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# Bio-based polyethylene blends including non-wood biomass materials

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Utilization of renewable and sustainable materials such as starch for thermoplastic films and injection molded articles has been pursued within the plastic industry. However, starch is one of the food sources for human beings. This presentation addresses the use of non-food and non-wood materials such as lignocellulose in polymeric blends for rigid container packaging. Lignocellulose is a structural material that is the main constituent of plants, which is comprised of cellulose, hemicellulose and lignin. Miscanthus and kenaf core were respectively processed through torrefaction or milling to achieve the necessary uniformity in particle sizes ranging from 40 to 60 microns prior to thermoplastic compounding using ZSK-30 twin screw extruder. The polymeric blends were then molded using BOY 22D injection machine and sample mechanical properties were evaluated. The results indicate that tensile values for Braskem bio-based polyethylene SHA7260 blends, containing up to 20% of the torrefied miscanthus, are at parity to the neat polymer. A similar trend is observed for Braskem bio-based polyethylene SHA7260 blends, containing up to 20% of the milled kenaf core. The sample elongation for all polymeric blends decreased relative to the neat polymer as lignocellulose content in the polymeric blends increased. According to the 24 hour shrinkage data, the sample dimensional stability is better than the neat polymer, indicating there is a restriction in polymer chain mobility when the processed non-wood biomass is presented and less sensitive to the presence of moisture. This work proves a new concept to effectively utilize non-food and non-wood materials for plastic manufacturing.

## Biography

Bo Shi completed his PhD in Environmental Engineering from University of Delaware in 1997. He started to work for Kimberly-Clark Corporation in Neenah, WI since 1996, emphasizing on corporate environmental sustainability, biopolymer processing and modification, and alternative natural fibers for a range of personal care product manufacturing. His project research and development efforts concentrate on effective utilization of biodegradable, renewable and sustainable materials for bio-based economy. He serves as a patent licensing corroborator at Algix for commercialization of algae-based bioplastics. He published a lot of papers in several technical journals and filed/granted about 25 US patents.

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