CHAPTER 4

SUMMARY AND CONCLUSIONS

In the present study nano jute fibers were prepared by chemical and physical treatments. The nano jute fibers prepared were characterized by the FTIR and the surface morphology was evaluated by scanning electron microscopy (SEM) and field emission scanning electron microscopy (FE-SEM). Transmission electron microscopy (TEM) and atomic force microscopy (AFM) were done to find out the fiber diameter. The prepared nano jute fibers are reinforced into the epoxy polymer matrix. The mechanical properties, dynamic mechanical analysis, thermo gravimetric analysis, heat deflection temperature etc., were evaluated for the fabricated nano jute fiber reinforced epoxy polymer composites.

Chapter 1 gives the definition of composites, constituents, reinforcement, matrix material, natural jute and fiber reinforced composites, their classification along with the latest literature survey.

Chapter 2 is devoted to the experimental work and the chemicals used for the present study. The procedure involved in the conversion of macro jute fibers to nano jute fibers, and the fabrication procedure for the nano jute fiber reinforced epoxy composites are well explained. The analytical instruments used in the study have also been described in this chapter.

In Chapter 3, the spectral analyses such as the FTIR for raw jute and the nano jute fibrils are well discussed. The raw jute and nano jute fiber
reinforced epoxy polymer composites prepared with different wt. % of the fibers are discussed. Mechanical properties such as tensile strength, flexural strength, impact and hardness of the composites were determined according to ASTM standards, to learn about the fiber/matrix adhesion. The mechanical properties were found to be improved in the case of nano jute fiber reinforced composites than in the macro jute fiber reinforced composites. A Dynamic mechanical analysis was done to understand the effect of fiber modification on the properties of the composites. The Water absorption behaviour of the composites was also studied to investigate the interfacial interaction between the fiber and the matrix. The Interfacial interaction was found to be good for jute nano fiber reinforced composites. The Surface morphology and crystallinity of the composites were studied by the TEM and AFM. The XRD reveals the crystallinity of the composite method.