

Thesis Title	Composites from Recycled High Density Polyethylene and Bagasse Fibers
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### ABSTRACT

In this research, composites between HDPE from drinking water bottles and bagasse fibers were prepared. Two coupling agents ( PE-g-AA and PE-g-MAH ) and two impact modifiers ( EPDM and EVA ) were used to improve properties of the composites. The results showed that adding the bagasse fibers into HDPE could improve tensile strength of the composites while elongation at break and impact resistance were decreased. The size screening of bagasse fibers was not necessary for preparing those composites. The properties of PE-g-AA or PE-g-MAH filled composites systems were not different because the same linkage occurred in both systems. Adding EPDM or EVA, which are elastomer, increased elongation and impact properties but tensile strength and modulus would decrease with increasing their content. The polar groups on elastomers are significant on the adhesion between fibers and matrix. MAH-EPDM, which acts as both elastomer and coupling agent, could show the highest elongation and impact strength of the composites and the MAH content in EPDM affected on composites' properties. With higher MAH content, the composites showed higher hardness but lower impact strength. The results of thermal properties showed that  $T_m$  and  $T_c$  of all composites systems were not different and adding EPDM or EVA, which are amorphous polymers, into those systems reduced the crystallinity of systems.