Supporting Information

Electrospun pectin-polyhydroxybutyrate nanofibers for retinal tissue engineering

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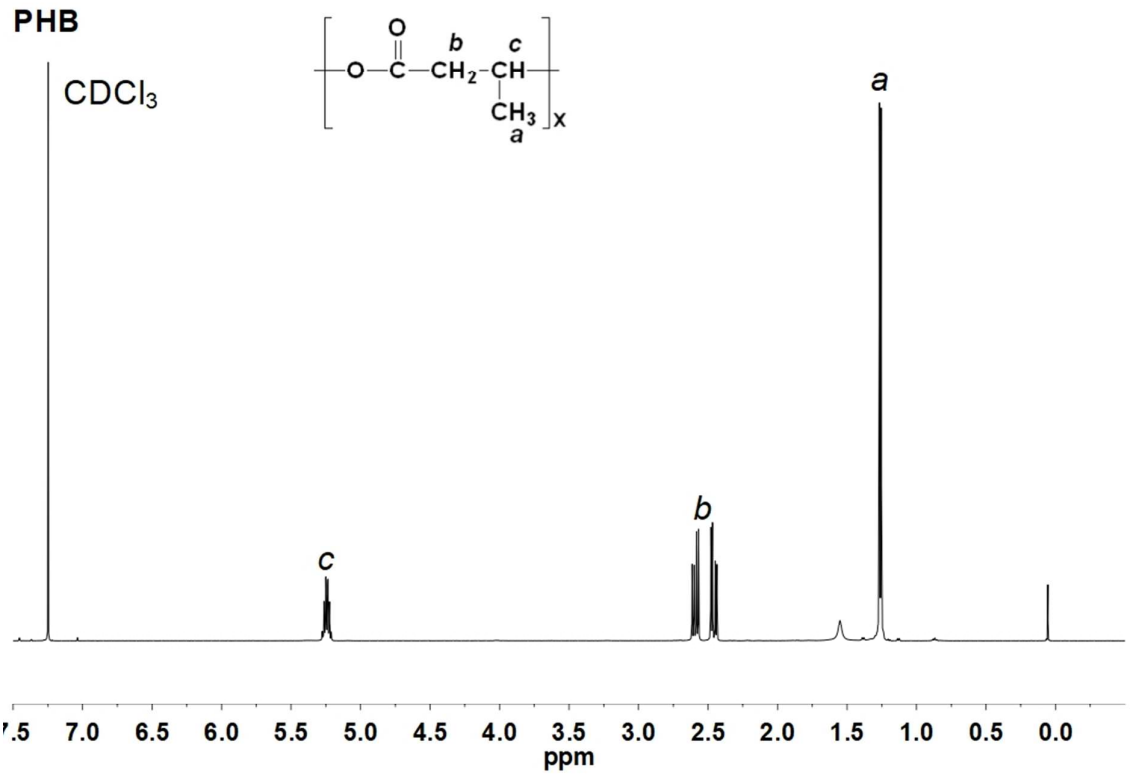

Figure S1. ^{1}H NMR (500 MHz) spectrum of PHB.

