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COMPARISON OF PINE CONE POWDER/MICA CONTENT ON THE MECHANICAL PROPERTIES OF POLYESTER COMPOSITES

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Wood as a building material is as old as mankind and the availability of this natural resource is diminishing. This situation has led to the development of alternative materials. Pine trees are the most common coniferous tree worldwide. Large woody cones are a key element for pine trees. Besides the obvious use of cones for decorations, pine cone can be used for a variety of purposes. The present study are explored the suitability of pine cone powder and mica fillers for composite productions and also compared their mechanical properties. These composites are made using matrices of polyester with pine cone powder, P and mica, M as filler. Corresponding polyester composites (C) are also made using pine cone powder increasingly into two different set; 1st code PC, 2nd code PMC. Loading filler weight ratios (wt%) of composite are given respectively 1st set P/M ratios; 6:0, 9:0 and 12:0, and 2nd set P/M ratios; 6:6, 9:6 and 11:6. The flexural strength is decreased up to increasing the reinforcement amount of pine cone powders from 6 to 12% in composite structures. The elastic modulus and hardness values are similar for all compositions in each set separately. The modulus of PMC increases 3 to 17% with adding ceramic mica phase content. After the addition of 6% mica to increasing the amount of cone powders, the flexural strength of PMC is lower than the PC's. Impact strength of fibrous organic cones phase is higher than inorganic ceramic mica phase, 13-18%. It is considered that the byproduct composites do provide a viable material and have the potential to become a sustainable replacement option for furniture panel composites.

Keywords: Pine cone powders, mica, composites, mechanical properties

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