

Supplemental Information

Bacterial cellulose nanoparticles as a sustainable drug delivery platform for protein-based therapeutics

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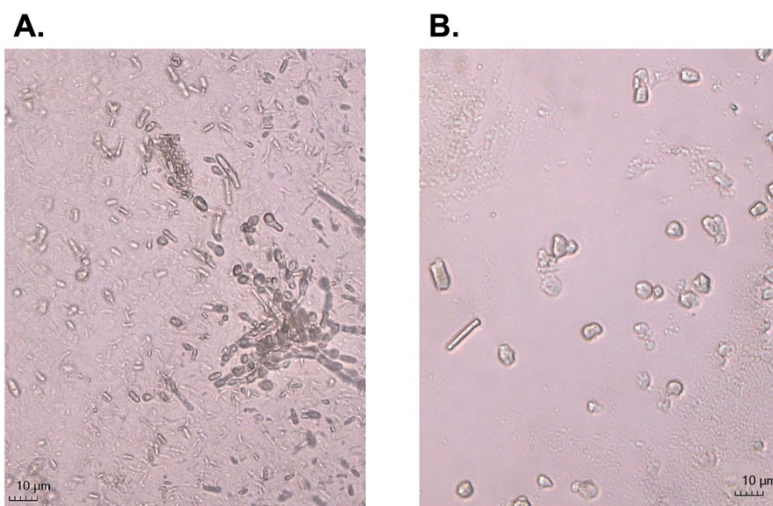


Figure S1. Microbial co-cultures in SCOBY starter kit: (A) in pellicle and (B) in liquid. Higher density of microbial cells in pellicles, yet still exhibited in liquid. Scale bars: 10 µm.

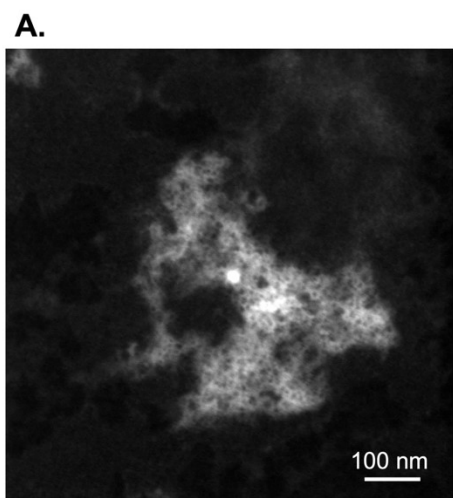


Figure S2. STEM image of BCNPs at 100 nm to show the distribution of particle morphology. Scale bar: 100 nm.

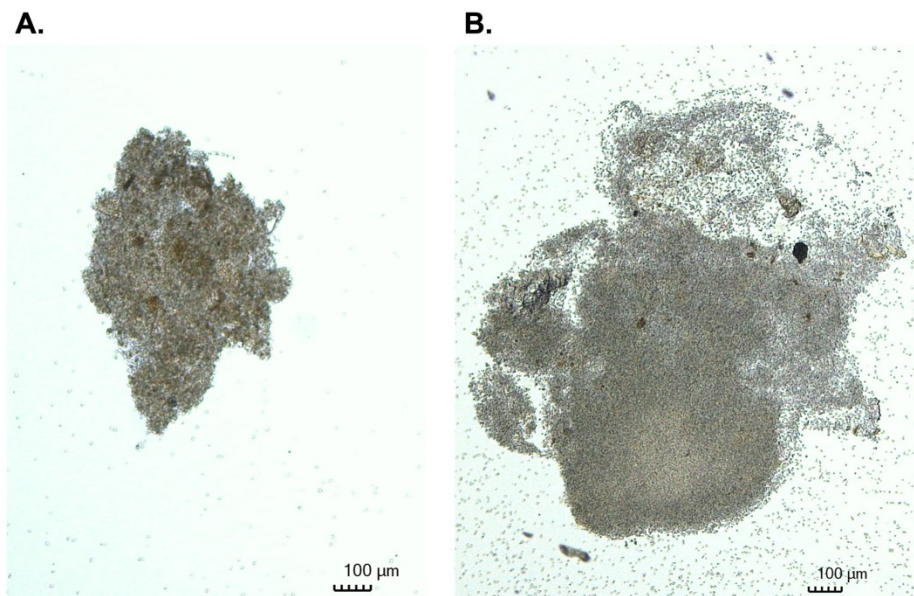


Figure S3. Light microscope images at a 5x optical setting for BC microparticles grown for: (A) 3 days and (B) 5 days. Increased particle size at 5 days of growth compared to 3 days. Scale bars: 100 μm .

