

# The effects of binder on the physical and mechanical properties of chemically treated sawdust-reinforced polypropylene composites

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## Abstract

This study investigates the effects of Polyvinyl Alcohol (PVA) as a binder on the mechanical and physical properties of wood polymer composites (WPCs). The WPCs were manufactured from tropical sawdust and polypropylene using a hot press molding method at five levels of sawdust loading (10–30 wt). For the manufacturing of the composites, the sawdust was chemically treated with 2-ethylhexyl methacrylate before 10 wt % PVA was added. The flexural strength, flexural modulus, Young's Modulus, and Rockwell hardness were found to improve with the treatments. However, the binder treated wood polymer composite (BTWPC) samples exhibited better mechanical properties than the raw wood polymer composite and the treated wood polymer composite (TWPC) samples. Moreover, water absorption decreased significantly for the TWPC and the BTWPC samples, indicating that their water resistance is higher than that of the raw samples. The SEM micrographs revealed that the interfacial bonding of the BTWPC had significantly improved, suggesting that the chemical treatment led to better dispersion of the filler into the matrix, and this improved further after the addition of the binder

**Keywords:** microscopy; mechanical properties; composites

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