

Effects of Date Palm fibres loading on mechanical, and thermal properties of Date Palm reinforced phenolic composites

ABSTRACT

Present research work deals with the various date palm fibres (DPF) loading (0%, 40%, 50%, and 60% by wt%) as reinforced material in phenolic composites. DPF reinforced phenolic composite were manufactured by hand lay-up technique and characterized mechanical (tensile, flexural and impact), morphological, and dynamic mechanical properties to evaluate optimum fibre loading of composites. It is observed that incorporation of 50% DPF loading improved tensile modulus and impact properties but reduce tensile strength, flexural strength and modulus. Scanning electron microscope investigated the interfacial bonding of fibre and matrix in composites. Storage modulus of DPF composites improved and 50% DPF loading illustrated highest storage modulus. Loss modulus increased when DPF was reinforced, 40% fibre loading showed highest Tg for loss modulus but Tg of 50% fibre loading was very close to the composite with 40% fibre loading. Tan delta of DPF composites display low value whereas increasing the fibre loading, the Tg of damping factor were increased. The obtained results concluded that 50% DPF composites have better mechanical and thermal properties with better interfacial bonding between fibres and matrix. This material can be use as insulation material in buildings, false ceiling and walls.

Keyword: Date palm fibres; Phenolic resin; Tensile properties; Flexural properties; Impact strength; Dynamic mechanical analysis