International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

# Comparative Study on Finished and Unfinished UV Resistant Cotton Fabric

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**Abstract:** ***Cotton is a soft, fluffy staple fiber that grows in a boll, or protective case, around the seeds of the cotton plants of the genus Gossypium in the family of Malvaceae. The fiber is almost pure cellulose. Under natural conditions, the cotton bolls will tend to increase the dispersal of the seeds. The species typically occurs in humid forests and stream sides. The plant contains Ultra Violet (UV) resistant activity in nature. The grape seed was shade dried and powdered to the test the presence of UV resistant activity. Ultraviolet rays constitute a very low fraction in the solar spectrum but influence all living organisms and their metabolisms. These radiations can cause a range of effects from simple tanning to highly malignant skin cancers, if unprotected. Fabric UV protection ability highly depends on large number of factors such as type of fiber, fabric surface, construction, porosity, density, moisture content, type and concentration of dyestuff, fluorescent whitening agents, UV-B protective agents (UV absorbers), as well as nanoparticles, if applied. Previous study shows that UV protective finishing has done using many herbal leaves like curry leaves, betal leaves etc. This paper deals with the deleterious effects of UV index and protection against UV index through textile materials. In this study, the results of UV protecting ability according to AATCC 183 – 1999 will be discussed to show that standard clothing materials are not always adequate to prevent effect of UV-R to the human skin. The application of suitable finishing methods can be employed as UV protection fabrics. This study reveals the effect of UV resistant activity of the Vitis Vinifera (grape seed) extract on 100% cotton fabric.***

**Keywords:** UV protection, Cotton, Grape seeds

## 1. Introduction

Textile refers to any material made of interlacing fibres. Fabric refers to any material made through weaving, knitting, spreading, crocheting, or bonding that may be used in production of further goods garments, etc,.

Clothing is fiber and textile material worn on the body. The wearing of clothing is mostly restricted to human beings and is a feature of nearly all human societies. The amount and type of clothing worn in dependent on physical stature, gender, as well as social and geographic considerations.

Physically, clothing serves many purposes; it can serve as protection from the elements, and can enhance safety during hazardous activities such as hiking and cooking. It protects the wearer from rough surfaces, rash-causing plants, insect bites, splinters, thorns and prickles by providing a barrier between the skin and the environment. Clothes can insulate against cold or hot conditions. Further, they can provide a barrier, keeping infectious and toxic materials away from the body. Clothing also provides protection from harmful UV radiation. Anne Innis Dagg & Lee Harding (2012).

Cotton is widely accepted as a clothing material because it is readily available in most parts of the world and properties like durability, conduction of heat and moisture absorption. Its biodegradability is a great attraction. Unfortunately it has drawbacks like inflammability, poor wrinkle recovery and poor crease retention. It is prone to bacterial attack Hipler & Elsner, (2006).

Specialty finishes like Fragrance Release, Protective Finishes, Skin Care Additives, Insect Repellent, Deodorizing Fragrance, Antimicrobials, Flame Retardant Finishes, Cool Finish & Thermal Finish, Water Proofing Finish and UV Stabilisers.

Cotton is the most famous and most widely used fabric in the world because of its versatility and ability to provide good comfort, particularly in apparel items. Cotton is soft, natural, vegetable fiber obtained from the seed-pod of the cotton plant. The use of cotton is diverse such as apparel, home furnishings, towels, rugs, and sewing thread, etc.(http://www.fabrics-supplliers.com/fabric-definitons.htm)

Terms such as near UV ((290 – 400 nm), far UV (180 – 290 nm) and vacuum UV (below 180 nm) have been coined by physicists based on the properties of the radiation. The term UVA represents the region 320 – 400 nm, the term UV B represents the region between UV C and UV A, i.e. 290 – 320 nm, and UVC region represents the region below 290 m . The order of potency has been decided as UVC > UVB > UVA >. The proportion of the UV region is about 5 – 6 % of the total incident radiation, and the quantum energy of UVR is similar to the bond energies of organic molecules.

El Zaher N.A. et al, mentioned that UV radiation is one of the major causes of degradation of textile materials, which is due to excitations in some parts of the polymer molecule and a gradual loss of integrity, and depends on the nature of the fibres.

