



MSME Technology Facilitation Centre

(A Joint Initiative of Government of West Bengal and Council of Scientific and Industrial Research)



Jute fibre-reinforced Composite

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Improvement of Jute Fibre

In order to develop composites with better mechanical properties and environmental performance, it is necessary to impart hydrophobicity to the fibres by chemical reaction with suitable coupling agents or by coating with appropriate resins. Modification of jute and other natural cellulosic fibres can be done by following means:

- Chemical means
- Coating with polymeric solutions and
- Graft copolymerisation.

These treatments are expected to block the hydroxy groups of jute thus making the fibres more hydrophobic. These surface modifiers penetrate and deposit into lumens of cell wall of fibre, minimising the possible extent of moisture access.

Jute as a Natural Fibre

Jute is a natural fibre with golden silky lustre. It is the most important vegetable fibre after cotton, in terms of usage, global consumption, production, and availability. Due to its properties like high tensile strength, low extensibility, bio-degradable nature, recyclability and environmental friendliness this fibre is one of the most versatile natural fibres that have been used as raw materials for packaging, textiles, non-textile, construction, and agricultural sectors.

Jute Composite

Several non-traditional channels are being explored for the use of this fibre. One such avenue is in the area of fibre-reinforced composites. Such composites can be used as a substitute in a number of demanding applications. The jute composites can be very cost-effective material. Reports indicate that natural fibre can be good composites.

Jute Composite Applications

The jute composites may be used in everyday applications such as lampshades, suitcases, paperweights, helmets, shower and bath units. They are also used for covers of electrical appliances, pipes, post-boxes, roof tiles, grain storage silos, panels for partition & false ceilings, bio-gas containers, and as low cost building and construction material used in times of natural calamities.

Drawback: Moisture on Jute Fibres

A major drawback associated with the application of jute fibres for reinforcement of resin matrices is moisture on Jute Fibres. Due to presence of hydroxy and other polar groups in various constituents of jute fibre, the moisture uptake is high (approx. 12.5% at 65% relative humidity & 20o C) by dry fibre. This leads to

- Poor wettability with resin and
- Weak interfacial bonding between jute fibre and the relatively more hydrophobic matrices.

Thus, it is essential to pre-treat the jute fibre so that its moisture absorption is reduced and the wettability by the resin is improved.

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