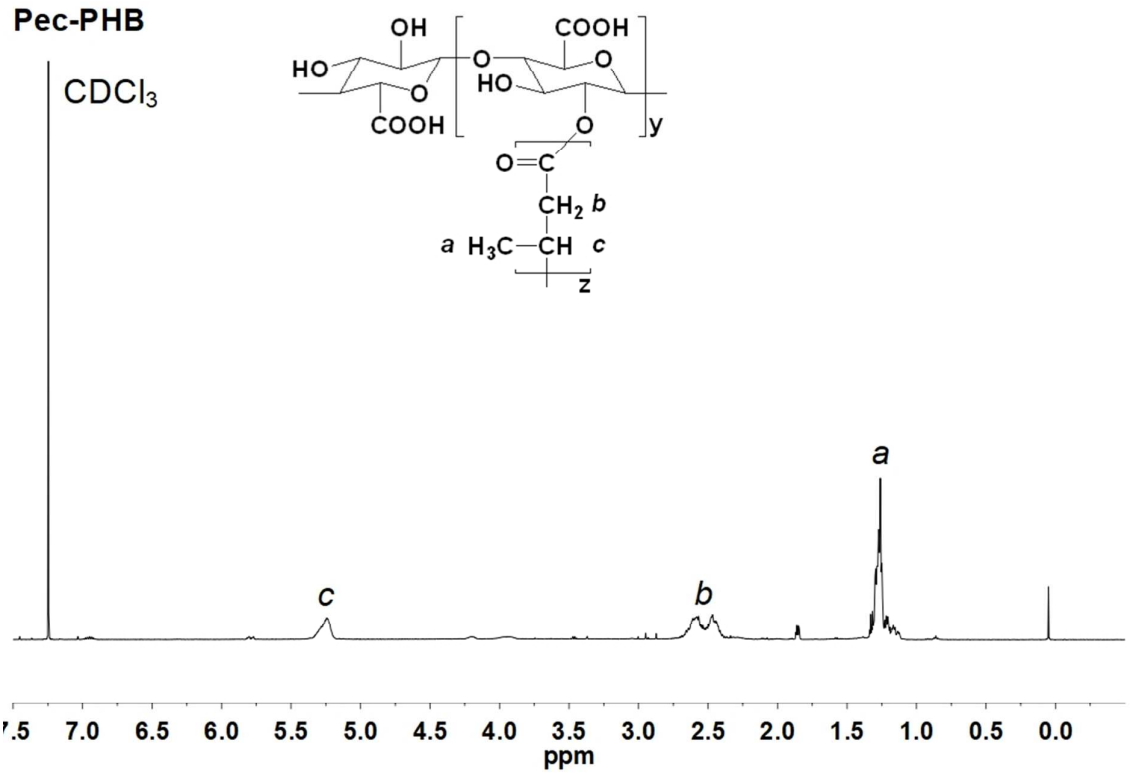

Figure S2. ^{1}H NMR (500 MHz) spectrum of pec-PHB.

