Comparison & Development of Modal Polyester & Cotton Polyester Knitted Fabric for Sports Wear

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Abstract - The Textile industry is on its way in the development of novel fibers and fabrics for use in sportswear. Polyester holds a predominant position in the manmade fiber industry. Its simple manufacturing techniques, easy availability and versatile properties are the reasons for its dominance. However, certain drawbacks of polyester like poor moisture absorption, formation of static charge breathability restricts its application to sportswear. The advancement in manmade fiber technology has resulted in the development of revolutionary moisture management Modal fibers. Modal's Chemistry has been tailored to give a very soft and feel and the "cool" touch of premium Cotton without compromising on the performance. These Modal fibers possess all the characteristics and comfort of cotton with the durability of synthetics.

Keywords: Durability, Skin friendliness, Body-to-Fabric, Comfort of Modal

I. INTRODUCTION

It is in recent times, the outlook on sports has changed from considering it as leisure or an extracurricular activity to a vital part of day to day routine / activity. This change is due to the increasing awareness of sports and its ability in keeping the body and the mind fit. This has facilitated the need for development of sportswear to cater the requirements of the sports personnel.

Hence, this project attempts to develop active sports wears from 57% Modal, 38%Polyester, 5%Lycra jersey and 57% Modal, 38%Polyester, 5%Lycra interlock. It is then compared with 57%Cotton, 38%Polyester and 5%Lycra jersey fabric to show its superiority, and also to analyze the performance characteristics and comfort properties of the same. When these Modal fibers are combined with polyester they result in better properties for sportswear than cotton blends.

II. REVIEW OF RELATED CONCEPTS

Advantages of using modal:

2.1.1. Advanced moisture management properties:

Modal fibers are among the fastest wicking and fastest drying products in the market. The moisture management properties are permanent through the life of the garment and are not affected by wash and usage.

2.1.2. Durability of modal:

Repeated laundry and use of laundry chemicals have very little effect on Modified modal.

2.1.3. Cotton like feel:

Modal's Chemistry has been tailored to give a very soft and feel and the "cool" touch of premium Cotton without compromising on the performance.

2.1.4. Skin friendliness of modal:

Modal has been developed to have no negative effects on the skin like Irritation. Modal when combined with cotton brings out a smooth feel to the wearer and suits the body for sportswear utilities.

2.1.5. Body-to-Fabric" Micro-climate" of modal:

Modified Moisture Absorbent cotton has been designed with a multiple staple length – just like Cotton. This results in a micro-climate between the fabrics leading to faster cooling.

2.2. Comfort of Modal with Durability of a Synthetic-Best of Both Worlds:

Modal fabrics come from a family of new generation performance fabrics that have the durability and performance of synthetics such as regenerated cotton and yet retain the comfort and benefits of Cotton. These fabrics are designed to mimic the super soft feel and superior comfort offered by high-grade Cotton such as Pima.

With the addition of a bit of hydrophilicity by chemically modifying the base polymer, the problems associated have been avoided. The higher moisture regain in these polymers result in the "cool" feeling of Cotton. Again, the favorable hydrophilic-Lipophiulic Balance (HLB) avoids the oil pull from the ski surface and thus maintains the smoothness, softness and the "glow" of a healthy skin. The chemically modified polymers are also inherently anti-static, especially in cold and dry conditions where the propensity for static generation is more.

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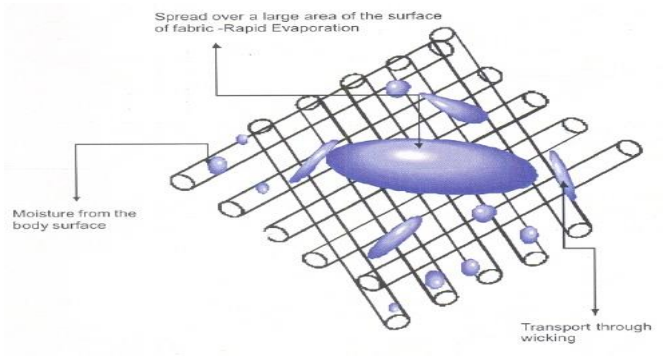


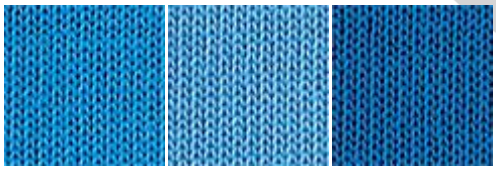
FIG 2.2 Hygroscopic nature of Modal Fabric

Modal based sportswear is sensual and soft, resilient and durable. It's naturally comfortable. And provides amazing stability throughout the life of the garment. It's kind to the skin, and gentle on the environment. This makes it precisely the right product for our time.

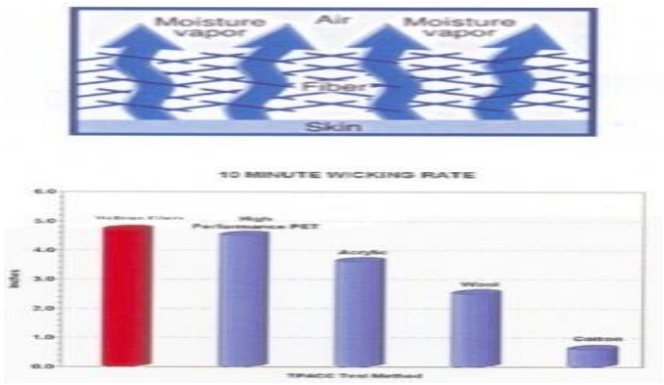
Modal needs lower heat for its double dyeing and finishing, so there's no stiffening of the fibers in the process. The result is an inherently soft, drapable fabric. One that takes less dyestuff, less energy, less water, less cost to produce. Modal is the first synthetic fiber that has the feel of the real.

