

Supplementary

Designing Sustainable Polymer Blends: Tailoring Mechanical Properties and Degradation Behaviour in PHB/PLA/PCL Blends in a Seawater Environment

**Leonardo G. Engler ^{1,2}, Naiara C. Farias ¹, Janaina S. Crespo ^{1,2}, Noel M. Gately ³, Ian Major ¹,
Romina Pezzoli ³
and Declan M. Devine ^{1,*}**

¹ PRISM Research Institute, Technological University of the Shannon: Midlands Midwest, Athlone Campus, University Road, N37 HD68 Athlone, Ireland;
a00278634@student.tus.ie (L.G.E.);
a00203999@student.tus.ie (N.C.F.); jscrespo@ucs.br (J.S.C.); imajor@ait.ie (I.M.)

² Postgraduate Program in Materials Science and Engineering, University of Caxias do Sul,
Francisco Getúlio Vargas Street, 1130, Caxias do Sul 95070-560, Brazil

³ Applied Polymer Technologies Gateway, Technological University of the Shannon: Midlands Midwest, Athlone Campus, University Road, N37 HD68 Athlone, Ireland;
n.gately@ait.ie (N.M.G.);
rpezzoli@ait.ie (R.P.)

* Correspondence: ddevine@ait.ie

Mechanical properties of the blends - Seawater degradation

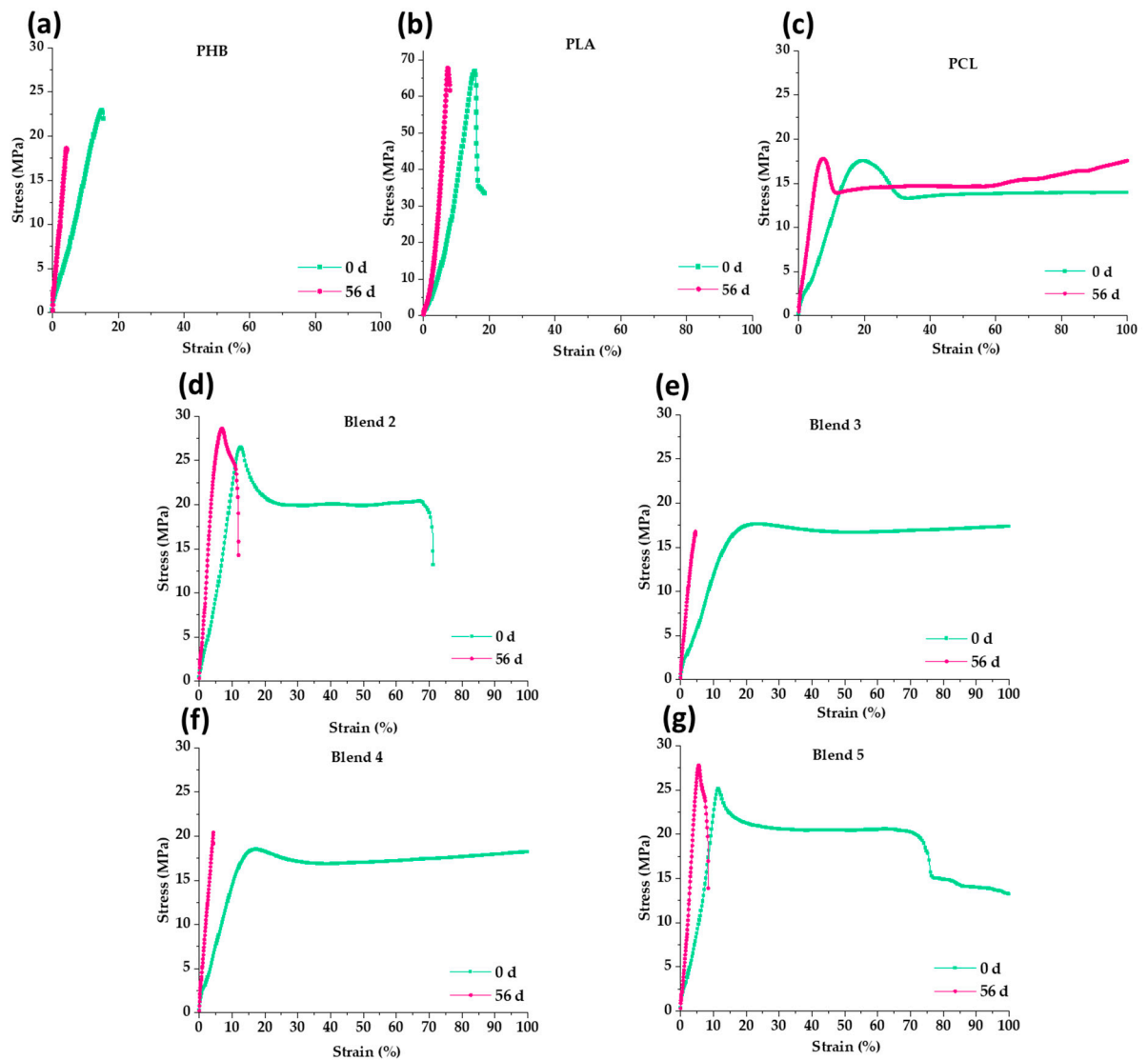
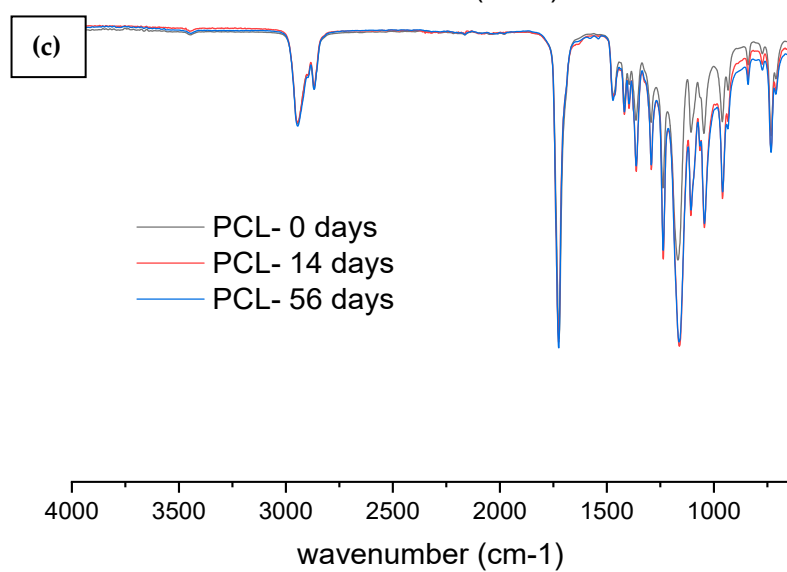
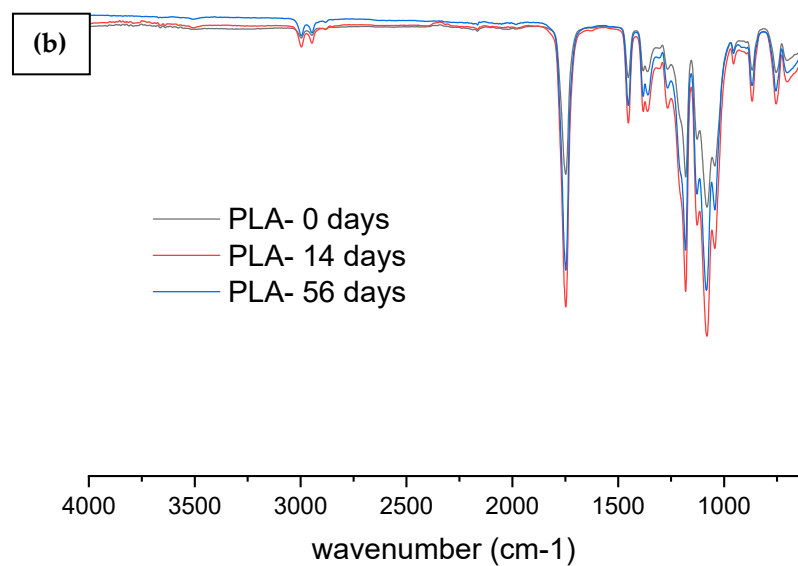
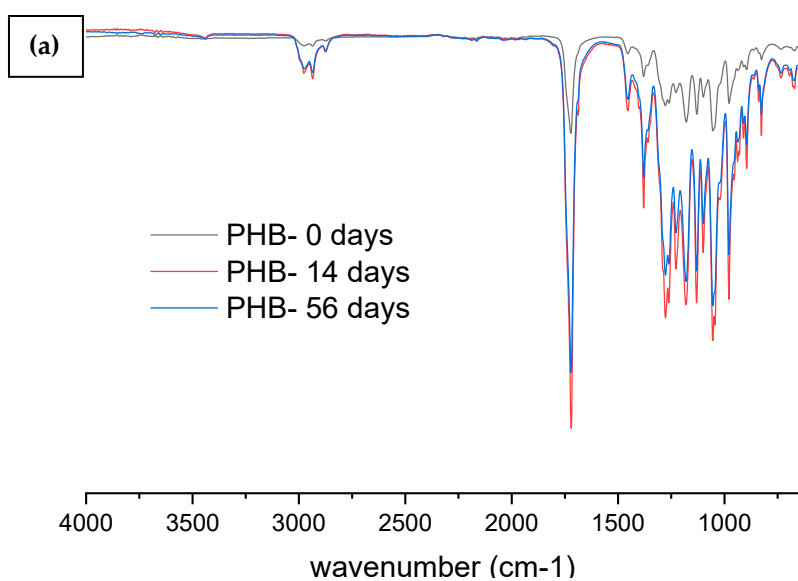
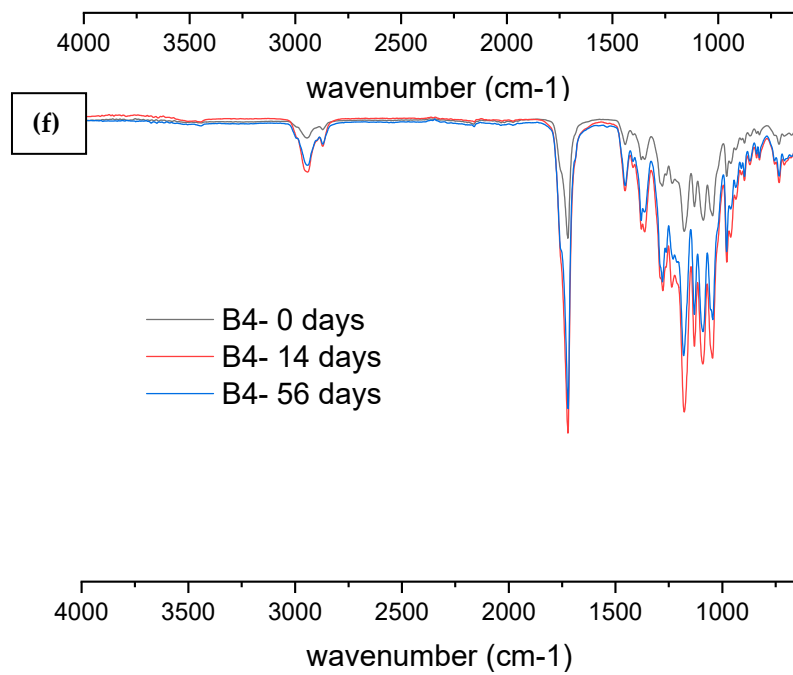
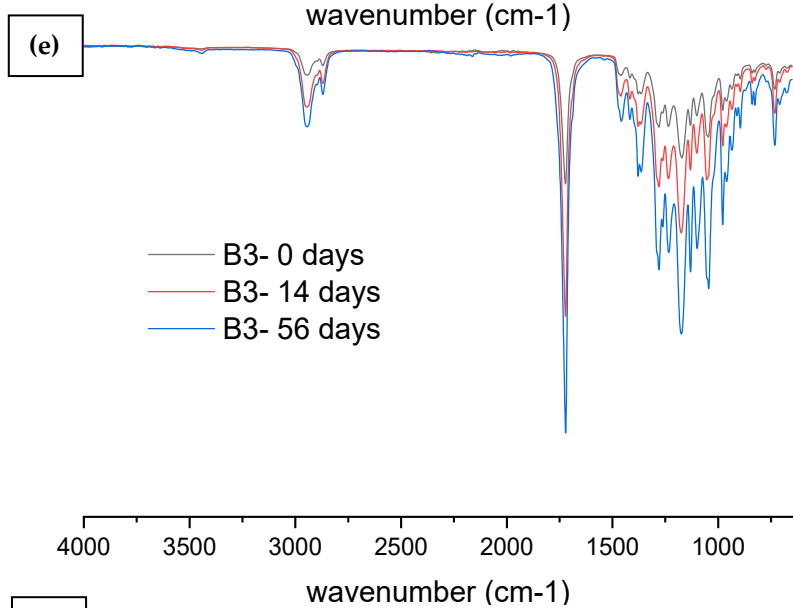
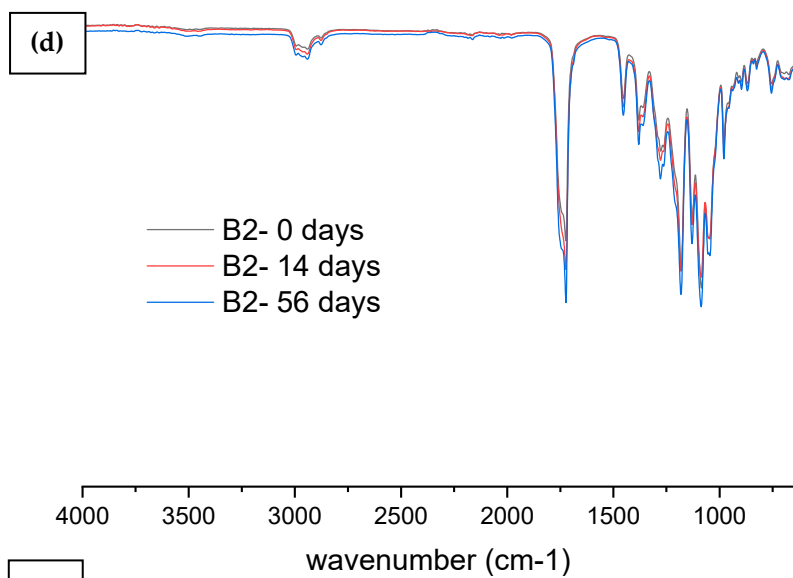