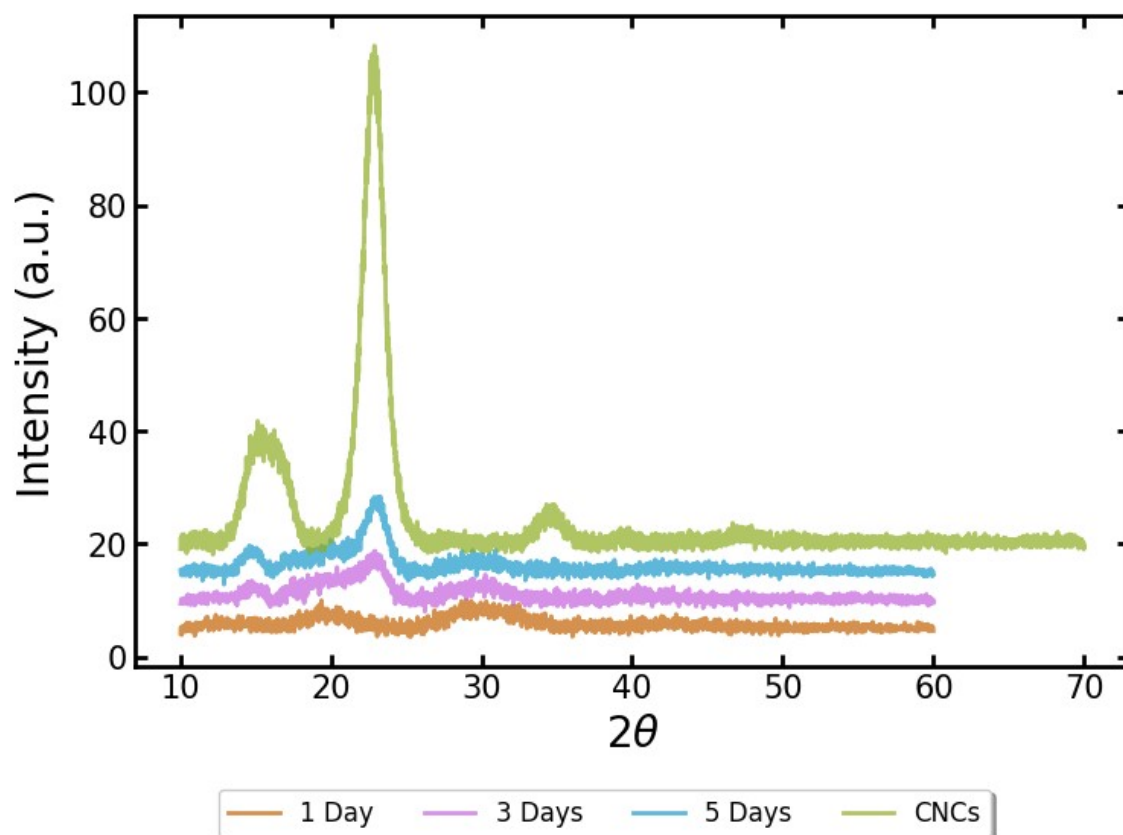


Figure S4. XRD spectra of BC grown for 1-day, 3-day, and 5-day timepoints and in comparison, to cellulose nanocrystals (CNCs). Qualitatively shows increase in crystallinity overtime of growth.

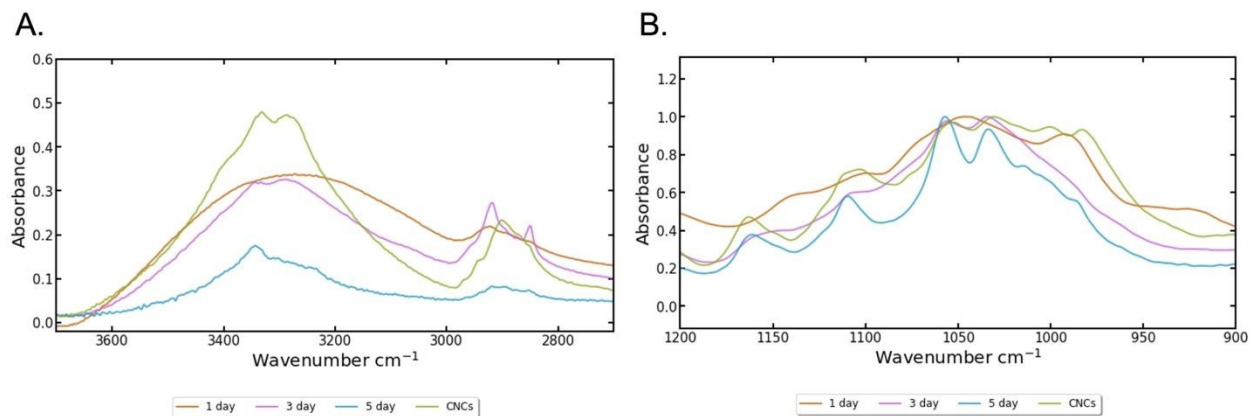


Figure S5. Closer look at FTIR spectra of BC grown for 1-day, 3-day, and 5-day timepoints and CNCs: (A) Wavenumber range 3600-2800 cm^{-1} and (B) Wavenumber range 1200-900 cm^{-1} .

