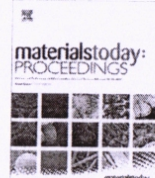




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Study of tensile properties on natural fiber polymer laminated composite

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ABSTRACT

In recent days, research work on polymer is increasing due to its outstanding properties. The present research work is used to describe the fabrication of natural polymer laminated composite using gelatin and coir fiber. Cellulose and epoxy resin is used to strengthen a polymer composite. The combination of gelatin, coir, epoxy resin and cellulose is provided the composite with strong and harder. Weight percentage of fiber, stirrer speed and slurry concentration is the input constrains of the hand lay method. Tensile properties are evaluated and optimized by Taguchi method.

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1. Introduction

Gelatin based natural polymer composite is used in food industries, panel board and biomedical. It's an abundant, versatile, renewable, cheap and biodegradable. The addition of cellulose, resin and fiber is used to enhance the composite properties. There are numerous reports in the literature which discuss the mechanical behaviour of natural fiber reinforced polymer composites. However, very limited work has been discussed on effect of tensile behaviour natural fiber polymer laminated composite. Natural fiber polymer composite is playing a significant role in construction and automotive applications. Tensile properties were evaluated in the polymer composite with different fiber composition [1,2]. The material behaviour of the polymer composite was related to the weight percentage of the fiber content and different composition of organic elements [3]. Tensile strength was performed in a laminated with carbon fiber, aramid fiber, and glass fiber using different resin and hardener [4]. The performance of tensile behaviour was evaluated in jute fiber polymer composite. The weight percentage of fiber was the biggest role in tensile strength [5,6]. The lamination of layer in the polymer composite was related to the

adhesive strength between fiber and elements of polymer [7]. Flexural and tensile strength properties were enhanced due to the addition of fibers with different composition [8]. The fiber matrix adhesion was analyzed in jute composite under different impact load and cyclic load conditions. It was found that strong interface bonding strength was achieved in the composite structure [9,10]. The quality characteristics and taguchi optimization was performed in glass fiber composite for the evaluation of tensile strength [11,12]. Taguchi approach was used to enhance the process characteristics and performance. The response variation was predicted by developed mathematical model [13–18].

The present work aims to develop the coir fibre based natural laminated polymer composites with different weight percentages and to analyse their tensile strength behaviour by experimentation.

2. Synthesis of composite

The various raw materials such as gelatin (200 g), coir fiber (20 g), epoxy resin (100 ml) and cellulose (40 g) were used for the fabrication of composite using hand lay method. The weight percentage of the coir fiber content varied from 2 to 6 %. Coir fiber is extracted from the coconut which is found in harder. Epoxy resin is a thermosetting polymer which is acted as matrices for fiber-reinforced composite and as structural adhesives. Due to consist

Abbreviations: ASTM, American Society for Testing and Materials; SN, Signal to Noise ratio.

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