Figure S1. Stress vs Strain of neat PHB/PLA/PCL and their respective blends at initial state and after 56 days of seawater degradation: (a) PHB, (b) PLA, (c) PCL, (d) 50/50/0, (e) 50/0/50, (f) 50/25/25, and (g) 30/50/20 (wt. % PHB/PLA/PCL).

Fourier-transform infrared spectroscopy (FTIR) - Seawater degradation





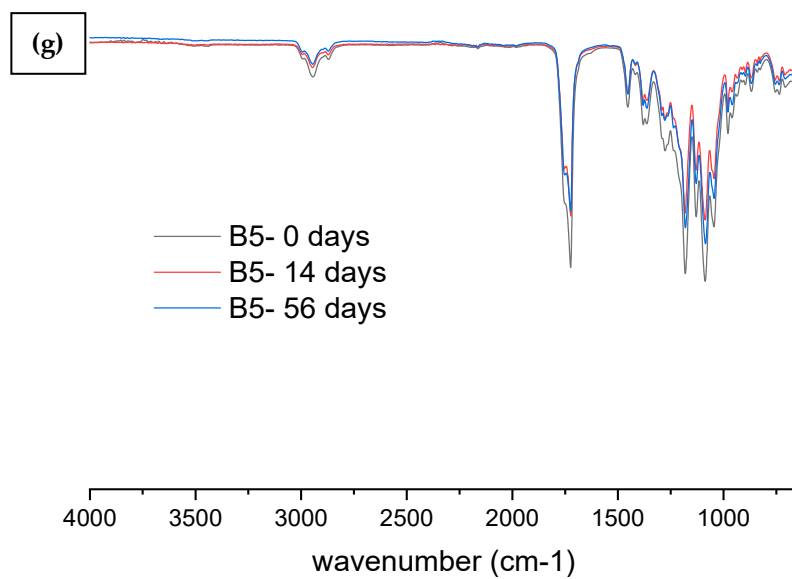
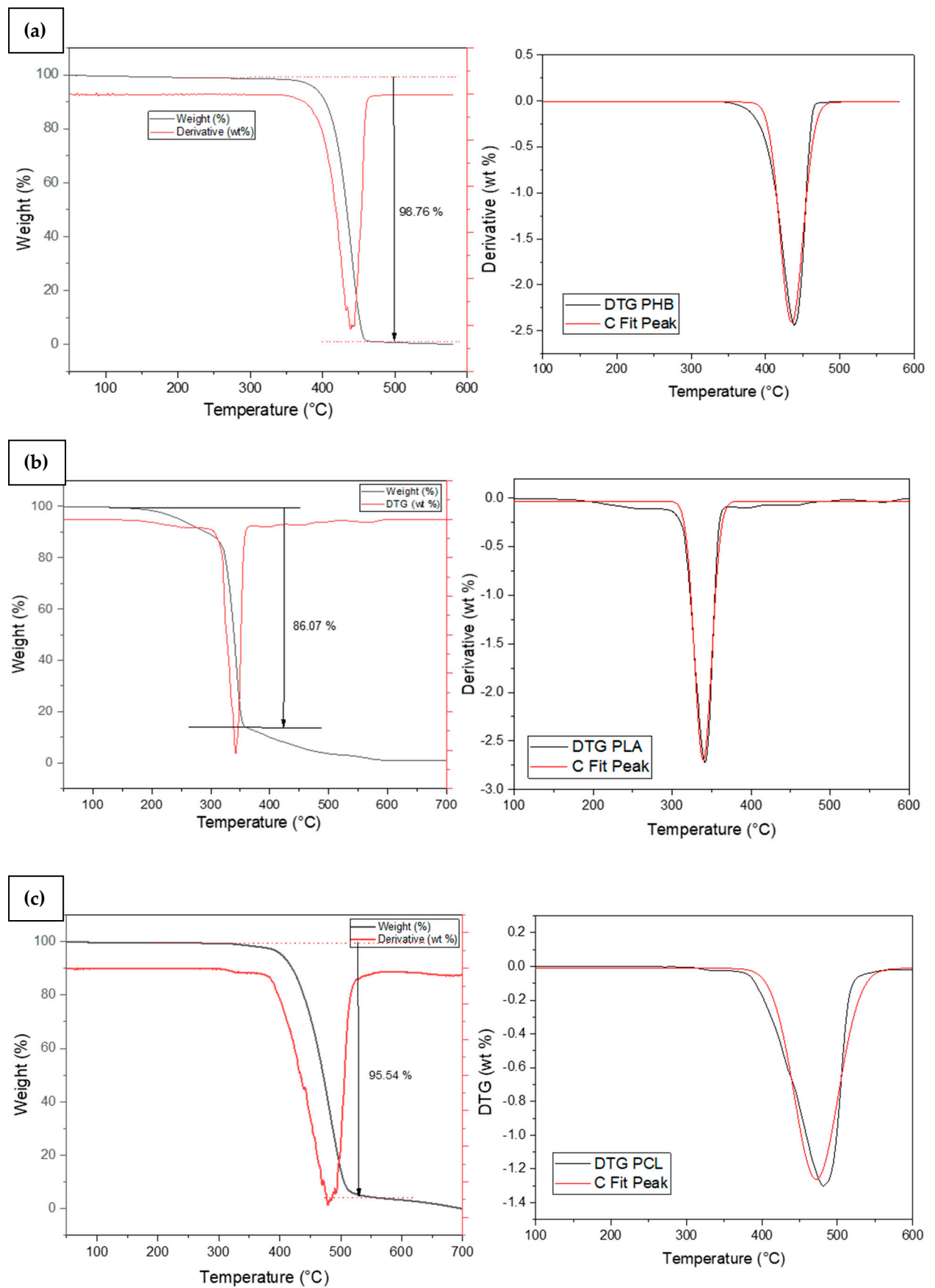
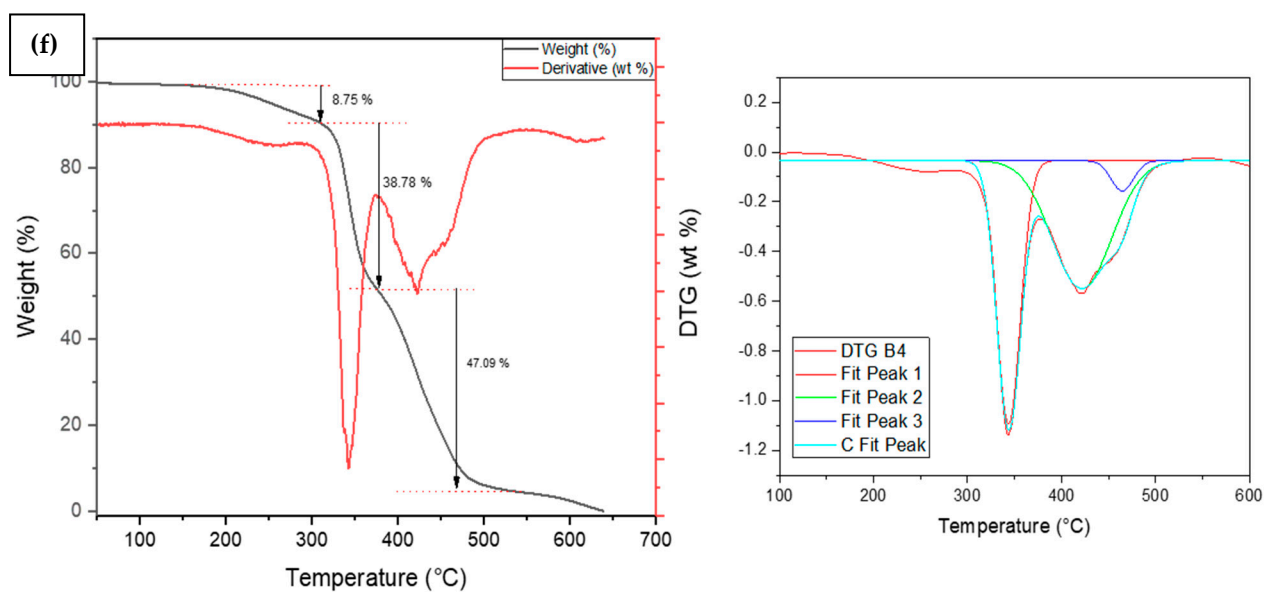
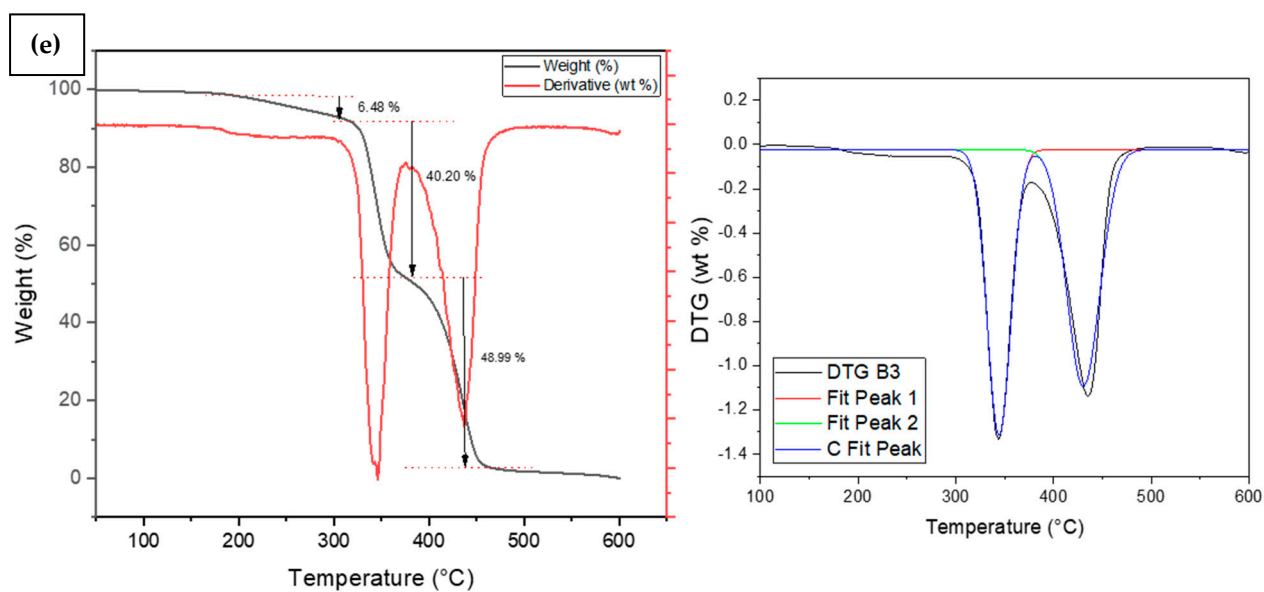
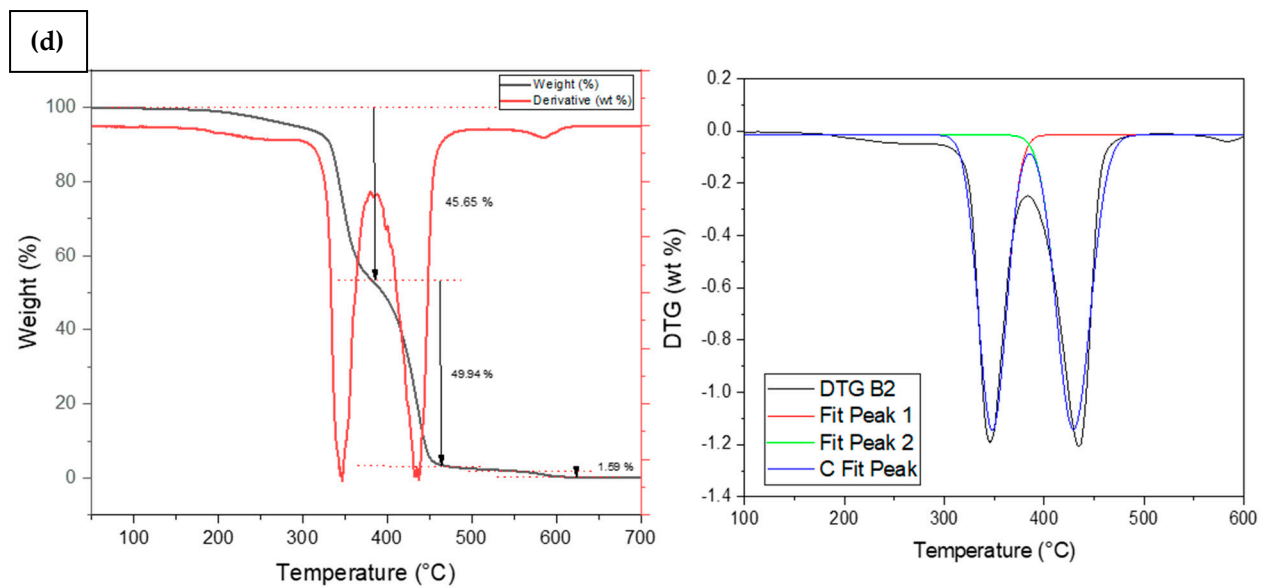