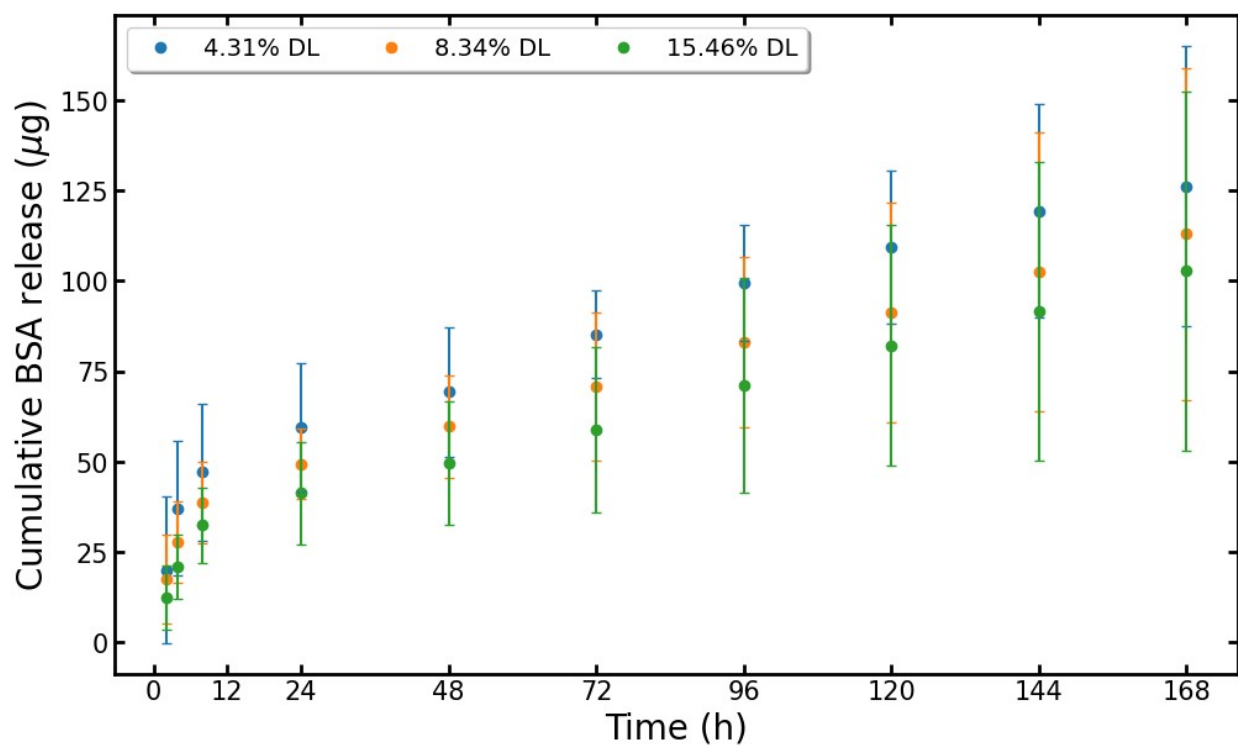


Figure S6. Results for cumulative BSA drug release (μg) from BCNPs/P80, calculated using equation (6).

Table S1. Results for particle size and concentration were measured on NTA n=5 for BCNPs prepared at different times. All values reported as an average \pm standard deviation (STD). The polydispersity index (PDI) was calculated from NTA results using equation (5).

Preparation BCNPs (Time frame prior to measurement)	Concentration BCNPs (particles/mL)	Particle Size \pm STD (nm)	PDI
Fresh	$8.35 \times 10^7 \pm 1.18 \times 10^7$	103.0 ± 1.5	0.0002
2 weeks	$9.00 \times 10^8 \pm 4.24 \times 10^7$	95.2 ± 4.0	0.0018
5 months	$4.37 \times 10^8 \pm 7.52 \times 10^7$	105.8 ± 4.4	0.0017
7 months	$3.13 \times 10^8 \pm 8.93 \times 10^7$	147.4 ± 6.3	0.0018