

March 26-28, 2018  
Vienna, Austria

Polym Sci, Volume 4  
DOI: 10.4172/2471-9935-C1-009

## DEGRADATION OF POLYLACTIC ACID AND STARCH BLENDS IN COMPOST AND SOIL

**Hongyun Tai and Osita Wilfred**

Bangor University, UK

**P**olylactic acid (PLA) and starch was blended using Brabender 30 EHT mixer at different weight ratios of 10:90, 25:75, 50:50, 75:25 and 90:10, respectively. Degradation of these biopolymer blends were carried out in compost and soil for a period of 14 and 28 days at 45 and 55°C in an incubator. Visual inspection, gel permeation chromatography (GPC), thermal gravimetric analysis (TGA), scanning electron microscopy (SEM), Fourier transform infra-red (FTIR), titration and gas chromatography (GC) analyses were performed to investigate the degradation behaviour of these biopolymer blends. The GPC results showed that the molecular weight of PLA reduced, while the TGA results showed that the thermal stability of the blends decreased, with the increase of starch content within the blends. The morphological results

from visual inspection and SEM analysis revealed that the size of polymers reduced and the shape became less regular owing to degradation. FTIR spectra of polymers displayed strong carbonyl bands and the degradation caused these bands to become broader with a slight shift to higher wave number at 1756.1cm<sup>-1</sup>–1763.7cm<sup>-1</sup>. Moreover, the addition of lipase into compost and soil promoted the degradation of polymer blends, leading to more CO<sub>2</sub> released and more weight loss comparing to the experimental results obtained without the use of lipase. To conclude, the degradation rate of PLA/starch blends can be tailored by changing the composition and environmental conditions (such as temperature and the addition of enzymes).

[h.tai@bangor.ac.uk](mailto:h.tai@bangor.ac.uk)