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# Effect of Different Pick Ratio of Polyester-Cotton and Cotton Yarn on Some Comfort Properties

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**Abstract:- This study is about the effect of some comfort properties on PC-Cotton fabric produced by keeping cotton as constant warp & having cotton and PC blend in weft with different pick ratio. It is observed that fabric having cotton as warp and polyester-cotton in weft is said to be best windproof fabric among all. It can be said that in fabric properties, anatomical difference has terrific part.**

***Keywords:-*** *Polyester Cotton blend, Woven, Comfort Property, Clothing Comfort.*

## I. INTRODUCTION

The foundational and ubiquitous wants of human being is comfort. But it is very hard to describe it. According to Fount & Hollies, "it counts non-thermal and thermal elements and is associated with wear affairs such as working, critical and non critical state".

The most judgmental factor in defining comfort is that, the motive of attire is to keep a constant body temperature, under unfavorable state. Factors affecting comfort analysis:

- Thermal Properties: conductivity, specific heat
- Moisture Related Properties: wet ability, wicking, moisture regain, and water absorption.
- Fabric Characteristics: construction, hand, stiffness, smoothness and roughness.
- Fiber Characteristics: staple length, crimp, cross – sectional shape.

The demand of regenerated cellulose based fibers has risen, due to high demand of cotton and low production rate to fulfill that demand worldwide. When comfort properties of regenerated cellulosic fiber is being compared then it is found that, viscose: tencel and viscose: modal blend gives best whereas viscose: cotton and viscose: bamboo blend gives lowest comfort properties values.[1]

Human's needs are changing day by day and as far as textile and apparel sector is concern, comfort has become very essential tool. There is several comfort properties are there like, thermal protection, air permeability, water resistance, water absorbance, size, etc. as demand for clothing comfort increasing the industrial sector is interested in using high fibers and fabric with new technologies[2.] On increasing the porosity rate, the air permeability of woven fabric is also increases.[3]

The fabrics with higher polyester content in polyester/ viscose blend yarn fabric give lower air permeability and high thermal insulation. Higher air permeability can be seen in lower pick density fabric. Plain fabric has lower value of air permeability and higher value of moisture vapour transfer than twill.[4]

The main characteristics of water absorption is, total quantity of water that can be absorbed irrespective of time and rate of water uptake. High absorbency fabric can be produced by taking finer, longer and hydrophilic fiber. Fabric structure is one of the main aspects in water absorbency.[5]

## II. METHODS AND MATERIALS

### *A. Materials*

Fabric is produced by using Polyester cotton blend in weft having blend ratio 65:35, of $34^s$ count in which polyester fiber has 1.2 denier and, 38 mm staple fiber where as cotton is having micronaire value 4. Yarn has blend ratio polyester to cotton 65:35. And cotton in warp.

Total 5 samples were made with cotton in warp, and cotton and PC in weft at different pick ratio and plain as weave. In sequence sample 1 has cotton : PC ratio1:1, sample 2 is made by taking cotton both in warp as well as in weft, sample 3 has cotton in warp and PC in weft, sample 4 has cotton : PC ratio 1:2 and sample 5 has cotton : PC ratio 2:1.

### *B. Methods*

Testing is done by standard test methods and at 27º C and 67% RH. Two comfort tests were examined. Air permeability was examined by ASTM D: 737 [pressure: 125 pa and test area: $38cm^2$] and Water Absorbency was examined by AATCC-79.

- *Air Permeability*

"The volume of air measured in cubic centimeters passed per second through $1cm^2$ of water is known as air permeability".

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- *Factors Affecting Air Permeability*

✓ Compactness
✓ Fiber Content
✓ Twist
✓ Resin Treatment

➢ *Water Absorbency*

Its main requirement is for towel, cleaning cloths, nappies, etc.

- *Factors Affecting Water Absorbency*

✓ Fabric Structure
✓ Fiber Type

Basic data of samples are given in table no. 1

| Sample No. | EPI | PPI | Warp Count (Ne) | Weft Count (Ne) {cotton/PC} | Warp Crimp (%) | Weft Crimp (%) |
|---|---|---|---|---|---|---|
| 1 | 73 | 35 | $20^s$ | $20^s$ /$30^s$ | 5 | 2 |
| 2 | 74 | 35 | $20^s$ | $30^s$ | 5 | 2 |
| 3 | 72 | 37 | $20^s$ | $20^s$ /$30^s$ | 5 | 2 |
| 4 | 74 | 40 | $20^s$ | $20^s$ /$30^s$ | 5 | 2 |
| 5 | 74 | 44 | $20^s$ | $20^s$ /$30^s$ | 5 | 2 |

Table 1

## III. RESULTS

*A. Air Permeability*

Lower the value, more windproof the fabric is said to be.

