CHAPTER 3

RESEARCH OBJECTIVES

The principal objectives of the research work described in this thesis were:

1. A study of surface modification of polyester staple fibres, varying in substrate and geometry modified by alkaline hydrolysis and study of effect of prime treatment conditions on weight loss.

2. The effect of draw texturing parameters on the characteristics of polyester draw textured yarn as understood through alkaline hydrolysis.

3. The potential of alkaline hydrolysis to study the ageing mechanism of polyester partially oriented yarns.

4. An experimental investigation of the effect of spinning parameters on the behaviour of 100% polyester (from staple fibres) sewing thread using alkaline treatment as a tool for examining the changes in their structure.

5. The correlation between the extraction force and the mechanical properties of the laboratory made jute/polyester union fabrics.

7. An investigation of the effect of heat setting temperature, bath ratio, boiling water shrinkage and repeated hydrolysis on the low stress mechanical properties of 100% polyester dress material.

8. An application of multivariate analysis techniques (factor analysis, cluster analysis and principal component analysis) to analyse the mechanical properties of polyester dress material subject to alkaline hydrolysis.

Although weight reduction treatment of polyester dress materials has become popular, there seems to be some doubt over the use of optimum treatment conditions which should be employed to confer optimum handle properties. Thus, the thrust of the thesis is to explore this area of research.

A survey of the literature on the surface modification of polyester shows that a great deal of work has been done by the various research workers to impart silk feeling by different methods. The increased need for the satisfactory performance of the fabrics by the consumers and demand for the better performance of the fabric in the modern online garment manufacturing technology has necessitated more fundamental research to be carried out to correlate the basic geometrical and physical properties of fibres, yarns and fabrics to the mechanical properties.

An attempt has been made to explore the possibility of using alkaline hydrolysis as a tool to study (1) the structural aspects of polyester sewing thread behaviour spun under different spinning conditions (2) the ageing mechanism (3) the effect of draw texturing parameters on the performance of draw texturised yarns.