Supporting information

Photoactive and antioxidant nanochitosan dots/biocellulose hydrogels for wound healing treatment

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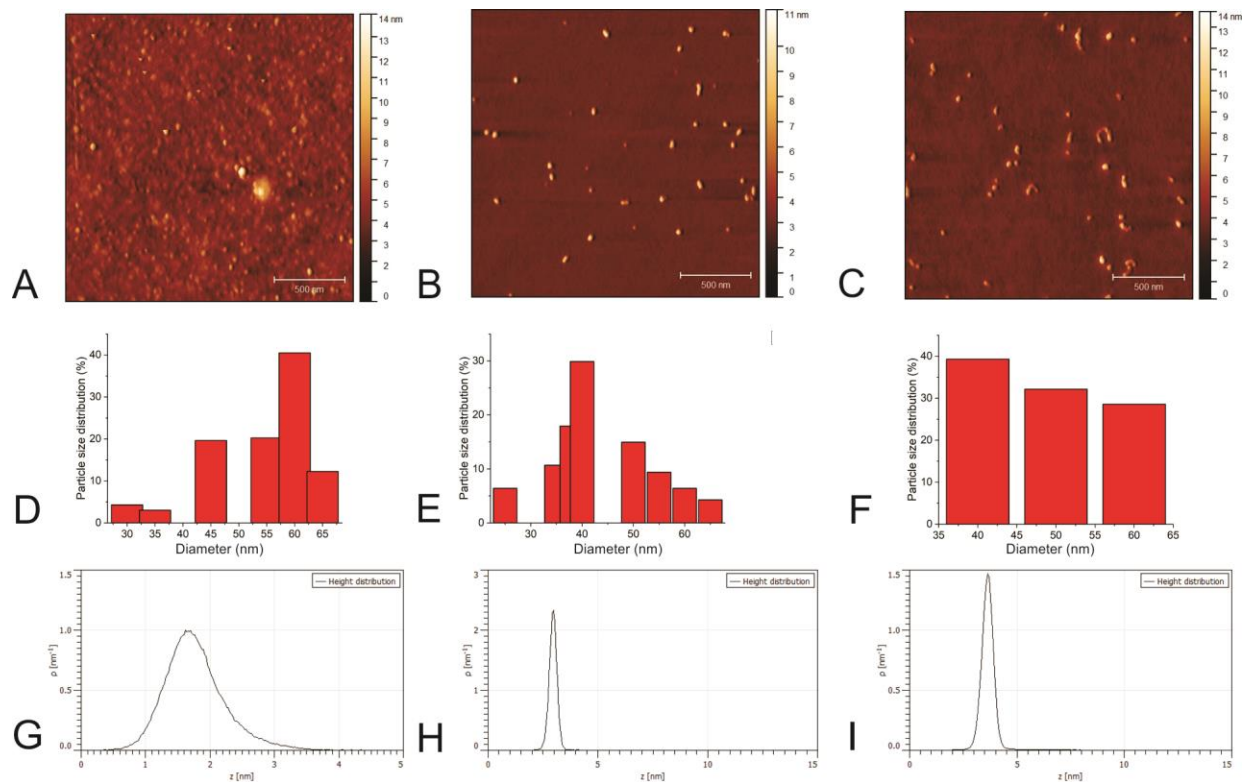
Fig. S1. Top view AFM images of n20ChiD (A), n40ChiD (B) and n60ChiD (C) samples; particle size distribution of n20ChiD (D), n40ChiD (E) and n60ChiD (F) samples; height profiles of n20ChiD (G), n40ChiD (H) and n60ChiD (I) samples.
