

Extraction and preparation of bamboo fibre-reinforced composites

ABSTRACT

Natural plant fibre composites have been developed for the production of a variety of industrial products, with benefits including biodegradability and environmental protection. Bamboo fibre materials have attracted broad attention as reinforcement polymer composites due to their environmental sustainability, mechanical properties, and recyclability, and they can be compared with glass fibres. This review classifies and describes the various procedures that have been developed to extract fibres from raw bamboo culm. There are three main types of procedures: mechanical, chemical and combined mechanical and chemical extraction. Composite preparation from extracted bamboo fibres and various thermal analysis methods are also classified and analysed. Many parameters affect the mechanical properties and composite characteristics of bamboo fibres and bamboo composites, including fibre extraction methods, fibre length, fibre size, resin application, temperature, moisture content and composite preparation techniques. Mechanical extraction methods are more eco-friendly than chemical methods, and steam explosion and chemical methods significantly affect the microstructure of bamboo fibres. The development of bamboo fibre-reinforced composites and interfacial adhesion fabrication techniques must consider the type of matrix, the microstructure of bamboo and fibre extraction methods.

Keyword: Bamboo fibres; Natural fibres; Mechanical extraction; Glass fibres; Composite preparation; Mechanical properties