

## Development and Characterization of Ethiopian Bamboo Fiber Polypropylene Composite

**Authors :** Tigist Girma Kedane

**Abstract :** The purpose of this paper is to evaluate the properties of Ethiopian bamboo fiber polymer composites for headliner materials in the automobile industry. Accurate evaluation of its mechanical properties is thus critical for predicting its behavior during a vehicle's interior impact assessment. Conventional headliner materials are higher in weight, nonbiodegradable, expensive in cost, and unecofriendly during processing compared to the current researched materials. Three representatives of bamboo plants are harvested in three regions of bamboo species, three groups of ages, and two harvesting months. The statistical analysis was performed to validate the significant difference between the mean strength of bamboo ages, harvesting seasons, and bamboo species. Two-year-old bamboo fibers have the highest mechanical properties in all ages and November has higher mechanical properties compared to February. Injibara and Kombolcha have the highest and the lowest mechanical properties of bamboo fibers, respectively. Bamboo fiber epoxy composites have higher mechanical properties compared to bamboo fiber polypropylene composites. The flexural strength of bamboo fibre polymer composites has higher properties compared to tensile strength. Ethiopian bamboo fibers and their polymer composites have the best mechanical properties for the composite industry, which is used for headliner materials in the automobile industry compared to conventional headliner materials.

**Keywords :** bamppoo species, culm age, harvesting seasons, mechanical properties, polymer composite

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