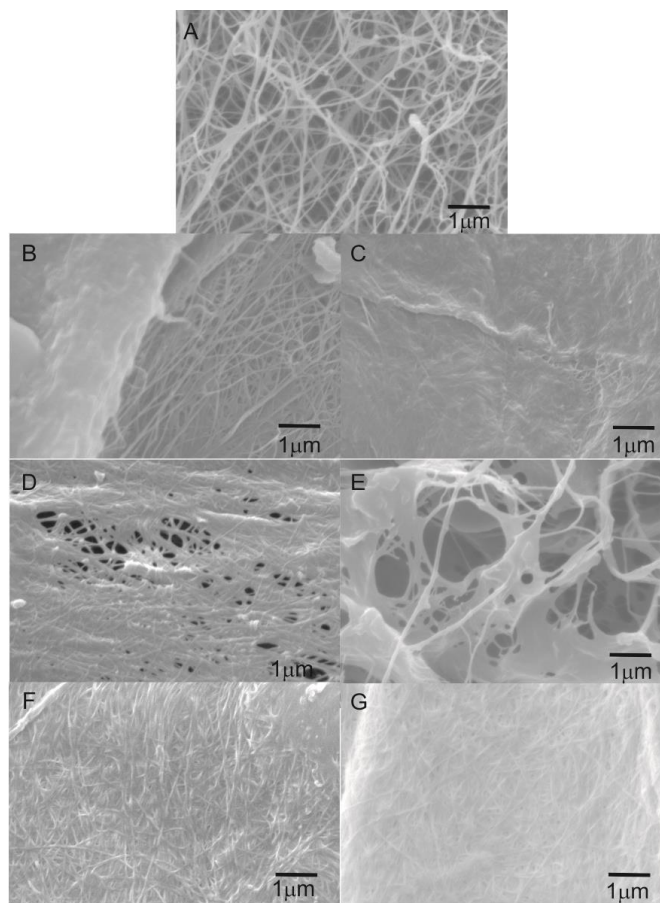
Fig. S2. SEM micrographs of A) BC, B) BC-n20ChiD0.2, C) BC-n20ChiD2, D) BC-n40ChiD0.2, E) BC-n40ChiD2, F) BC-n60ChiD0.2 and G) BC-n60ChiD2 samples.
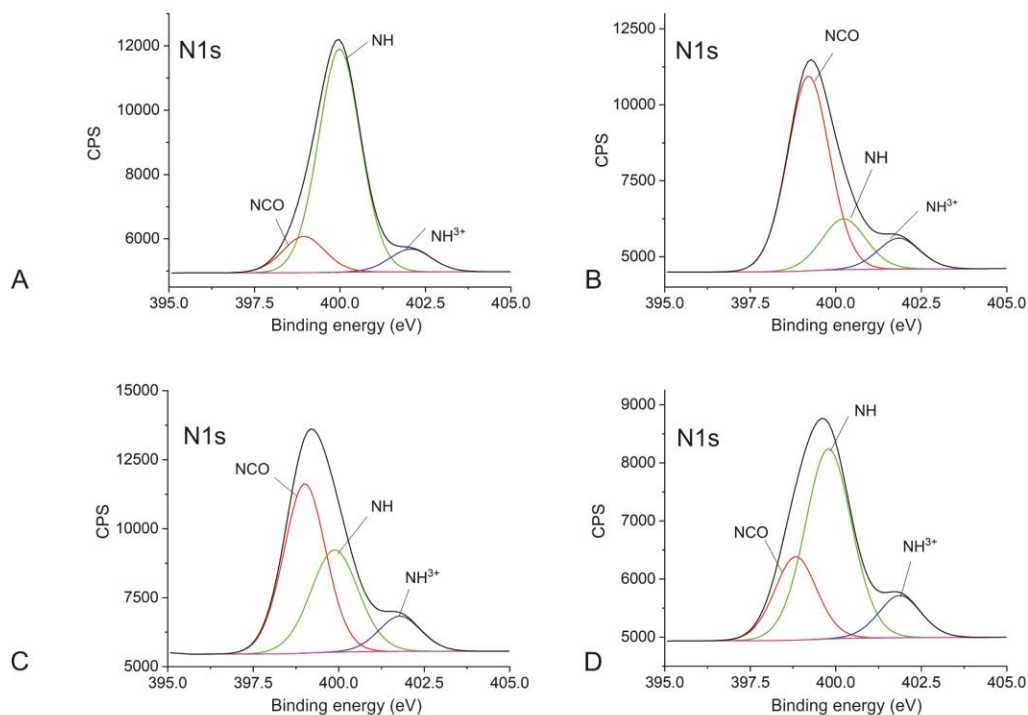
Fig. S3.The high-resolution XPS spectra of N1s peak of (A) BC, (B) BC-n20ChiD2, (C) BC-n40ChiD2 and (D) BC-n60ChiD2.

