BIODEGRADABLE THERMOPLASTICS AS MATRICES FOR NATURAL FIBER COMPOSITES

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Biocomposites, consisting of biodegradable polymer matrix and natural fibers as reinforcement, are beginning to find their way into commercial applications in today’s market [1].

The main objective of our ECO-PCCM project [2] is to develop environmental-friendly (eco-) composite materials based on biodegradable or recyclable thermoplastic polymers and natural fibers. Our recent results indicates that several biodegradable polymers can be successfully used as matrix material for production of kenaf fiber composites, using conventional manufacturing processes, as extrusion and compression molding.

The focus in this work has been to compare the properties of polyhydroxybutyrate (PHB), polyhydroxybutyrate-co-valerate (PHBV) and polylactic acid (PLA) based composites, reinforced with kenaf fibers. Polymer matrices are modified with compatibilizing agents (CA) to promote interfacial adhesion between the fibers and polymer. The CAs were synthezized from the corresponding neat polymer by reactive blending of low molecular weight compound.

For all natural fiber biodegradable polymer composites, mechanical, morphological, thermal and thermogravimetric analyses have been done. The obtained results have shown that PLA-based composites has exhibited higher mechanical properties compared to those obtained for PHBV and PHB based composites. The compatibilization strategy improves matrix/fibers interfacial adhesion, as confirmed both by morphological and DMTA analyses as well as by the evaluation of the adhesion parameter.

References

2. ECO-PCCM, FP6-2002-INCO-WBC-1, INCO-CT-2004-509185