



CHAPTER IV

CONCLUSIONS

Similarly to the conventional fibrous reinforcements of biomass origins (paper, wood flour, cotton cloth, etc.) and coarse natural fibers of recent interests (sisal, henequen, palm fiber, or jute), coir fiber can also be used in reinforced thermosetting plastics.

2-diallylamino-4,6-dichloro-1,3,4-triazine, having two double bonds and two active chlorine atoms, was used for the modification of coir fibers. This coupling agent was synthesized from the reaction of cyanuric chloride and diallylamine. Using the Thurston method, the reaction occurred at low temperature, the product of which was obtained at 66 % yield. Another method, the modified reaction was performed at ambient temperature by adding dropwise of diallylamine to the cyanuric chloride solution to obtain the purer coupling agent at 93 % yield. This coupling agent was then characterized by infrared spectrometer, nuclear magnetic resonance spectrometer, mass spectrometer, and elemental analysis.

The coir fibers were treated with 2 %, 5 %, and 8 % acetone solution of the coupling agent and were then used as reinforcement for polyester composite by hand lay-up process; consequently, the glass fiber reinforced composite and the untreated coir fiber reinforced composite were also prepared in the similar way. The experimental results indicated the modified coir fiber composite had better mechanical properties than the unmodified coir fiber composites. It is indicated that coupling agent improves interfacial adhesion of the cellulose-polyester composites.

In comparison to glass fiber reinforced composites, the modified coir fiber reinforced composite showed the lower mechanical properties. However, the impact strength was comparable to that of the glass fiber reinforced composite. Applications of the modified coir fiber reinforced composites can be the products which do not need high strength such as housing products. Furthermore, the modified coir fibers can certainly be used as fillers in combination with glass fiber for reinforcement of unsaturated polyester resins, as it helps reduce costs of the composite. In addition, the optimum ratio of coir fibers to glass fibers should be furthermore pursued in order to provide excellent mechanical properties.



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