Figure S2. FTIR of neat polymers PHB/PLA/PCL and their respective blends: (a) PHB, (b) PLA, (c) PCL, (d) B2: 50/50/0, (e) B3: 50/0/50, (f) B4: 50/25/25, and (g) B5: 30/50/20 (wt. % PHB/PLA/PCL).

Thermogravimetry (TG) and DTG analysis





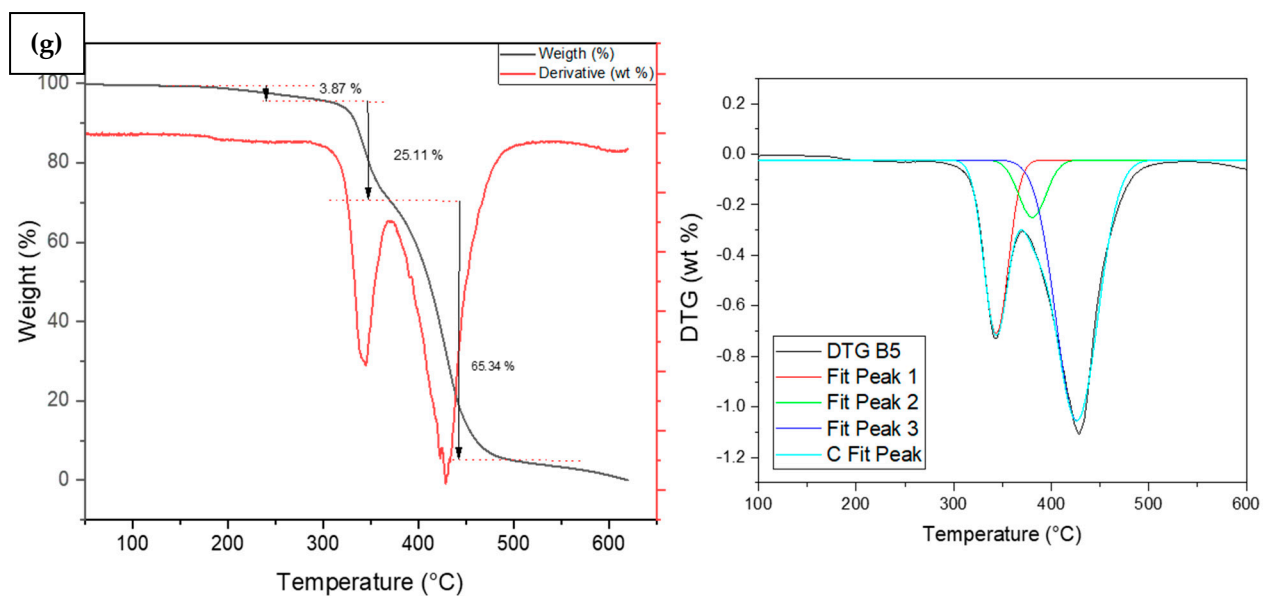
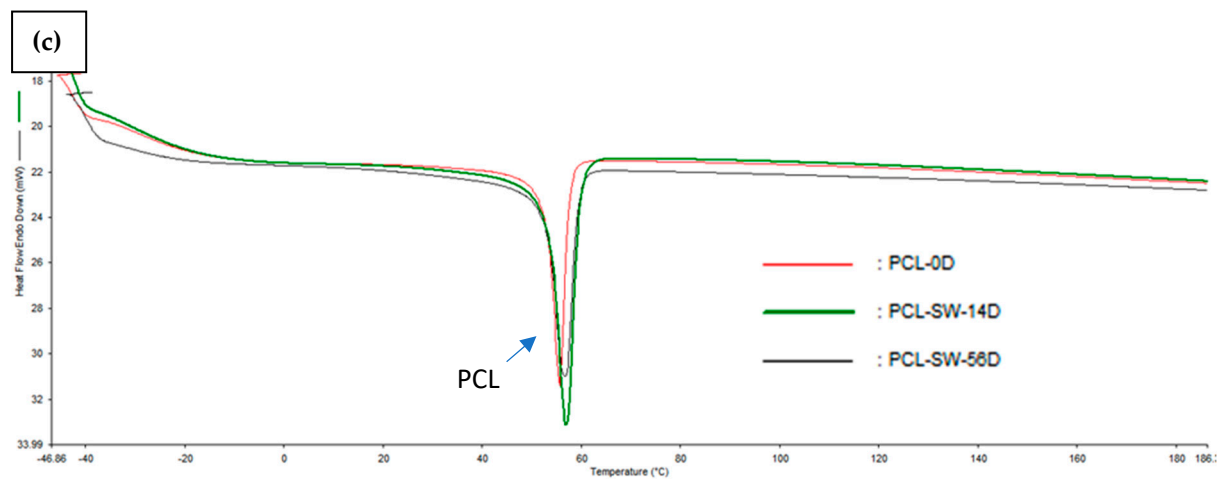
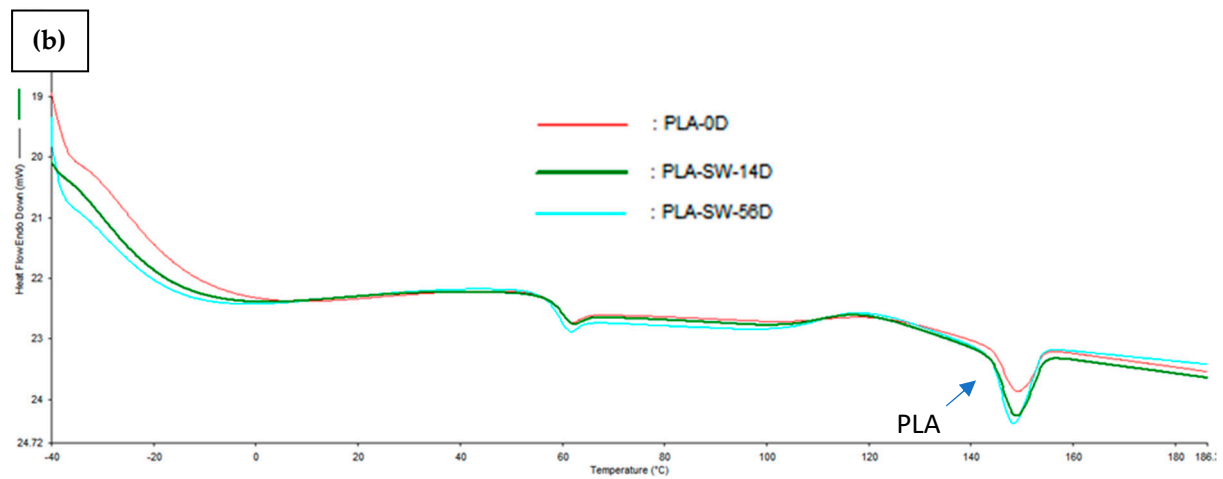