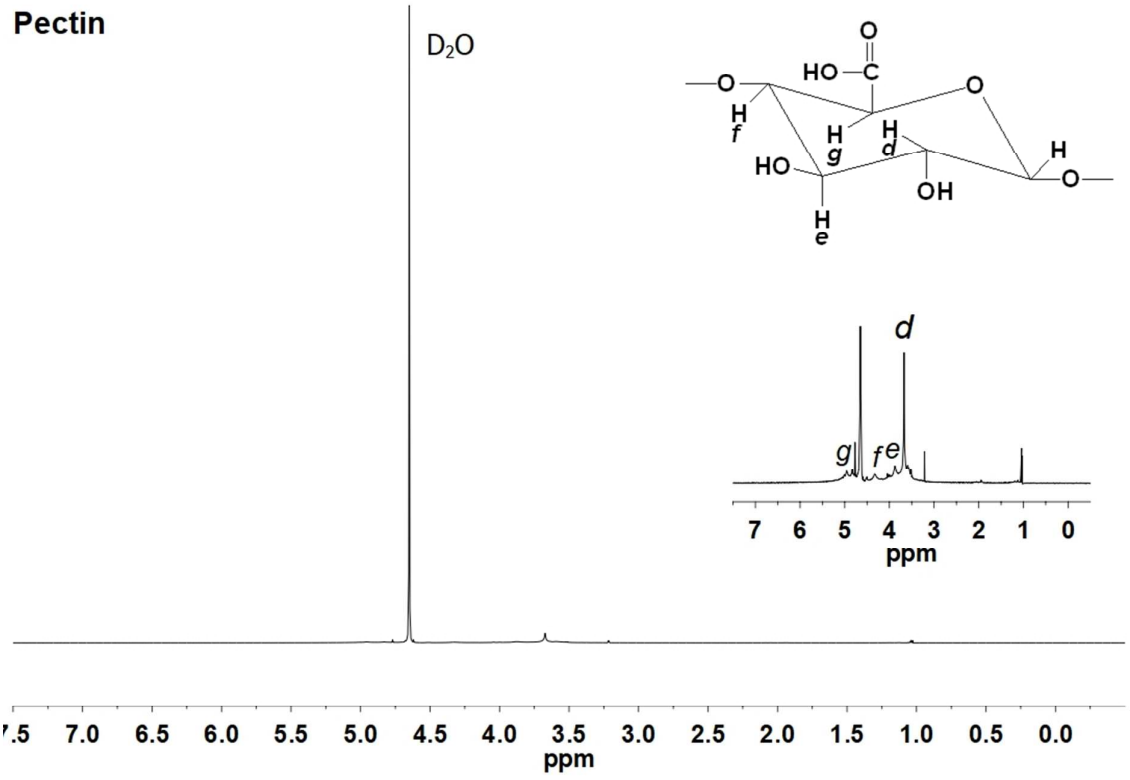

Figure S3. ^{1}H NMR (500 MHz) spectrum of pectin.

Table S1. Thermal properties of the precursors (pectin and PHB) and of copolymer, pec-PHB.

Sample	Thermal Decomposition Temperature, T_d [A] (°C)	Residue [B] (%)	Glass Transition Temperature, T_g [C] (°C)	Melting Temperature, T_m [C] (°C)	Heat of Melting, ΔH_m [C] (J/g)	Degree of Crystallinity, X_c [D] (%)
Pectin	245.61	27.69	34.78	-	-	-
PHB	288.44	1.11	8.69	160.98	76.96	52.71
Pec-PHB	246.26	15.31	-15.41	-	-	-

[A] T_d is defined as the temperature at which the mass of the sample has a 15% weight loss, determined from the peak of derivative weight curve by TGA. [B] Residue is defined as the mass percentage of the sample at 500 °C, determined from TGA. [C] T_g, T_m and ΔH_m were deduced from the second heating curve by DSC. T_m was taken as peak maxima. ΔH_m was determined from the endothermic melting peak. [D] X_c was calculated using the following equation:

$$X_c = \frac{\Delta H_m}{\Delta H_m^O} \times 100\%$$

where ΔH_m^o is a reference value which represents the heat of melting for 100% crystalline PHB, 146 J/g.[1]

Reference

1. Barham, P. J.; Keller, A.; Otun, E. L.; Holmes, P. A., Crystallization and morphology of a bacterial thermoplastic: poly-3-hydroxybutyrate. *Journal of Materials Science* **1984,** *19* (9), 2781-2794.

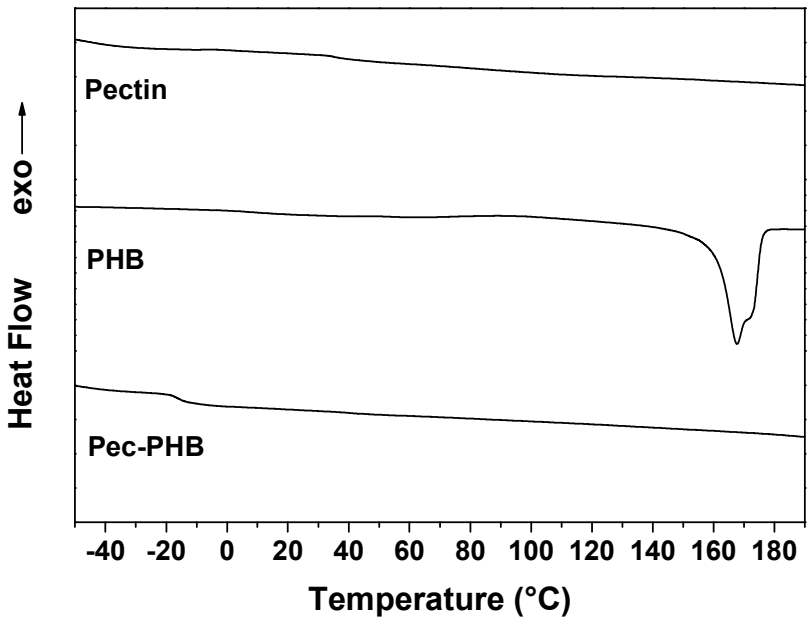

Figure S4. DSC curves of the precursors (pectin and PHB) and of copolymer, pec-PHB.

