CHAPTER 7

SUMMARY AND CONCLUSIONS

7.1 SUMMARY

Tencel is the first new fibre in 30 years, and it is the latest cohort of manmade cellulosic fibre shaped extremely advanced environment friendly and engineered technical process. Tencel fibres have made a special impact on the worldwide textile market since their appearance, and trends in the field of textile fibres and the necessity of increasing the research on analysis of tencel fibres potential for the garment sector, and especially for fashion. In 1992, tencel fibre was launched commercially and many research papers on the tencel silk, tencel cotton, tencel modal, tencel wool blends have been published in the literature. Nevertheless, considerable research work has been made out to study the viability of tencel and bamboo fibre for clothing application. A very little research work is available on comfort properties of tencel bamboo blends and this work examines these aspects in depth. Hence this research work provides valuable information on the comfort properties of the tencel/bamboo (eco-friendly cellulosic) single jersey knitted fabric with different blend proportions for the first time. In the development of this research work, it became ostensible that a considerable amount of work was required to fill up the gaps existing in the literature and for as this work also deals with an investigation of the tencel bamboo blended yarn properties on the comfort characteristics of single jersey knitted fabrics in depth. This research work will be an immense help to the investigators who are analyzing the comfort properties of single jersey knitted fabric for various dress wears.
CONCLUSION

The objective of this study is to investigate the relationship between blend ratio and yarn properties, thermal comfort, moisture management properties of tencel bamboo blends.

7.2.1 Effect of Blend Ratio on Yarn Properties

The following conclusions were obtained from the Chapter 4 study:

- An increase in the tencel content of tencel/bamboo blended yarns has a significant influence on the overall quality of the yarn in terms of yarn imperfections and mechanical properties, such as strength and elongation.

- The strength of 100% tencel yarn is more than tencel/bamboo blend yarn and 100% bamboo yarn. Elongation of bamboo yarn is more than 100% tencel yarn and tencel/bamboo blend yarn. Difference in fibre characteristics is the reason for this. When yarn unevenness is taken much difference is not seen. The observed variation is due to the variation induced by machine. It was also noted that the hairiness of bamboo yarn is lower than other yarns, close packing of tencel fibre makes the yarn diameter lesser when compared to pure bamboo and tencel/bamboo blended yarns. 100 % bamboo yarn is having lower frictional co efficient than other yarns.

- It would be advisable to blend tencel with bamboo to obtain the necessary fabric comfort properties rather than pure tencel, which has less desirable properties and is also not cost-effective.
7.2.2 Effect of Blend Ratio on Thermal Comfort

The following conclusions were obtained from the Chapters 5 study:

- The parameters of air permeability, thermal resistance, water vapour permeability and thermal conductivity are significantly affected by the fibre blend ratios. An increase in the tencel fibre content in the fabric affects the thermal comfort properties. The knitted fabrics made from tencel blended yarns have lower thickness and lower mass per square meter than the bamboo fabrics.

- The thermal conductivity of knitted fabrics reduces as the proportion of tencel fibre decreases in the yarn. The water vapour permeability and air permeability show concomitant increase as the proportion of tencel fibre increases.

- 100% tencel fabrics have higher air permeability and higher thermal resistance values compared with tencel/bamboo blended fabrics. As expected fabric with finer yarns showed higher air and water vapour permeability. As far as the thermal conductivity is concerned, the increase in loop length decreased the thermal conductivity and for the water vapour permeability, the loop length increased, the flow rate of water vapour also gets increased.
7.2.3 Effect of Blend Ratio on Moisture Management Characteristics

The following conclusions were obtained at from the Chapter 6:

- According to the results, it can be stated that, as the tencel content increases, maximum absorption rate increase, whereas the wetting time, maximum wetted radius, spreading speed and overall moisture management of the fabrics deceases. It is concluded from this study that increase in tencel content result in decrease in the fabric GSM. It means that with the increase in blend ratio, it takes less time to wet a knitted fabric. The highest OMMC values have been observed with the tencel fabrics when the results of the study are examined. This result indicates that the tencel fabrics have good moisture management property and quick water transfer ability compared to others. For the bamboo fabrics, AOTI values were found negative, and this result shows that the bamboo fabrics keep the liquid in their structure and give wet feelings to the user. According to the OMMC values, all the bamboo/tencel fabrics have been found in the same category and they were evaluated as “good” in moisture management.

In the view of the overall results obtained from the study, the thermal and moisture behaviour of the tencel/bamboo blended single jersey knitted fabric will pave the way for a new era in creating a very good market segment for the developments of innovation products with respect to clothing. And also, it is recommended that blends of tencel and bamboo in single jersey knitted fabrics be produced so as to have an optimum performance of comfort owing to the contribution on tencel fibre while keeping a completely natural
cool feeling. Tencel is most comfortable to wear, but, for this to be of most benefit, it is necessary to deliver this to the marketplace at affordable prices. The tencel fibre production process is proven to be extremely eco-friendly and tencel fabrics are particularly soft due to their smooth fibre surface, and it has cool to the touch and soft on the skin, which help to alleviate skin irritation. Tencel fibre definitely will come out on top in the future world textile market.

7.3 RECOMMENDATIONS FOR FUTURE WORK

This area of research work has broader scope for upcoming research and might result in innovative products in different clothing sectors with improved functional properties which will be useful for consumers. Further the work could be extended in the following area.

- For this research, the yarn remaining after testing is knitted in the structure of single jersey; the knitted fabrics are chemical process and then tested. Nevertheless, for the weaving of yarn with this blend, the requirements from yarns are more stringent than for knitting. In future, comparing the properties of woven fabrics woven with tencel/bamboo yarns can be developed for the hospital textiles.

- This research work has concentrated on single jersey knitted fabrics and this finding may not be applicable to other items such as sportswear and protective materials. It may conduct the same kind of study with the different production systems such as rotor spinning and compact spinning of tencel blended yarn with various knitted structures like rib, interlock etc..
- This research work has concentrated moisture management properties have evaluated in fabric stage without any treatment. It will be a good idea to evaluate the effect of surface modification (Plasma or other finishing) of inner layer tencel fabric in multilayer textiles and based on the performance of results, sportswear textile can be produced using multilayer textiles and studied further. This research work may be lead to a new product development.