

## **Effects of multi-walled carbon nanotubes (MWCNTS) on the mechanical and thermal properties of plasticized polylactic acid nanocomposites**

### **Abstract**

A multi-walled carbon nanotube (MWCNT)/plasticized polylactic acid (PLA) composite was prepared using a two-roll mill set at 170°C and 50 rev/min. The material was characterized using dynamic mechanical analyzer (DMA). Characterization works include obtaining mechanical properties, such as tensile and flexural properties of the nanocomposites. Polyethylene glycol (PEG) at 6 wt% was used as the plasticizer for blending with the PLA. It was found that the tensile and flexural strengths of the nanocomposites increased up to 43.8 MPa and 81.4 MPa respectively with the addition of 0.15 wt% MWCNTs. The DMA results revealed that the storage modulus and the glass transition temperature ( $T_g$ ) of the nanocomposites improved with the addition of 0.15 wt% CNTs, which was previously reduced by the incorporation of PEG.

### **Keywords**

Multi-walled carbon nanotube (MWCNT); Plasticized polylactic acid (PLA); Nanocomposites; Mechanical and thermal properties