Grapes have been used for centuries to treat numerous conditions, according to the University of Maryland Medical Centre. The leaves of the vine were used to treat inflammation and pain, and the unripened grapes were used to soothe sore throats. The grape seeds are even beneficial, as they are the source of grape seed extract, which offers several of its own medicinal benefits. Grape seed extract is

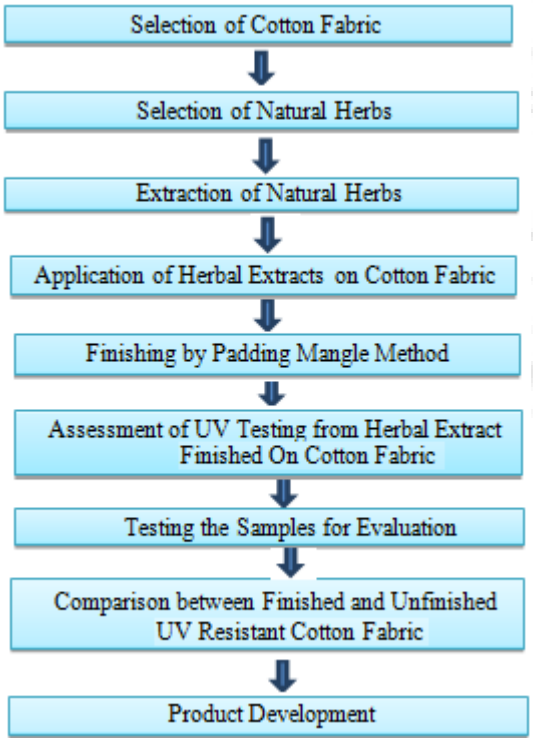
available in the form of liquid, capsules or tablets. For benefits to the skin, it can be taken internally or applied topically.

This project work will cover the use of natural dye from grape seed extract. The components in the grape seed used in UV protection.

**Objectives**

- To select the 100%cotton fabric.
- To identify and collect the natural herbs.
- To Desize the 100% cotton fabric.
- To apply the herbal extraction of grape seeds on 100% cotton fabric.
- To examine the natural dyeing dyeing properties of grape seed on 100% cotton fabric.
- To examine the UV resistant activity of finished 100% cotton fabric using the herbal extract.
- To evaluate the physical and chemical properties of finished fabric.
- To compare the UV resistant activity between finished and unfinished 100% cotton fabric.

## 2. Methodology




**Selection of Fabric**

Cotton has different kind of physical properties depending on its fineness and length of fibre. The hundred percent (100%) cotton is the most important of all natural fibre used by the world's textile industry. Cotton fabric is soften and comfortable to wear lose to skin because of its good moisture absorption qualities. Cotton fabric was purchased from Ukkadam, Coimbatore.

Cotton is probably one of the most common fabrics are likely to clothing. Cotton is a natural fibre and is used in a wide variety of clothing and home furnishing. Cotton is easily washed and dry cleaned. Cotton is a good strong fabric that is absorbent, and easy to work with. Cotton is a tendency to wrinkle very easily, so cotton began to

**Desizing**

Desizing is the term usually restricted to the process of removal of starch from the fabric. It is the first wet processing textile technology employed to remove the size material from the fabric. The 100% cotton fabric was kept in water in soaking condition over night.

**Selection of Natural Herbs**

*Vitis Vinifera* (Grape Seed) herb was selected for the experimental process. This is used to treat various health problems like heart diseases, cancer, skin diseases, hair problems, etc,. Grape seeds contain Ultraviolet resistant activity in nature.

**Grapes, Grape Seed & Grape Seed Extraction**

**Extraction of Natural Herbs**

The Grape seeds (Vitis Vinifera) were separated from the grape fruit manually. It was then dried, mixed in a blender and was sieved. The sieved powder was subjected to storage (Refrigerator) for further studies.

**Grape Seed Extraction**

Extraction was carried out by dissolving 6 grams of the grape seed powder in 100ml of 80% acetone, kept overnight under shaking condition using shaking Incubator. Then the extract was filtered using Whatmann no.1 filter paper, filtrate was collected and evaporated at room temperature. The concentrated extract was stored at 4 degree Celsius and used for further studies.

