CHAPTER 5

CONCLUSION

Based on the above studies the following conclusions have been derived.

Angora rabbit hair has close range of ortho and para cortical cells with lesser percentage of cuticle cells than fine wools and Indian wools, while Indian wools have higher percentage of paracortical cells than fine wools.

Among the different chemical treatments on various wool fibers and Angora rabbit hair, protease enzyme and sodium hydroxide treatments are found to be suitable for the improvement of the performance properties of above wool fibers and Angora rabbit hair and their subsequent materials.

The Angora rabbit hair resembles its physio-chemical and mechanical properties with fine wool fibers and its modification with sodium hydroxide at fiber level leads to utilization of this fiber in value added textiles.

The sodium hydroxide treated Angora rabbit hair is blended with viscose rayon in 20:80 ratios and a blend yarn of 21.03’s with 24.48% coefficient of variation is spun in a cotton spinning system. The above said blend yarn was woven into a union fabric with cotton yarn as warp.

The properties of finished and unfinished union fabric resemble the desirable properties of a woven cotton fabric, in which Ceraperm-MW finished and S-SPG+C-MW+C-UP combination finished fabrics showed better softness and handle than other finished fabrics.
The application of natural ingredients such as aloevera, chitosan, and curcumin in combination form on pretreated cotton, wool and rabbit hair fiber substrates imparts antimicrobial activity in which the better antimicrobial activity is observed in aloevera combination than non-aloevera combination.

The aloevera+chitosan+curcumin combination treatment on pretreated cotton, wool and rabbit hair fiber substrates shows better antimicrobial activity and it stands up to 25 washings.

The application of protease enzyme treatment on wool/cotton union fabric improves their finishing performance as well as softness with moderate improvement in smoothness. The subsequent finishing treatment on enzyme treated fabric improves the above properties and the effect depends on the nature of the finishing agent.

The cellulase enzyme treatment influences the performance properties in warp direction, while protease enzyme treatment in weft direction of wool/cotton union fabric, which attributed that enzymes influence their corresponding fibre properties specifically and their successive applications influence the whole fabric properties.

The Savinase treated fabrics are showed better improvement in softness in both subjective and objective assessments, before and after finishing treatment than corresponding Papain treated ones. The finish add-on is higher in lipase treated fabrics than protease treated ones since Lipase enzyme modifies both cotton and wool fibrous substrates, while Savinase prefers wool substrates only.

The combination of a micro silicone emulsion with a cationic softener imparts better softening effect than other finishing combinations. The combined finishing treatment of nano polysiloxane emulsion, micro
polysiloxane emulsion and cationic softener with and without prior enzyme treatment shows better softening and handle properties than other finishing combinations. The Sandoperm-RPU based combination finishing treatment shows a slight reduction in softness in the finished fabric.

The wicking properties of the Sandoperm-RPU, Ceraperm-Aqua and their combination finished fabrics are better than other combination finished fabrics. The Synthappret-BAP+Ceraperm-CW combination finishing on Savinase treated fabric shows better shrink resistance and total hand value.

The β-cyclodextrin based combination finishing on cellulase enzyme treated fabric shows moderate shrink-resistance and total hand value. However, the antimicrobial character of the above fabric is good.

All the enzyme treatments reduce the tearing strength of fabric. However the tearing strength of the treated fabric retains with the subsequent finishing treatments except in Finish-VLF based finishing.

The bending stiffness is reduced after enzyme treatment(s) in both direction and further reduction in finishing treatment depends on the type of finishing chemical applied. The drapeability is improved only after enzyme treatment(s) followed by polysiloxane based finishing treatment.

It is concluded that Savinase 16.0L EX enzyme along with or without prior Bactosol-CA enzyme treatment followed by Ceraperm-MW based combination finishing on wool/cotton union fabric impart better aesthetic properties such as softness and handle properties (with cationic softener and polyurethane-based finishing) and functional properties such as shrink resistance and antimicrobial activity (with DMDHEU-based finishing and β-cyclodextrin-based finishing).
5.1 FURTHER WORK

1. The effect of enzyme treatment and subsequent chemical finishing on of wool: cotton fabric from intimate blend can be studied.

2. Beta-cyclodextrin based functional finishing on wool-based / specilaity hair fibre based products can be studied.

3. The application of natural antimicrobial agents in presence of Beta-cyclodextrin on woolen products can be studied.

4. The tailoring performance of this finished wool/cotton fabric can be studied in FAST System