Hemp Fibre-Reinforced Polylactic Acid Composites: A Sustainable Materials for Engineering and Industry

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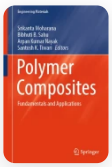

Polymer Composites

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Abstract

In recent years, composites made from hemp fibre (HF) reinforced polylactic acid (PLA) have seen rapid growth between the Natural Fibre Reinforced Composites (NFRCs). The engineering and industrial sectors have taken a keen interest in HF-PLA composites as a sustainable alternative material. The outstanding qualities of HF-PLA composites, such as their low specific weight, better mechanical capabilities, and biodegradability are increasing their popularity. Creep behaviour, thermal, and mechanical properties of HF-PLA composites are briefly examined. The biodegradability and recycle-ability of HF-PLA composites made using various manufacturing techniques have also been investigated. Potential usage in additive manufacturing and sustainable packaging is also mentioned, along with structural, dielectric, and automotive applications for HF-PLA composites in the future. Mechanical and physical characteristics of HF-PLA-produced components have also been summarized, along with the impacts of 3D printing sceneries. This work sheds information on the potential and constraints of HF-PLA composites, which is an important contribution. Reinforcing natural fibres in a polymer matrix enhanced mechanical, thermal, and tribological behaviour by increasing interfacial adhesion between the fibre and the matrix. The composites' fibre-matrix interface stress transmission performance was improved by chemical treatment of the natural fibres. To expand their usefulness to high-end sectors like the aerospace and marine industries, improvements must be made to the thermal characteristics and moisture response.