**Application of Herbal Extracts on Cotton Fabric**

The herbal extracts on textiles are an ancient technique of finishing in natural herbs. When exposed to skin, the natural

herbs are absorbed in to the body and may function as a means of providing skin infections, arthritis. It is also known to strengthen the immune system. Herbal extract treated cloth may help to treat skin diseases & arthritis. Herbal extraction finished textiles are 100% organic, completely free of synthetic chemicals and toxic irritants, eco-friendly and biodegradable.

**Shaking Incubator**

A shaker is a piece of laboratory equipment used to mix, blend, or to agitate substances in tubes or flasks by shaking them, which is mainly used in the fields of chemistry and biology. A shaker contains an oscillating board which is used to place the flasks, beakers, test tubes, etc. Although the magnetic stirrer has come to replace the uses of shaker lately, the shaker is still a preferred choice of equipment when dealing with such large volume substances, or simultaneous agitation is required.

**Padding Mangle Method**

**RECIPE**
Fabric : 100% Cotton
Quantity : 2 metre
MLR : 1:20
Herbal Powder : 160gms
Time taken : 5 minutes
Temperature : $160^0$C
Rpm : 20
Pressure : 3
Drying : Shade Drying

Padding is one of the most familiar machines for use in dyeing, pre-treatment or finishing. It is used for application of chemicals or even dyes to the fabric in a uniform manner in open width form.This machine is used in continuous and semi-continuous methods of chemical/dye application to fabrics. It is suitable for application of low substantively dyes or chemicals to fabrics.

**Finishing of 100% Cotton Fabric Sample**

**Procedure**
The 100% cotton woven fabric was finished with the prepared acetonic grape seed extract according to the following:

**Recipe**
Fabric : 100% cotton
Finishing method : Padding mangle
Citric acid : 8%
Pressure : 3psi
Wet pickup : 100%
Temperature : $160^0$C
Time : 5min
Rpm : 20

The fabric sample was finished with the prepared extraction using padding method. The fabric was padded with 8% citric acid in a padding mangle at a pressure of 3 psi with 100% wet pickup followed by drying and curing at 160°C for 5 min and at different 20 rpm speed.

**Natural Dyeing**
While finishing the fabric using grape seeds, it also exhibited dyeing property to the fabric. The colour obtained was Pine 203 (pantone colour). The colour fastness test and perspiration test has been evaluated for the assessment of dyeing property. Natural dyes are comprised of dyes and pigments that are obtained from various parts of plants including roots, bark, leaves, flowers, and fruit. The major applications are colouring of food, leather, wood, and natural fibers like wool, silk, cotton, and flax. Natural dyes may have a wide range of shades. Dyeing with natural dyes, however, normally requires the use of mordants, which are metallic salts of aluminium, iron, chromium, and copper, among others, to ensure a reasonable colour fastness to sunlight and washing

**Assessment of UV Testing of Herbal Extract Finished On 100% Cotton Fabric**

**UV/V Spectrophotometer**
Ultraviolet–visible spectroscopy or ultraviolet-visible spectrophotometry (UV-Vis or UV/Vis) refers to absorption spectroscopy or reflectance spectroscopy in the ultraviolet-visible spectral region. This means it uses light in the visible and adjacent (near-UV and near-infrared [NIR]) ranges. The absorption or reflectance in the visible range directly affects the perceived colour of the chemicals involved. In this region of the electromagnetic spectrum, atoms and molecules undergo electronic transitions. Absorption spectroscopy is complementary to fluorescence spectroscopy, in that fluorescence deals with transitions from the excited state to the ground state, while absorption measures transitions from the ground state to the excited state.

**UV/V Spectrophotometer**

**Principle Of Ultraviolet-Visible Absorption**
Molecules containing π-electrons or non-bonding electrons (n-electrons) can absorb the energy in the form of ultraviolet or visible light to excite these electrons to higher anti-bonding molecular orbitals. The more easily excited the electrons (i.e. lower energy gap between the HOMO and the LUMO), the longer the wavelength of light it can absorb. Based on the fact of four type of transition- π-π*,n-π*,σ-σ*,n-σ*.The energy required for various transitions obey the following order σ-σ*>n-σ*>π-π*>n-π*.

