CHAPTER II
LITERATURE SURVEY

There are many reports detailing studies of the modification of natural fiber surface to improve compatibility of fiber with polymer matrix. Mukherjea *et al.* (1983) reported on the use of polyesteramide polyol resin as an interfacial agent for jute/epoxy composites. The resin was synthesized by melt condensation using a mixture of alkanolamines, polyethylene glycols, and dicarboxylic acids/anhydrides. With this resin, it was found that the use of optimum hydroxyl value and molecular weight of the resin significantly improved the water resistance capacity of the composites. Varma *et al.* (1989) reported on the comparison of the hybrid composites of glass/modified jute fabric and unsaturated polyester resin by modifying jute fabric with γ-aminopropyltrimethoxysilane, isopropyltriisosteroyltitanate, and tolylene diisocyanate. They found that only titanate-modified jute resulted in improvement in the mechanical properties and performance characteristics of the hybrid composites. Lekuthai (1990) synthesized 2-diallyamino-4,6-dichloro-1,3,5-triazine for use as a coupling agent for coir fiber and polyester resin. It was found that the modified coir fiber composites had better mechanical properties than the unmodified fiber composites. However, in comparison with glass-fiber reinforced composites, only the impact strength of modified coir-fiber composites was comparable to the glass fiber reinforced composites while the other mechanical properties were lower. Bledzki *et al.* (1996) reported on the many techniques for the modifications of natural fiber for composites. Devi *et al.* (1997) studied the mechanical properties of pineapple-leaf fiber-polyester composites by analysing the influence of fiber length, fiber loading, and types of coupling agent on the tensile, flexural, and

impact properties of the composite. Composites with good strength were obtained by using vinyltri (2-ethoxy methoxy) silane treated pineapple leaf fiber with unsaturated polyester resin. Maximum strength was obtained at 30 wt% fiber loading and 30 mm fiber length. Samai and Ray (1997) reported on the effects of chemical modifications on physicochemical behaviour of pineapple-leaf fiber. The modified fibers showed significantly increased hydrophobicity, improved mechanical strength, and moderate chemical resistance. Escamilla *et al.* (1997) studied the preparation and characterization of henequen cellulose grafted with methyl methacrylate and its application in the composite of poly(styrene-co-acrylonitrile) (SAN)/and poly(vinyl chloride) (PVC)/grafted fibers. They found that increasing the amount of the grafted PMMA increased the compatibility of the fibers with SAN and PVC.

In all these reports the modified fibers showed significant improvement in hydrophobicity. The mechanical strength of the composites also improved, indicating that there was an improvement in compatibility between the fiber and polymer matrix.

However, in most of these reports the methods that were used for fiber modifications were quite complicated with the need either to synthesize a new coupling agent or to carry out complicated reactions. It is, therefore, unlikely that they will find useful applications. Moreover, in all the studies there have been no attempts to study the nature of the interactions between fiber and polymer matrix which is the most important factor determining the strength of a composite.