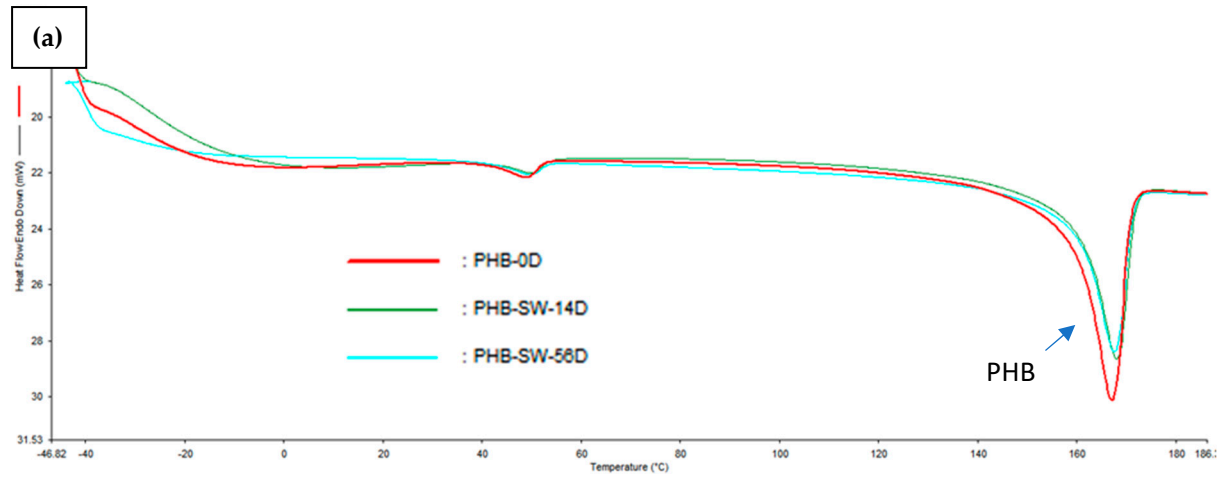
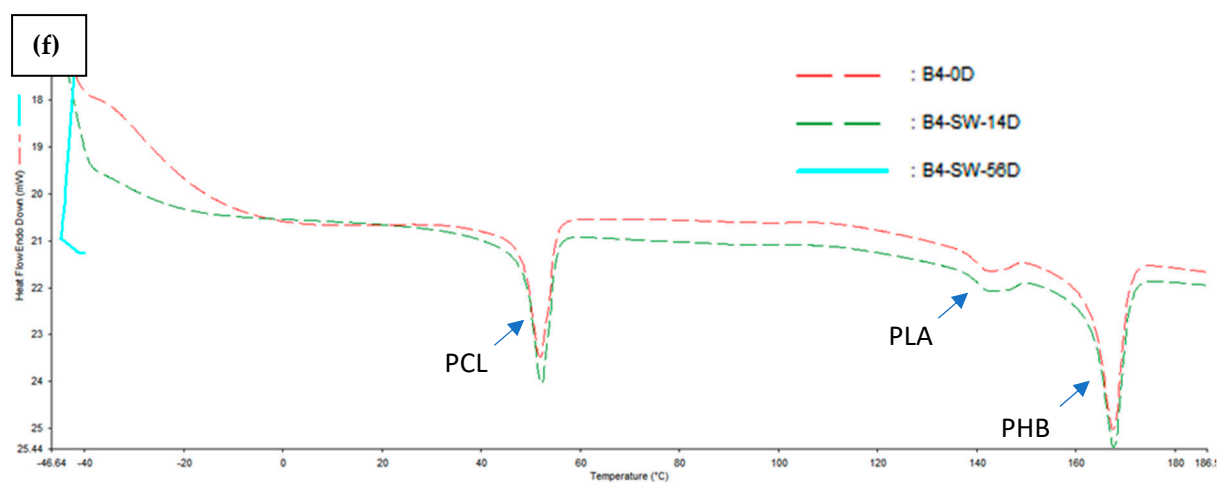
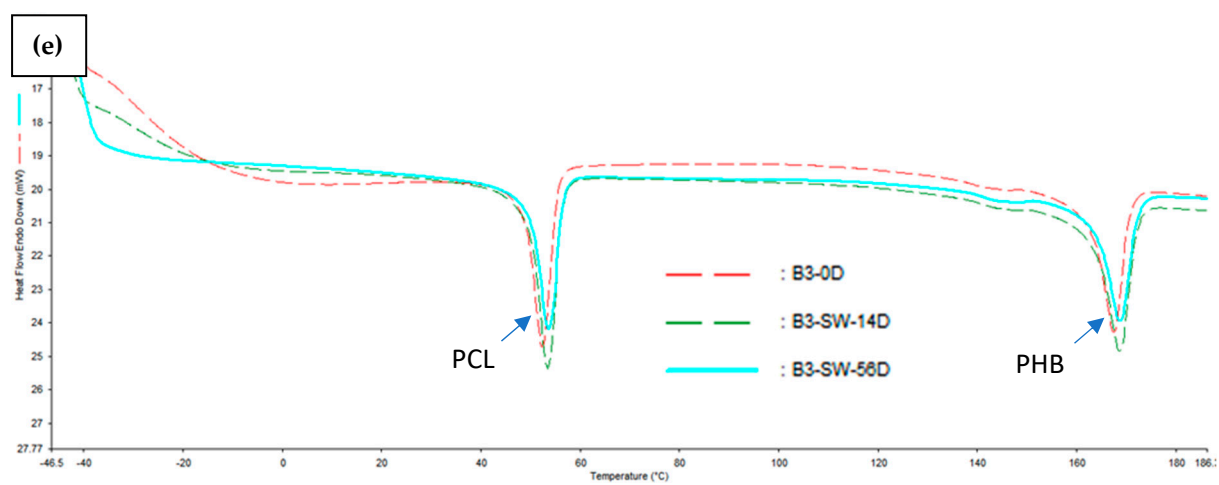
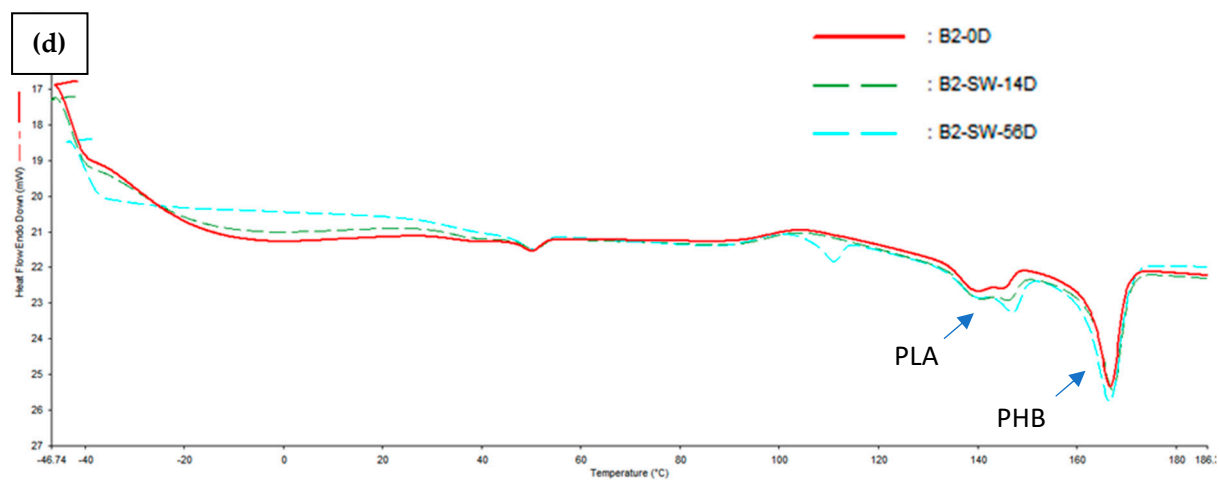