**UV testing by AATCC 183 – 1999**
The ultraviolet protection of a fabric is expressed by the Ultraviolet Protection Factor (UPF). The UPF evaluates the reduction in the amount of the UV radiation that passes through the fabric to the skin. For example, when a fabric

has an UPF of 20, only 1/20$^{th}$ of UV radiation reaches the skin. UV transmittance through the fabric samples was determined within a wave length range from of 280 to 400 nm using a Shimadzu UV/Vis Spectrophotometer. The standard method used for determining the UPF was AATCC 183 – 1999 (Transmittance or Blocking of Erythemally weighted Ultraviolet Radiation through fabrics).

The AATCC (183-1999) Transmittance or Blocking of Erythemally weighted Ultraviolet Radiation through fabrics using Shimadzu UV/Vis Spectrophotometer in 100 to 400 nm wavelength. The standard UPF ratings are given below:

15 to 20 - Good - 93.3-95.9%
25 to 35 - Very Good - 96-97.4%
40 to 50 - Excellent - 97.5% or more

**Evaluation**
Objective assessment attempts to find the relationship between fabric hand and some physical, mechanical, comfort and colour fastness properties of a fabric objectively. It quantitatively describes fabric using translation result from some measured values of relevant attributes of a fabric. Techniques used for objective hand evaluation are by special instrument for measuring properties of fabric.

**Assessment of Fabric Weight**
The fabric weight is also expressed as mass per unit area and weight per unit length. The weight of the fabric can be described in two ways, either as the "weight per unit area" or "Weight per unit length".Electronic weighing balance was used to determine the fabric weight. The samples were out by using a GSM cutter and weighed using a electronic weighing balance.

**Assessment of Tensile Strength**
The strength of a material under tension on distinct from compression, fusion or shear.The sample was prepared to determine the tearing strength for both warp and weft yarn.

**Cut Strip Method**
Cut 5 specimens of size 12"x2" along warp direction and 5 specimens along weft direction from the given fabric sample. Ensure that the threads of sample run through full length till clamping and accuracy of width gauge length should be 75mm.

**Assessment of Abrasion Resistance Test**
Abrasion is the earing a way of any part of a material by rubbing against another surface. It is stated in terms of number of cycles on a specified degree or amount of abrasion. Standard test method ASTM D 4966-98 was used to determine the abrasion resistance of textile fabric using Martindale abrasion tester (modal GT-7012-M).

**Assessment of Tearing Strength**
The resistance offered by a textile material when it is subjected to sudden force is generally termed as tearing strength. Each specimen of warp set should have different warp yarns and each specimen of weft set should have different weft yarns.Prepare at least five specimens of each type.

**Assessment of Pilling Test**
The entanglements of fibres generally termed as pills, Stands protruding on the fabric surface during wear and tear. A test to assess the property of pills to form & or to be retained on the surface of a fabric when it is subjected to specified conditions is called pilling test.

A specimen (125mm x 125mm) is cut from fabric (2 for warp and 2 for weft).All the four samples are then tumbled together in a cork-lined box 9" x 9" x 9" and allowed for required revolution cycle. The specimens are taken out and removed from rubber tube and rated. Also, pilling is mainly due to fibres with very high "lateral strength" or "bending strength" or "low brittleness".

**Assessment of Spray Test**

**Test Specimens**
Five test specimens 180.0 × 180.0 mm (7.0 × 7.0 in.) are needed and should be conditioned at 65 ± 2% relative humidity and 21 ± 1°C (70 ± 2°F) for a minimum of 4 h before testing. Where possible, each specimen should contain different groups of length- wise and width wise yarns.

**Colour Fastness to Washing**
Washing fastness of fabric samples dyed with natural dyes was analysed by ISO method. A test specimen of 10 x 4 cm was stitched along with the multi-fiber adjacent fabric. The composite specimen was agitated with preheated (40$\pm$2$^0$C) soap solution (5g/l) of MLR 1:50 and stainless steel balls added and agitated for 30 minutes in the rotary shaker (42 rpm). Then the samples were rinsed and shade dried. The change in colour of the specimen and the staining of the adjacent fabrics were assessed with grey scale.