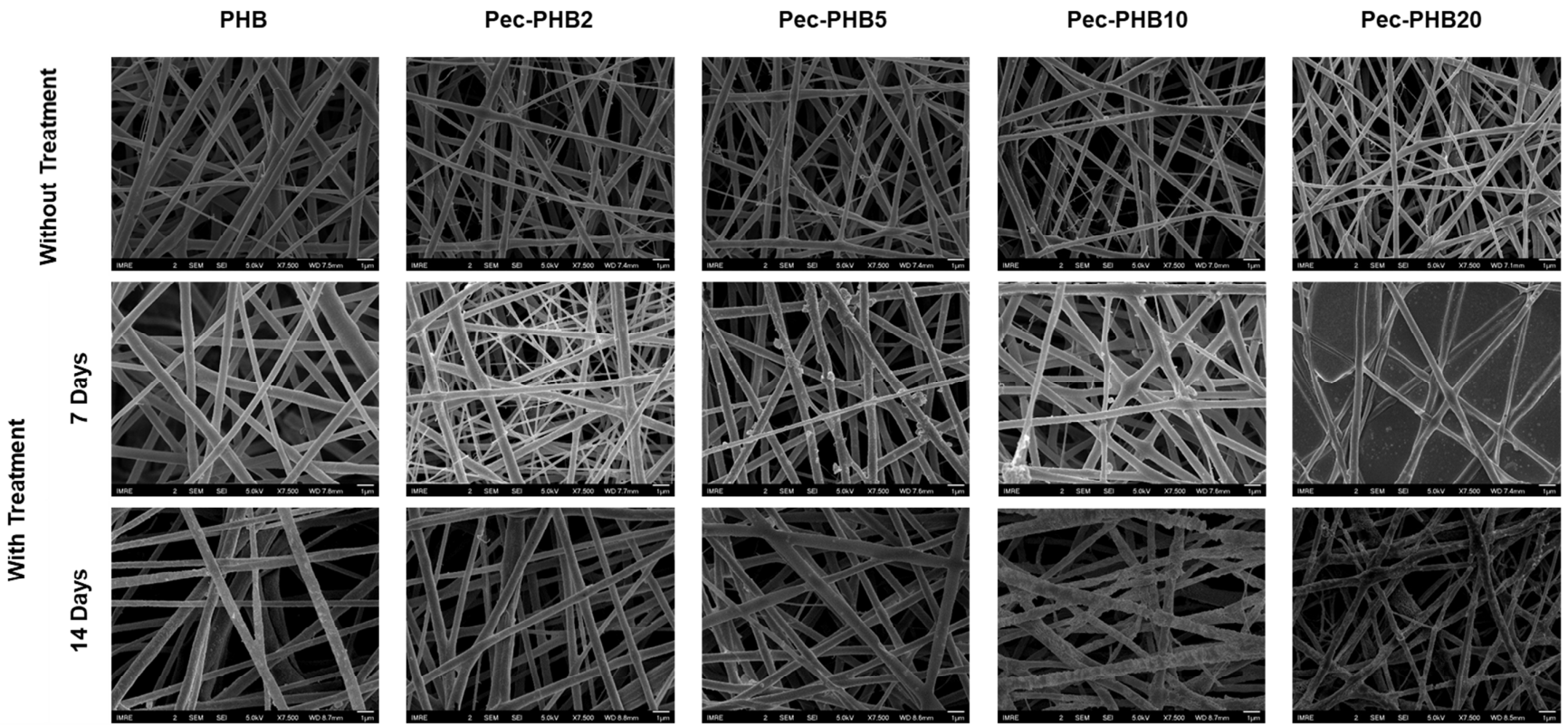

Figure S5. SEM micrographs (7500X) of electrospun fibres (PHB, pec-PHB2, pec-PHB5, pec-PHB10, pec-PHB20) without and with treatment (incubated in PBS solution (pH 7.4) at room temperature and lightly shaken at 150 RPM for 2 weeks) for 7 days and 14 days.

