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Effect of freeze-dried durian skin nanofiber on the physical properties of poly(lactic acid) biocomposites
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Abstract
Durian skin wastes generated by durian fruit or Durio zibethinus Murray shows potential as a new natural fiber-based reinforcement for polymers. Freeze drying (FD) method is reported able to reduce the size of particles. Thus, in this research, durian skin nanofiber (DSNF) is developed using a FD process from durian skin fiber (DSF) and its effect on poly(lactic acid) (PLA) biocomposite is investigated. Cinnamon essential oil was added as a plasticizer for PLA biocomposite. Morphological analysis via transmission electron microscopy and scanning electron microscopy showed that FD method reduced the DSF particle size into DSNF. Dynamic light scattering was also performed to see the size distribution of DSNF particle after the freeze dried process. The hydrophobicity of the biocomposite was measured by contact angle and UV transmittance was done to analyze its transparency and UV penetration. The tensile strength of these composites showed significant changes in the presence of DSF and DSNF in PLA. © 2020 Society of Plastics Engineers

Author Keywords
composite; nanofibers; polymer nanofiber; thin films

Index Keywords
Composite materials, Contact angle, Essential oils, Finite difference method, High resolution transmission electron microscopy, Lactic acid, Light scattering, Nanofibers, Natural polymers, Particle size, Scanning electron microscopy, Tensile strength, Uranium metallography, Vanadium metallography; Bio-composites, Freeze dried process, Freeze drying, Morphological analysis, Poly lactic acid, Polylactic acids; Particle size analysis

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