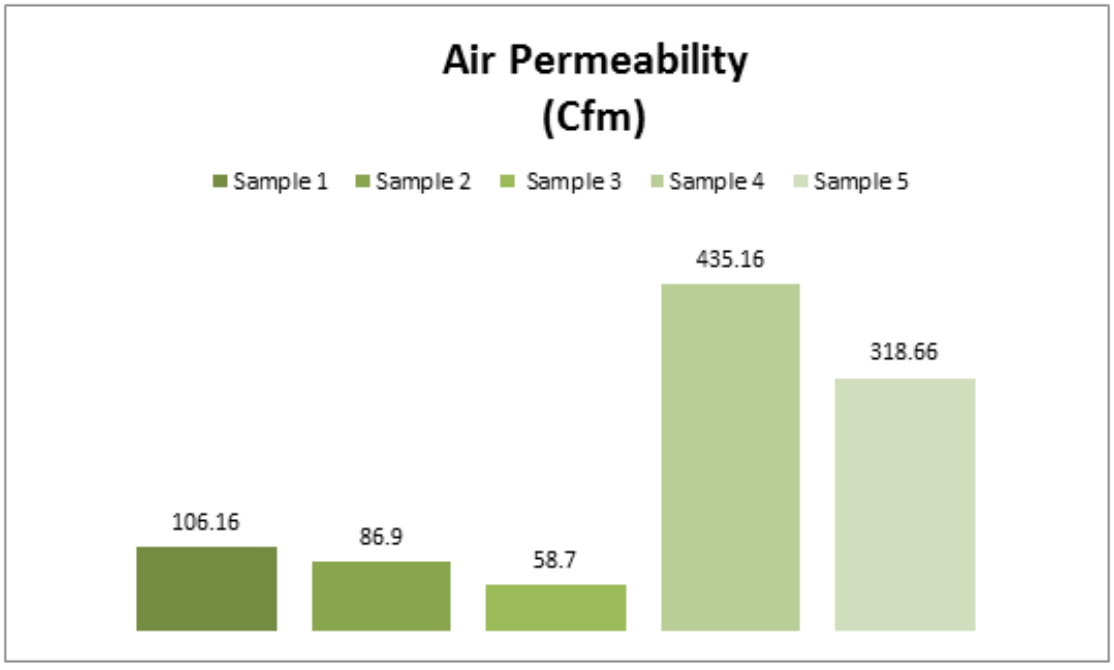


Fig 1

*B. Water Absorbency*

Sample having more value, can be said as more waterproof.

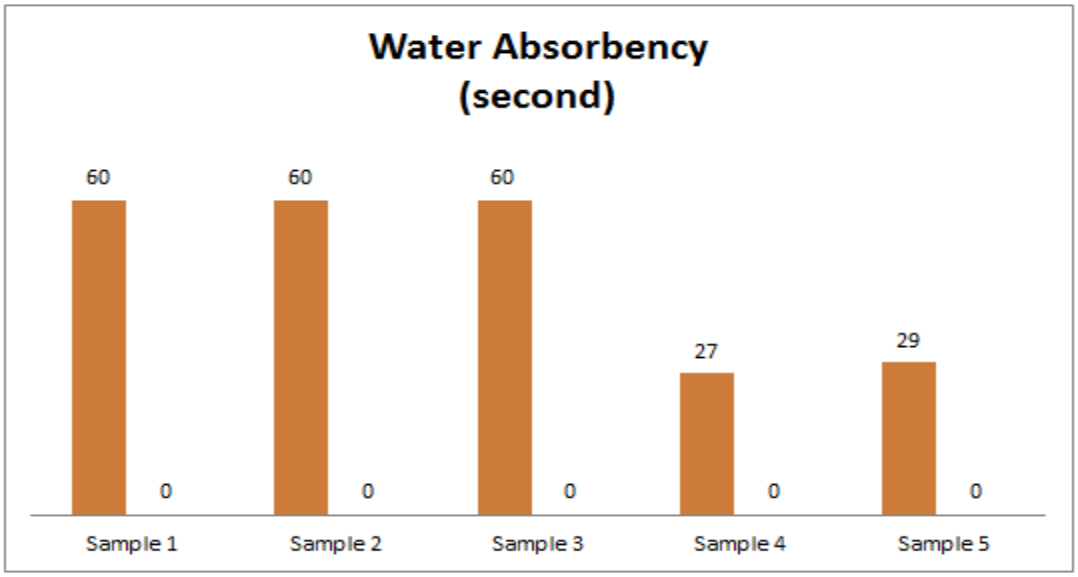


Fig 2

## IV. CONCLUSION

Significant difference in properties of fabric produced by keeping cotton ($20^s$) as constant warp and using polyester-cotton (65:35) and cotton in weft with different pick ratios has seen in this experiment. Total 2 comfort properties have been examined i.e., air permeability and water absorbency.

*A. Air Permeability*

Sample no 3 (which is prepared by cotton $20^s$ count as warp and polyester in weft) has lowest air permeability value, which means it permits the list amount of air to pass through it. And this test is used for fabrics having end uses in jackets, aerospace industry, military uniforms, etc.

*B. Water Absorbency*

Sample no1, 2 & 3 all showed best water absorbency among all 5, this test is useful for fabrics used in protective garments, sails, sports, packing material, technical textiles, etc.

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