CHAPTER V

CONCLUSIONS

The present study dealt with the effect of various concentrations of thermoplastic and thermosetting finishes, like acrylic finish and DMDHEU finish on physical properties of cotton and polyester blend fabrics. While there were variations with some finished fabrics, the following general conclusions were drawn from the results of the present study.

1. The effect of different concentrations of acrylic and DMDHEU finishes was found to improve wrinkle recovery for cotton fabric A and 67/33 polyester/cotton fabric B, the influence of DMDHEU finish on wrinkle recovery was greater than the influence of acrylic finish. The effect of combination finishes of acrylic and DMDHEU indicated improvement in wrinkle recovery for cotton containing fabrics. A higher or similar amount of DMDHEU to acrylic finish showed more increase in wrinkle recovery. The polyester fabric C treated with different finishes showed no changes in wrinkle recovery.

   The effect of combination finishes with 5.0 percent concentration showed no appreciable difference in improving wrinkle recovery, as compared to the 2.5 percent concentration of the finish for fabrics A and

B. While with fabric D, a specific improvement in wrinkle recovery was noted with 5.0 percent concentrations of combination finishes as compared to 2.5 percent concentrations.

The influence of all the finishes was seen to be more with increasing cotton content in a fabric which was explained as the finishes reacting with cellulose. No effect was thus noticed on polyester.

2. The tensile strength of cotton fabric A and polyester/cotton fabric B increased with acrylic finish, while the effect of DMDHEU finish in these fabrics showed decrease in strength with increase in concentration of the DMDHEU finish. The loss in strength for fabric B was however less as compared to fabric A. The loss in tensile strength with DMDHEU finish was minimized with combination finishes. The loss in strength was minimum with greater or equal proportions of acrylic finish to DMDHEU finish. Polyester fabric C showed little change.

Combination finishes with higher concentrations (5.0 percent) helped cotton fabric A to reduce the loss in tensile strength, whereas combination finishes with lower concentrations (2.5 percent) served better for polyester/cotton fabrics B and D.

The DMDHEU finish cross-links the cellulose chains causing rigidity and so loss in strength. The acrylic finish caused apparent bridging up of the cellulose chains. Its presence however minimized the loss in strength when used in combination with DMDHEU finish.

3. The acrylic finish served to improve the elongation of cotton fabric A but did not improve elongation of polyester/cotton fabric B and polyester fabric C. The increase in concentration of DMDHEU finish lowered the elongation for cotton fabric A. No such loss in elongation was noticed for polyester/cotton fabric B, and polyester fabric C.

For cotton fabric A, a decrease in elongation was noticed with combination finish as compared to the unfinished fabric. For 67/33 polyester/cotton fabric B, elongation at breaking point was higher or similar. In the case of 50/50 polyester/cotton fabric D, elongation at breaking point was similar to unfinished one with higher or equal proportion of acrylic finish to DMDHEU finish.

It is interesting to note that acrylic finish acting as lubricant helped to improve elongation with increase in strength while the DHDHEU finish caused decrease in elongation with decrease in strength.

4. Acrylic finish has less influence in improving the appearance rating and ease of ironing as compared to that of DMDHEU finish. Polyester fabric C when treated at lower level of concentration (2.5 percent) of combination finish helped in improving the appearance rating in general.

The appearance rating values for cotton fabric were improved with greater or similar proportion of DMDHEU to acrylic finish. With fabric B, maximum improvement in appearance rating was noticed with equal or more proportion of DMDHEU to acrylic finish at the lower concentration (2.5 percent) of the combination finish. In the case of 50/50 polyester/cotton fabric D, finishes having 1:4 and 1:1 ratios of acrylic finish to DMDHEU finish at 5.0 percent concentration were found to be better to improve appearance ratings.

5. The changes in wrinkle recovery and in tensile strength were related to the acrylic and DMDHEU finishes. With increasing presence of DMDHEU finish a steady rise in wrinkle recovery was accompanied by a loss in strength. Acrylic finish in increasing amount not only helped to improve wrinkle recovery but also helped to retain or to improve tensile strength. The changes brought about by these two finishes were small for fabric B as compared to

fabrics A and D, which was due to the higher polyester content in fabric B.

Considering the various physical properties studied equal proportions of both the finishes namely acrylic and DMDHEU worked as optimum combination finish.

In the present study the activity of acrylic finish was known to be less as compared to the cross-linking activity of DMDHEU. Recently, self cross-linking or so called reactive acrylic finish (like polyacrylamide) are available. These can be as reactive as DMDHEU and a study of their combination for textile finishing will be quite interesting.