Figure S3. TGA and DTG of the neat polymers PHB/PLA/PCL and their respective blends (**left:** TG and DTG/**right:** deconvolution of the DTG peaks): (a) PHB, (b) PLA, (c) PCL, (d) B2: 50/50/0, (e) B3: 50/0/50, (f) B4: 50/25/25, and (g) B5: 30/50/20 (wt. % PHB/PLA/PCL).

Differential scanning calorimetry (DSC) - Seawater degradation





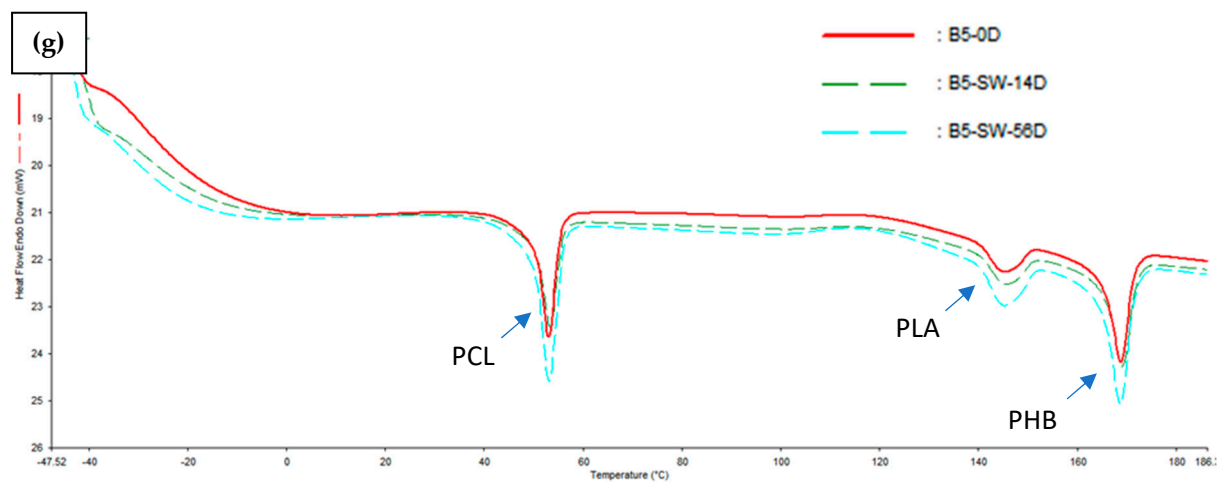


Figure S4. DSC of neat polymers PHB/PLA/PCL and their respective blends: (a) PHB, (b) PLA, (c) PCL, (d) B2: 50/50/0, (e) B3: 50/0/50, (f) B4: 50/25/25, and (g) B5: 30/50/20 (wt. % PHB/PLA/PCL).