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Preparation of Water Hyacinth and Oil Palm Fiber for Plastic Waste Composite

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Abstract : This research aims to utilize the agricultural waste and plastic waste in Thailand in a study of the optimum conditions for preparing composite materials from water hyacinth and oil palm fiber and plastic waste in landfills. The water hyacinth and oil palm fiber were prepared by alkaline treatment with NaOH (5, 15 wt%) at 25-60 °C for 1 h. The treated fiber (5 and 10 phr) was applied to plastic waste composite. The composite was prepared by using a screw extrusion process from 185 °C to 200 °C with a screw speed of 60 rpm. The result confirmed that alkaline treatment can remove lignin, hemicellulose and other impurities on the fiber surface and also increase the cellulose content. The optimum condition of composite material is 10 phr of fiber coupling with 3 wt% PE-g-MA as compatibilizer. The composite of plastic waste and oil palm fiber has good adhesion between fiber and plastic matrix. The PE-g-MA has improved fiber-plastic interaction. The results suggested that the composite material from plastic waste and agricultural waste has the potential to be used as value-added products.

Keywords : agricultural waste, waste utilization, biomaterials, cellulose fiber, composite material
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