The different blends of our PHB/pec-PHB nanofibers were incubated in PBS solution (pH 7.4) at room temperature and lightly shaken at 150 RPM for 2 weeks with PHB nanofiber as the control. PBS solutions were changed every 2 days. SEM images of the nanofibers were acquired on

a weekly basis and revealed that the macrostructure of the fibre matrices remained intact in all cases. Incubating of the nanofibers in PBS solutions (pH 7.4 and pH 12.0) at 37 °C indicated complete solubilisation after approximately 2 months at the higher pH and 3 months at pH 7.4 Nanofibers with the higher pec-PHB content degraded faster under these conditions.

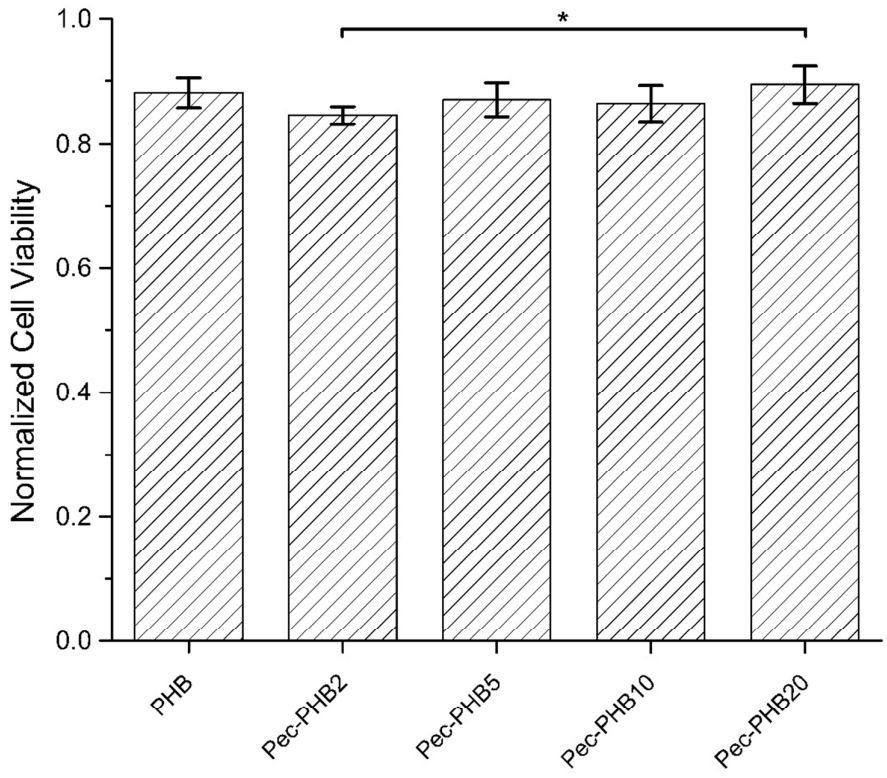

Figure S6. Cell viability of NIH/3T3 fibroblasts on PHB and pec-PHB nanofibers after 72 hrs. Readings are normalized to tissue culture plastic. (N = 6 | solid line: $p < 0.05$).

Pec-PHB nanofibers were cultured with NIH/3T3 fibroblasts for 72 hrs and resazurin assay was performed to compare biocompatibility of the various nanofibers. Pec-PHB nanofibers present cell viabilities of 85% and above, comparable to that of pristine PHB. One-way ANOVA (Tukey post hoc test) at 5% level revealed that the means of pec-PHB2 and pec-PHB20 were significantly different, indicating higher pec-PHB content improved the cell viability. Overall, pec-PHB nanofibers were found to be non-cytotoxic and biocompatible.