

## *Preface*

Effective and economic utilisation of organic waste materials as reinforcement in cheap thermosetting plastics was investigated in the present study. Oil palm fibres, a major waste material left unutilised in palm oil industry could be used to prepare high impact composite materials by reinforcing in phenol formaldehyde resin. These composite materials will have added advantages such as enhanced biodegradability, enhanced damping, cost effectiveness, light weight, good appearance, etc. Now-a-days the natural fibre reinforced plastic composites have emerged as a covetable substitute for other materials in automobile industry as well as in building industry.

Review on the recent developments in fibre reinforced composites along with the characterisation techniques of various composites is presented in Chapter 1. Chapter 2 describes the details of the materials used in this study along with the experimental techniques for sample preparation and characterisation methods. Important physical and chemical properties of oil palm fibres are investigated and discussed in Chapter 3. This chapter also deals with various modifications given to the fibres and their effect on their thermal and mechanical properties. The static mechanical properties of untreated and treated oil palm fibre reinforced phenol formaldehyde composites are given in Chapter 4. Chapter 5 gives the hybridisation effect of oil palm fibre with glass on the mechanical properties of the composites. Chapter 6 and Chapter 7 deal with stress relaxation and dynamic mechanical thermal analysis of the composites. Water sorption characteristics of the composites studied in detail and are given in Chapter 8. The composites were subjected to accelerated weathering studies and the changes in the properties are reported in Chapter 9. Electrical properties of the composites were determined and are illustrated in Chapter 10. The tensile properties of the composites were theoretically calculated and compared with the experimental results. This is presented in Chapter 11. Finally, the thesis concludes by giving the summary of the results obtained in the present work and an outline of the future prospects in this topic.