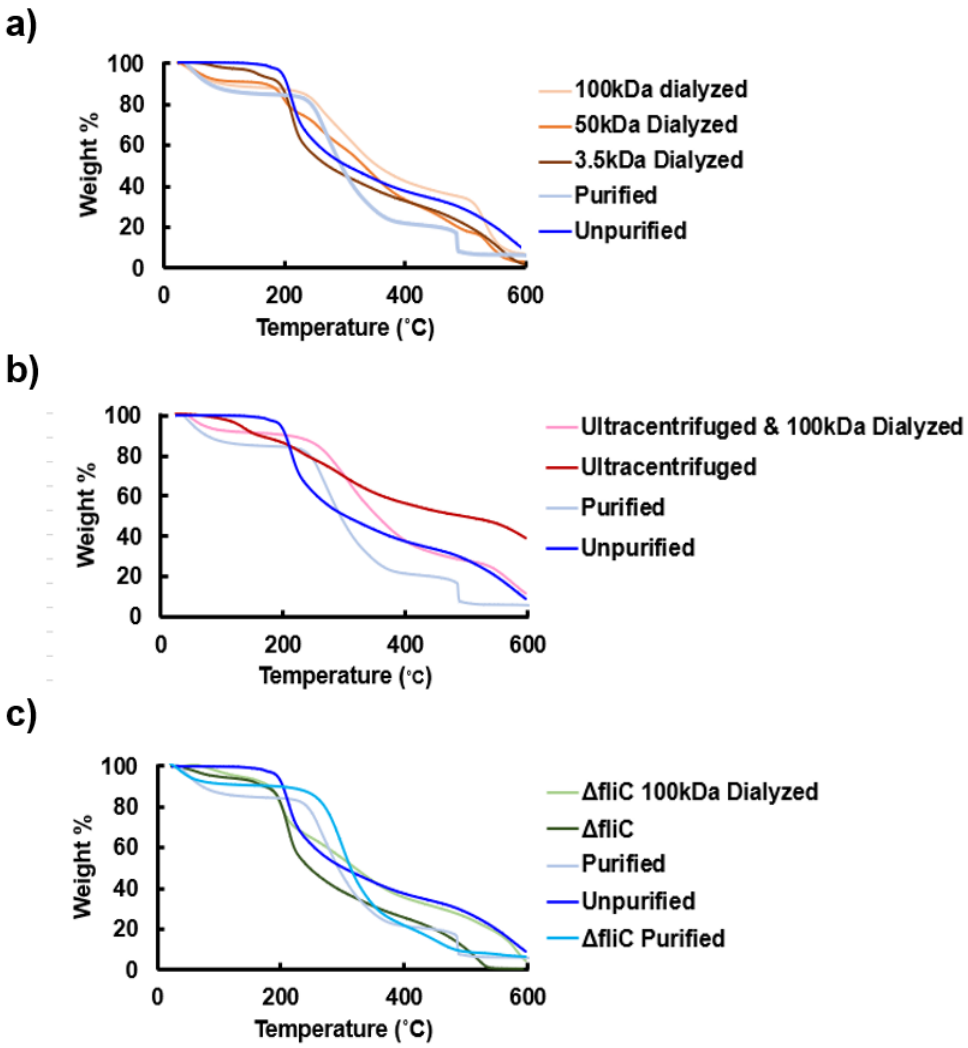

Figure S8: Thermogravimetric analysis for a) dialyzed material, b) ultracentrifuged material and c) protein knockout material.

2 Supporting Tables

2.1 Strains Used in this Study

Table S1: Strains used in this Study

Strain	Organism	Genotype	Description	Source
DH173	*Sphingomonas sp.* LM7	LM7	Wild Type	Hershey Lab[1]
DH313	*Sphingomonas sp.* LM7	Δ*prmJ*	In frame deletion of BXU08_RS00395	Hershey Lab[1]
DH1312	*Sphingomonas sp.* LM7	Δ*fliC*	In frame deletion of BXU08_RS13585	This work
DH1313	*Sphingomonas sp.* LM7	Δ*prmJ*Δ*fliC*	In frame deletion of BXU08_RS13585 in DH313 background	This work

2.2 Plasmids Used in this Study

Table S2: Plasmids used in this Study

Plasmid	Description	Antibiotic	Reference
pNPTS138	Suicide plasmid for deletion in *Sphingomonas sp.* LM7; carries *sacB* for counter-selection	Km	M. Alley[1]
pDH298	To delete *prmJ*; Gibson cloning of fused upstream and downstream regions of BXU08_RS00395	Km	Hershey Lab[1]
pDH1329	To delete *fliC*; commercial synthesis of fused BXU08_RS13585 upstream and downstream regions, inserted into SpeI/HindIII site of pDH100	Km	Hershey Lab[1]
pDH1331	To delete *fliC*; commercial synthesis of fused BXU08_RS13585 upstream and downstream regions, inserted into SpeI/HindIII site of pDH100	Km	This work

References

[1] Alexandra G. Goetsch et al. *A novel exopolysaccharide pathway from a freshwater Sphingomonas isolate*. Nov. 4, 2023. DOI: 10.1101/2023.11.03.565537. URL: https://www.biorxiv.org/content/10.1101/2023.11.03.565537v1 (visited on 11/13/2023).