2.3. Sportswear

Modal, a more sophisticated version of cotton is going to be a preferred fabric for sportswear. Modal is a fiber that puts comfort first, because it allows customers to engineer superior breath ability and wick ability into soft, natural-feeling fabrics. Through a unique patented polymer modification and the physical design of the fiber itself, Modal when combined with polyester and Lycra gives fabrics a fresher, softer, noticeably cooler feeling. This is why it showed superb comfort ratings and exceptional technical performance characteristics in both wear trials and laboratory testing.



2.3 KNIT STRUCTURE OF MODAL, VISCOSE AND COTTON



Objectives

- To produce weft knitted fabrics from 57%Modal 38%Polyester and 5%Lycra jersey , 57%Modal ,38%Polyester and 5%Lycra interlock and the same with cotton replacing modal.
- To develop sportswear from Modal / Polyester blends and to compare with cotton/polyester knitted fabrics of same parameters.
- To evaluate the sportswear in terms of performance characteristics like mechanical properties.

III. MATERIALS AND METHODS

INTRODUCTION

Modal being a versatile fiber, since it possesses all the required properties, it is invariably and most widely used for all apparel uses as like as cotton. Starting from the wears for just born babies to the people of old age, modal will be used mostly for clothing of all ages in various finishes and fashions. Modal fibers which have some special properties over Cotton is now being introduced to the market and needs to be studied in detail about their function for the analysis of low stress mechanical properties in comparison with Cotton.

SUMMARY OF MATERIALS AND METHODS:

Fibers involved - Modal, Polyester, Lycra, Cotton

Yarn produced - 100% Modal spun yarn- 40s Ne count

100% Cotton ring spun yarn- 40s Ne count.

Polyester - 160 denier continuous filament yarn.

Lycra - 40 denier.

Knitting structure - single jersey, interlock

BIOWASHING:

Bio-Gloss XL is applied to fabric / garment in soft flow, rotary drum washer with high mechanical action. The recipe is as follows.

Bio-Gloss XL	**: 0.75- 1% (on weight of garments)**
Lub Pro VX	**: 0.5-1 gm/ltr.**
Temperature	**: 55-60°C**
Ph	**: 4.5-5.5**
Time	**: 30-90 min.**

Results and Discussion

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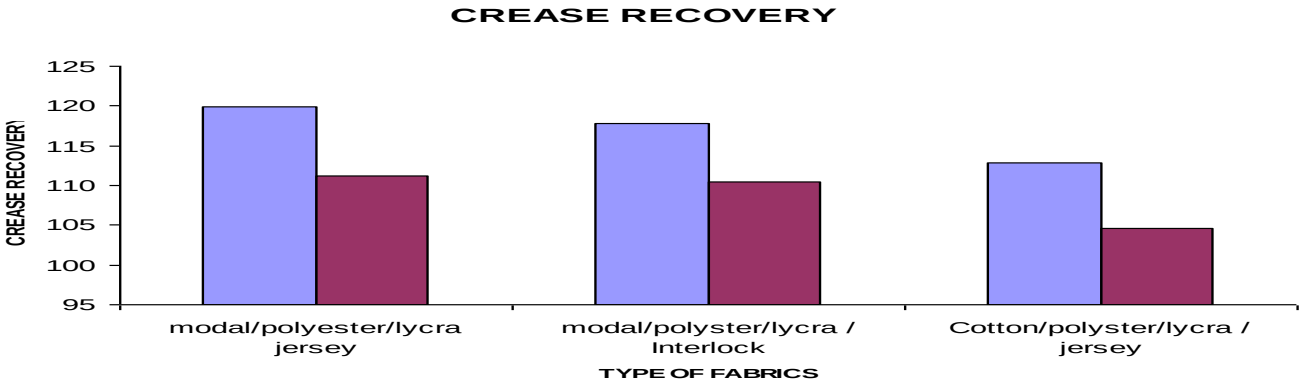
The Modal/polyester blends and Cotton/polyester blend fabrics made in this project are tested and studied for its fabric characteristics. They are discussed as follows.

IV. CREASE RECOVERY

The crease recovery test results of different ratios of blended fabrics are shown in the table 5.1

TABLE 5.1 CREASE RECOVERY

S.No	Type of fabrics	Crease recovery AATCC 66-2003	
		Course	Wales
1	modal/polyester/lycra jersey	119.9	111.2
2	modal/polyster/lycra interlock	117.8	110.5
3	Cotton/polyster/lycra jersey	112.8	104.6



V. CONCLUSION

The textile garment industries around the world progress rapidly in terms of increasing productivity, and shortening project time. Globally lots of research activities are being carried out in developing new apparel textiles with improved properties. Modal and its blends fabrics are the recently emerging trends in the field of textiles as compared to cotton.

From the results it can be concluded that:-

- 57% Modal 38% polyester 5% Lycra used sportswear is having higher bursting strength than 57% cotton 38% polyester 5% Lycra fabrics.
- 57% Modal 38% polyester 5% Lycra used sportswear is having higher crease recovery than 57% cotton 38% polyester 5% Lycra fabrics.
- Color fastness properties of Modal blends are significantly better than that of Cotton blends.
- Modal blends also stands similar to cotton blends in perspiration fastness.
- Modal blends when compared to cotton blends gives shrinkage and spirality.
- Modal blends also stands similar to cotton blends in water absorbency.
- Hence it can be concluded that 58% Modal 37% polyester 5% Lycra can easily replace 58% cotton 37% polyester 5% Lycra and 100% cotton in sportswear due to all better properties.

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