

## **ABSTRACT**

Fiber-reinforced polymer composites have played a dominant role for a long time in a variety of applications for their high specific strength and modulus. Although glass and other synthetic fiber-reinforced plastics possess high specific strength, their fields of application are very limited because of their inherent higher cost of production. In this regard, an investigation has been carried out to make use of coir, a natural fiber abundantly available in India. Natural fibers are not only strong and lightweight but also relatively very cheap. In this project work describes the characterization and improvement of different properties of a new set of natural fiber based polymer nanocomposites consisting of coir as reinforcement, nanoclay and urea formaldehyde resin. The newly developed composites are characterized with respect to their mechanical characteristics. Experiments are carried out to study the effect of nanoclay variation on mechanical, moisture resistance, chemical resistance and thermal stability behavior of these urea formaldehyde based polymer nanocomposites. In the present work, coir fibers were treated by different techniques like dewaxing, alkali and silane treatment and by incorporating nanoclay composites were prepared and their different properties like mechanical, thermal, moisture and chemical resistance etc. were evaluated. Scanning electron micrographs obtained from fractured surfaces were used for a qualitative evaluation of the interfacial properties of coir/urea formaldehyde (UF) and nanoclay. These results indicate that coir can be used as a potential reinforcing material for many structural and non-structural applications. This work can be further extended to study other aspects of such composites like effect of fiber content, fiber orientation, loading pattern, fiber treatment on mechanical behavior of only coir based polymer composites.