Table S1. Elements detected in BC, BC-n20ChiD2, BC-n40ChiD2 and BC-n60ChiD2 samples by XPS method.

Name BC	Atomic%	Name BC-20nChiD2	Atomic%	Name BC-40nChiD2	Atomic%	Name BC-60nChiD2	Atomic%
C1s	59.5	C1s	73.4	C1s	73.3	C1s	67.4
O1s	36.8	O1s	21.8	O1s	21.5	O1s	30.7
N1s	3.7	N1s	4.8	N1s	5.2	N1s	2.5

Table S2. Characteristic bonds detected in C1s and N1s peaks of BC sample by XPS method.

Name BC	Binding energy (eV)	Atomic (%)
C1s C-C	284.8	7.3
C1s C-O, C-N	286.4	24.5
C1s O-C-O, NCO	287.9	6.5
C1s O-C=O	289.0	0.9
O1s C-O	532.7	52.4

O1s -CO-	531.2	2.2
O1s O2*CO	533.5	4.2
N1s NH	400.0	2.1
N1s NCO	398.9	0.4
N1s NH $^{3+}$	402.1	0.2

Table S3. Characteristic bonds detected in C1s and N1s peaks of BC-n20ChiD2 sample by XPS method.

Name BC-n20ChiD2	Binding energy (eV)	Atomic (%)
C1s C-C	284.5	28.9
C1s C-O, C-N	286.2	20.8
C1s O-C-O, NCO	287.9	5.2
C1s O-C=O	289.0	0.6
O1s C-O	532.5	36.2
O1s -CO-	531.0	2.9
O1s O2*CO	533.4	2.1
N1s NCO	399.2	2.9
N1s NH	400.2	0.8
N1s NH3+	401.9	0.5

Table S4. Characteristic bonds detected in C1s and N1s peaks of BC-n40ChiD2 sample by XPS method.

Name BC-n40ChiD2	Binding energy (eV)	Atomic (%)
C1s C-C	284.4	29.8
C1s C-O, C-N	286.1	21.3
C1s O-C-O, NCO	287.8	5.4
C1s O-C=O	289.1	0.6
O1s C-O	532.4	33.5
O1s -CO-	531.0	2.4
O1s O2*CO	533.2	3.4
N1s NCO	399.0	2.3
N1s NH	399.9	1.6
N1s NH3+	401.8	0.5

Table S5. Characteristic bonds detected in C1s and N1s peaks of BC-n60ChiD2 sample by XPS method.

Name BC-n60ChiD2	Binding energy (eV)	Atomic (%)
C1s C-C	284.6	20.1
C1s C-O, C-N	286.2	20.6
C1s O-C-O, NCO	287.7	7.8

C1s O-C=O	289.0	1.2
O1s C-O	532.4	39.3
O1s -CO-	533.2	7.0
O1s O2*CO	531.0	2.1
N1s NCO	398.8	0.6
N1s NH	399.8	1.4
N1s NH3+	401.8	0.3

Table S6. The position, FWHM and degree of crystallinity of BC, BC-n20ChiD2, BC-n40ChiD2 and BC-n60ChiD2 samples.

