

Studies on the Effect of Alkali and Enzymatic Treatment on Properties of Banana Fibre and Banana/Polypropylene Composites.

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Banana fibres were treated with NaOH, laccase and xylanase enzymes separately at 10%, 15% and 20% and characterized. For alkali treatment Box-Behnken method was used and the optimum conditions for lignin removal from banana fibres were NaOH concentration of 11g/L, treatment time of 2.5 hours and temperature of 90°C. The characterization of the laccase and xylanase enzyme treated banana fibres revealed improvement in cellulose %, lignin removal and hemicelluloses removal. The change in chemical composition has resulted in the improvement of tensile strength since the cellulose is the major load bearing component. The TGA analysis shows highest thermal stability for treated fibres.

Composites have been produced from Banana and Polypropylene fibres using compression moulding technique after needle punching. Mechanical properties such as hardness, tensile strength, flexural strength, impact resistance, thermal conductivity and sound absorption were determined for the samples. The tensile strength showed that the banana fibre reinforcement has improved the Tensile strength. Flexural and Impact strength also, followed the same trend as tensile strength. The various treatments have improved the composites sound absorption but the voids have reduced, which has a greater influence on the sound absorption characteristics. The thermal conductivity of the untreated and treated composites was very much lower than the other composite materials. Of the various treatments given, the NaOH fibre composites showed the highest values of thermal conductivity and the xylanase treated had the lowest thermal conductivity. The environmental analysis done objectively revealed that enzyme treatment is considered be eco-friendlier than that of the NaOH treatment.