Chapter 10
Banana Fiber Reinforcement and Application in Composites: A Review

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ABSTRACT

The growing awareness about sustainable development, environmental ecology and new legislations has led researchers to focus attention on bio fibres reinforced composites. In this field research has been done on many fibres but fibres such as banana, coir, bagasse, jute have gained importance in the recent decades. The main advantage of the natural fibre based composites materials being their low cost, easy availability, low density, acceptable specific properties, ease of separation, enhanced energy recovery, C02 neutrality, biodegradability and recyclability in nature. The attention is being given to the development of natural fibre composites is to explore value-added application avenues for their use and also for a sustainable and economical use of easily available natural material in hand. Agricultural waste is a very good example of such naturally available material and it can also be used to prepare composite materials for commercial use this has a very significant advantage over other natural fibres as its abundance and because of almost no cost.

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INTRODUCTION

Composites: A Definition

A composite material is defined as a material made by combining two or more materials to give a unique combination of properties, one of which is made up of stiff, long fibres and the other, a binder or 'matrix' which holds the fibres in place.

According to Jartiz 1965, "Composites are multifunctional material systems that provide characteristics not obtainable from any discrete material. They are cohesive structures made by physically combining two or more compatible materials, different in composition and characteristics and sometimes in form."

This definition is can be contradicted as it allows to any mixture of materials to be classified as a composite without specifying the laws which should distinguish it from other very banal, meaningless mixtures.

Beghezan (1966) defined as "The composites are compound materials which differ from alloys by the fact that the individual components retain their characteristics but are so incorporated together as such to take advantage only of their attributes and not of their short comings, in order to obtain improved materials."

Kelly (1967) stated that "the composites should not be regarded simple as a combination of two materials. In the broader significance; the combination has its own distinctive properties. In terms of strength, resistance to heat or some other desirable quality, it is better than either of the components alone or radically different from either of them."

Composites Constituents

Most composites consist of a bulk material referred as the "matrix" and a "reinforcement" of some kind. The reinforcement is added primarily to increase the strength and stiffness of the matrix.

Importance of Matrix in a Composite

A matrix material of composites is required to perform the following functions:

1. To bind together the fires of the reinforcement by the virtue of its cohesive and adhesive characteristics.
2. To protect the fibres from environment and handling.
3. To disperse the fibres to maintain the desired fibre orientation and spacing.