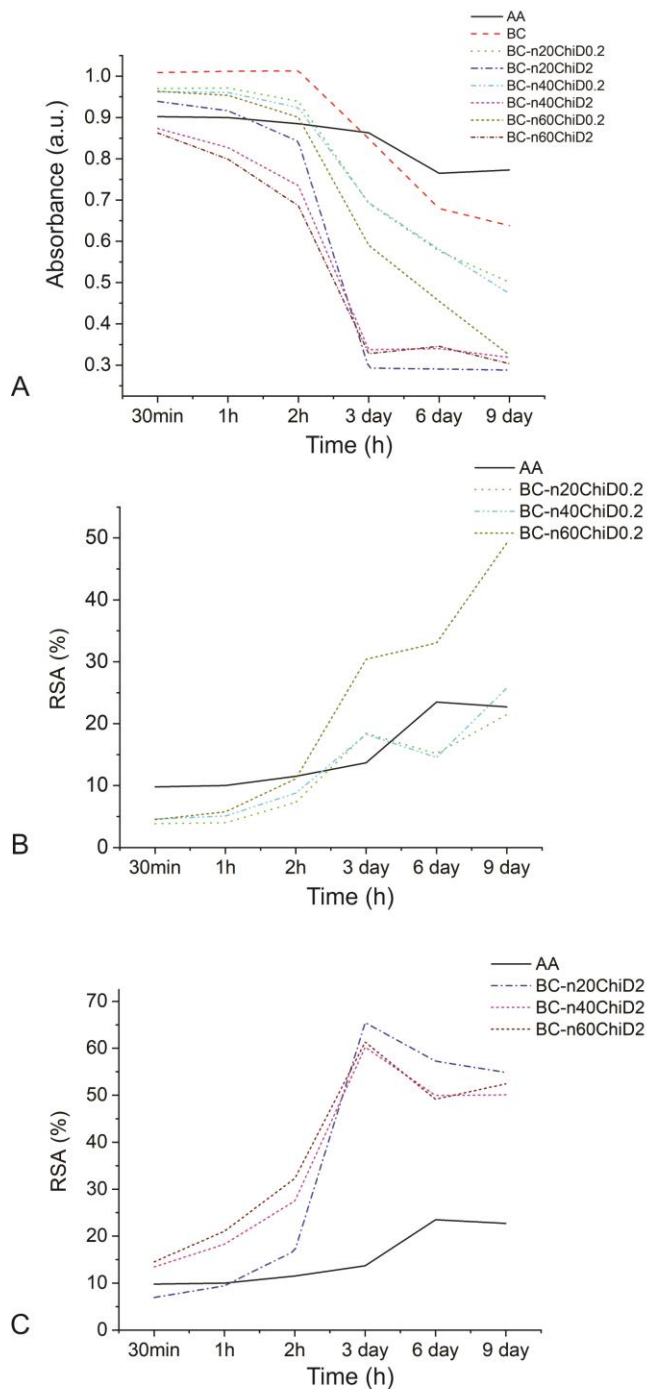| Sample	2θ (°)	FWHM	Degree of crystallinity
BC	14.22	1.74	62.6
	16.74	0.92	
	22.48	2.17	
BC-n20ChiD0.2	14.32	1.65	75.5
	16.70	0.99	
	22.46	2.73	
BC-n20ChiD2	14.32	1.53	70.8
	16.70	0.76	
	22.46	2.94	
BC-n40ChiD0.2	14.32	1.65	82.6
	16.70	0.65	
	22.46	2.95	
BC-n40ChiD2	14.32	1.65	70.0
	16.70	0.65	
	22.46	2.95	
BC-n60ChiD0.2	14.36	1.9	72.0
	22.62	3.75	
BC-n60ChiD2	14.32	1.92	74.0
	22.62	3.49	

Fig. S4. DPPH• scavenging assay. Absorbance of DPPH• solution with BC, BC-20nChiD0.2, BC-20nChiD2, BC-40nChiD0.2, BC-40nChiD2, BC-60nChiD0.2, BC-60nChiD2 nanocomposites and AA (A); RSA of BC-20nChiD0.2, BC-40nChiD0.2 and BC-60nChiD0.2 nanocomposites and AA (B); RSA of BC-20nChiD2, BC-40nChiD2 and BC-60nChiD2 nanocomposites and AA (C).