Application of biorenewable fibers in biocomposites

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Abstract

Interest in the use of natural fibers has grown during the last decade due to their low costs and the search for renewable sources. Composites consisting of polypropylene (PP), or high-density polyethylene (HDPE), and biorenewable fibers from soybean hulls, wood, and big blue stem (BBS) were prepared by extrusion processing. The test samples were prepared by injection molding. Mechanical properties of the composites were evaluated. The effect of the fiber type and content on the mechanical properties of natural fibers/PP composites and natural fibers/HDPE composites were studied. The results showed that the fiber content influenced tensile and flexural properties. The wood and big blue stem fiber composites had higher Young's modulus and tensile strength than soybean hull fiber composites. The Young's modulus of wood, big blue stem and soybean hull fiber composites compared with pure polypropylene and polyethylene were comparable or higher. The melt flow index of these composites was reduced due to the fibers, restricting the flow of the polymer molecules. Biorenewable fibers like soybean hulls, big blue stem can be used as excellent reinforcing materials for low cost composites.