

### CHAPTER III

#### PURPOSE OF STUDY

The recent interest in acrylic products for textiles has indicated that acrylic acid and its esters are gaining importance as binders in printing and non-woven textiles and also as sheets. While the use of acrylamide has been emphasized for textile finishing to improve the performance of textiles.

Acrylamide finishing has been investigated under different conditions by different researchers in the Clothing and Textiles Department. Jain (60) used glyoxal and hydrogen peroxide as redox catalytic system with acrylamide. Acrylamide with glyoxal and mixed redox catalytic system using sodium thiosulphate, ammonium persulphate and hydrogen peroxide was used by Modi (80), who studied the improvement in the abrasive wear of textiles. The work by Kunzru (69) dealt with the use of acrylamide along with formaldehyde and epichlorohydrin with ammonium persulphate and hydrogen peroxide for its influence on the wash and wear characteristics of textiles.

Deshpande and Chavan (30) and Gardon (48) have reported that acrylamide improved the properties in cellulose. Sharma and Daruwalla (97) used other vinyl monomers along with acrylamide onto cotton using ceric ammonium nitrate.

The utility of acrylamide has been explored on cotton and cotton - polyester blends, its extension for finishing of wool and wool - cotton blend fabrics has been awaited.

Bereck and Kamein (7) found that acrylic copolymers improved tensile strength in wool fabrics and a good correlation between tensile strength and area shrinkage was noted. Lipson (72) used methacrylic acid to improve the shrink-resistance in wool fabrics.

It was expected that the performance of fabrics will be improved by applying acrylamide. As reported by Doshi and Varghese (31) wrinkle recovery and smooth drying properties can be imparted to cotton fabrics by applying acrylamide to introduce an amide group and then formaldehyde to form crosslinks.

Based on these concepts the work was planned to study the applications of acrylamide polymer finish. An attempt has been made to convert acrylamide - formaldehyde adduct, with a suitable catalytic system, into partially linear polymer to be linked with fibre molecules. Thus its influence on the shrink-resistance and other related properties of fabrics has also received attention, while utility on the garments (like skirts) has been studied in the later part.

It was expected that acrylamide, like other acrylic products is thermoplastic by nature and will give linear polymer. Better performance can be achieved by using formaldehyde which can introduce crosslinks, besides having reactions with amide group. Ammonium persulphate, sodium thiosulphate and hydrogen peroxide can serve as redox system. (Hydrogen peroxide, an additional oxidizing agent was used as it helped to reduce the yellowing

tendency). Trichloro acetic acid was introduced for durability of finish besides being a wet cure catalyst.



The specific objectives of the study were as follows :

1. To study the influence of acrylamide polymer finish on shrink-resistance of fabrics.
2. To study the influence of acrylamide polymer finish on other related properties of fabrics. These were :
  - (a) elastic recovery (b) tensile strength and elongation
  - (c) tearing strength (d) stiffness (e) wrinkle recovery
  - (f) appearance rating after wrinkling and ironing.
3. To study the effect of acrylamide polymer finish on pleat retention of fabrics.
4. To study the durability of acrylamide polymer finish on the fabrics.
5. To study the application of the acrylamide polymer finish for use on pleated garments, in particular.

Thus, on the basis of the previous researches conducted in the department and the related literature in this area, this project was planned. The main aim of this study was to see how the acrylamide finish prepared for this research can improve the properties of wool, cotton and their blend fabrics.