

215-071

BIODEGRADABLE COMPOSITES OF CURAUA FIBERS AND POLYURETHANE

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With increasing environmental awareness and stronger government regulations on environmental issues throughout the world, there has been an ever-increasing interest in natural fiber biocomposites. Studies on structure and properties of natural fibers show that their composites combine good mechanical properties with a low density. However, one of the reasons why the use of cellulosic natural fibers has been limited is their poor compatibility with polymeric matrices. Therefore, these fibers normally undergo chemical treatments (such as alkaline treatment) in order to improve their properties and adhesion to the polymer matrix. Nevertheless, these chemical treatments generate liquid waste and thus, have negative environmental impact. Plasma treatment of natural fibers otherwise has the potential to increase surface roughness and activate the surface, thus increasing compatibility to the polymer matrix with no liquid waste generation. Using natural fibers combined with polymers based on renewable resources is increasingly attractive for industries and manufacturers around the world, which aim at replacing petrochemical-based material for biocomposites. In this study, curaua fibers were plasma-treated and combined with polyurethane resin derived from castor oil. The effects of plasma treatment on the fiber were investigated by tensile and density tests. Curaua fiber-polyurethane composites were manufactured and the effect of plasma treatment on the composite was investigated by tensile tests. Results show that the fiber was modified by the plasma and that the employed treatment may increase the compatibility of the fiber to the polymeric matrix.