**Colour Fastness to Rubbing**
Rubbing fastness was analysed by ISO 105 x 12 method. The device used to test rubbing fastness was "Crock meter". It has finger of 1.0 cm diameter moving to and fro straight line over a 10$\pm$0.30 cm track on specimen with downward force on 9N.

Dry and Wet crocking test was performed by a 5 x 13 cm piece of dyed sample and placed it on the base of crock meter with its long dimension in direction of rubbing. Place specimen holder over specimen as an added measures to prevent slippage. Mount a white test cloth square over the end of finger which projected downward weighted sliding arm. Lower the covered finger on to the test specimen. Set and run the motorized tester for 10 completions. The white tested cloth square was removed and colour transferred to white tested cloth was assessed by a comparison with grey scale for staining.

**Colour Fastness to Sunlight**
A test specimen of 1 x 6 cm was wound closely on a card and was mounted in the exposure rack. The rack was placed at an angle of 45$^o$C. The rack was exposure to sunlight. The samples were evaluated for colour change after 24 hours of exposure using grey scale. The colour fastness to sunlight of specimen was evaluated by comparison of colour change of the exposed portion to the masked control portion of test

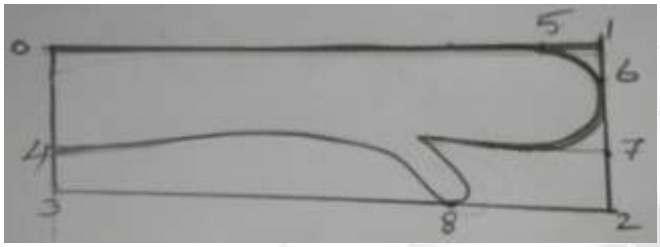
specimen or unexposed original material, using ISO Grey scale for colour change and gradation was noted on the extent of fading.

**Construction of Gloves**

**Gloves**

**Drafting Procedure**

**Gloves Pattern**




Square lines from 0.
0-1, 2-3 = hand length + 1.5cm (1/2")
0-3, 1-2 = hand width + 1.5cm (1/2")
0-4 = ½ elbow + 1.5cm (1/2")
5 = short finger length
6 = mid-finger length + 1.5cm (1/2"). Join 5-6
7-2 = distance between mid-finger and thumb finger + 1cm (1/4")
8 = thumb finger + 1.5cm (1/2"). Join 8 to 4.

**3.6.10.3 Construction Details**

- The length of the hand was traced on the brown sheet of paper.
- The paper pattern was cut using the measurement traced.
- Then the paper pattern was placed on the fabric.
- The fabric was cut along the placed paper pattern.
- After cutting, the fabric was pinned together, so that it should not be displaced from its position.
- Stitch along the seam from top of the hand length towards the palm side.
- After joining the two pieces, elastic to be attached at the top of the gloves.
- Take $1/4^{th}$ of the measurement of gloves open circumference for elastic.
- Stretch the elastic and complete the stitching inside out.
- Top stitch was given and finished.
- The product was pressed and packed.

This product is eco-friendly as well as commercially affordable. Therefore, it can be developed for marketing purpose.

**Plate XVII:** Final Product of Gloves

## 3. Results and Discussion

**UV Resistant Activity Assessment Test Method**

The ultraviolet protection of a fabric is expressed by the Ultraviolet Protection Factor (UPF). The UPF evaluates the reduction in the amount of the UV radiation that passes through the fabric to the skin. The 100% cotton woven fabric was finished with the prepared acetonic grape seed extract according to the following recipe. The fabric sample was finished with the prepared extraction using padding method. The fabric was padded with 8% citric acid in a padding mangle at a pressure of 3 psi with 100% wet pickup followed by drying and curing at 160°C for 5 min and at different 20 rpm speed.

It was observed that the 100% cotton fabric finished with grape seed extract showed UPF range of 32 and the % UV radiation blocked was obtained as 96.2%. Therefore, the exhibited protection category was Very Good.

