

## Effect of chemical modification or compatibilizers on the mechanical properties of WPC

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**Abstract:** Wood Plastic Composites (WPC) are defined as composite materials that contain thermoplastics and lignocellulosic fibers. The main problem of using lignocellulosic fibers as reinforcement in a thermoplastic matrix is the compatibility of the lignocellulosic material with the matrix. Interfacial adhesion between lignocellulosic fibers and polymers is very poor. Lignocellulosic materials are hydrophilic due to OH functionality, while thermoplastic polymers are hydrophobic. Lignocellulosic fibers show a tendency of forming large aggregates, which cause poor dispersion of the fibers in the polymer matrix. The compatibility between the reinforcing material and the matrix plays an important role in determining the mechanical properties of a composite material. Various methods may be employed to improve the compatibility of hydrophilic lignocellulosic materials with a hydrophobic matrix. Two methods are generally used for improving the compatibility of lignocellulosic fibers and thermoplastic matrix which are utilization of compatibilizers or chemical modification of the lignocellulosic fibers. In this study, the effects of these treatments on the mechanical properties of the composites have been compared. Maritime pine (*Pinus pinaster*) wood flour samples were pretreated with acetic anhydride (AA) to achieve three different weight percent gain levels (5%, 10% and 16% WPGs) or adding various amount of maleated polyethylene (MAPE) (1, 2, 3, 5 and 10%) then compounded with high density polyethylene (HDPE) by using twin screw extruder. The influence of acetylation levels or compatibilizers amount on the mechanical properties of 30 wt% Maritime pine wood flour reinforced HDPE composites was determined.

**Keywords:** Maritime pine, Wood plastic composites, Acetylation, MAPE