**Evaluation of Physical Testing**

**Fabric Weight (GSM)**

**Table 1:** Fabric Weight (GSM)

| S.No | Samples | GSM |
|---|---|---|
| 1. | Unfinished fabric | 1.028 |
| 2. | Finished fabric | 1.084 |

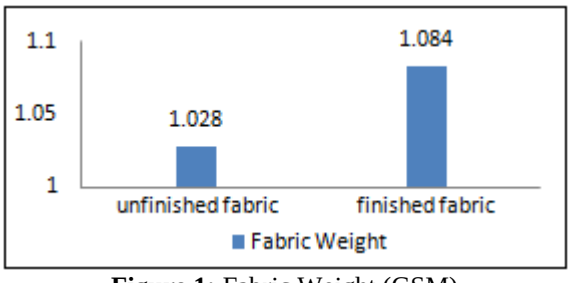



**Figure 1:** Fabric Weight (GSM)

From the above Table-I & Figure-I, it was observed that the Fabric Weight of Finished fabric was greater than Unfinished fabric.

**Abrasion Resistance (GM)**

**Table 2:** Abrasion Resistance (GM)

| S.No | Samples | Abrasion resistance |
|---|---|---|
| 1. | Unfinished fabric | 95.46% |
| 2. | Finished fabric | 92.28% |

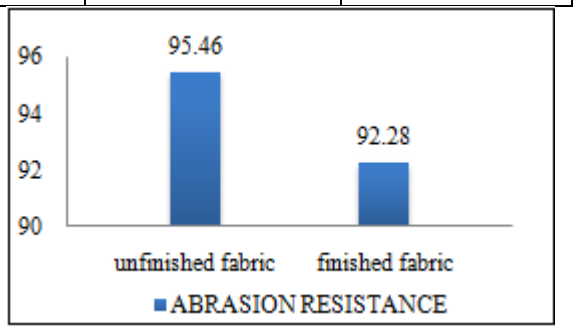



**Figure 2:** Abrasion Resistance (GM)

From the above Table-II & Figure-II, it was observed that the Abrasion Resistance of Unfinished fabric was greater than Finished fabric.

**Tearing Strength**

**Table 3:** Tearing Strength (GF)

| S.No | Samples | Tearing Strength(gf) |
|---|---|---|
| 1. | Unfinished fabric | 262.4 |
| 2. | Finished fabric | 265.6 |

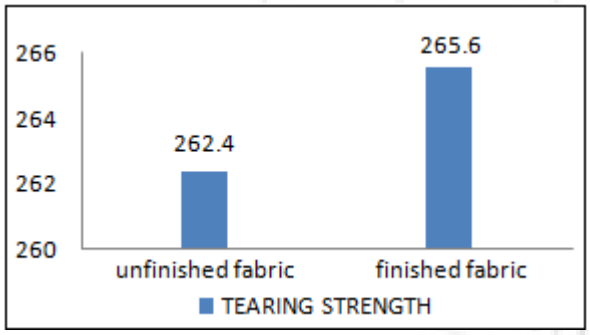



**Figure 3:** Tearing Strength (GF)

From the above Table-III & Figure-III, it was observed that the Tearing Strength of Finished fabric was greater than Unfinished fabric.

**Tensile Strength**

**Table 4:** Tensile Strength (KGF)

| S.No | Samples | Warp force(kgf) | Weft force(kgf) |
|---|---|---|---|
| 1. | Unfinished fabric | 16.32 | 12.78 |
| 2. | Finished fabric | 16.01 | 12.28 |

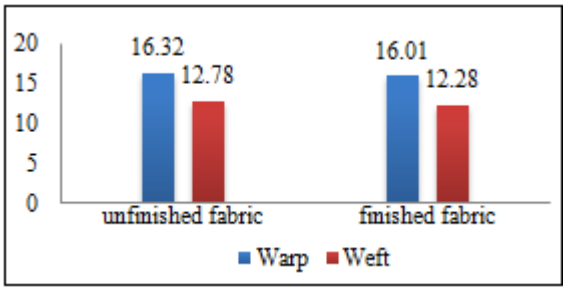



**Figure 4:** Tensile Strength (KGF)

From the above Table-IV & Figure-IV, it was observed that the Tensile Strength of Unfinished fabric was greater than Finished fabric for both warp force and weft force.

**Pilling Test**

**Table 5:** Pilling Test Grade Marks

| S.No | Samples | Warp rating | Weft rating |
|---|---|---|---|
| 1. | Unfinished fabric | 4 | 4.5 |
| 2. | Finished fabric | 4.5 | 5 |

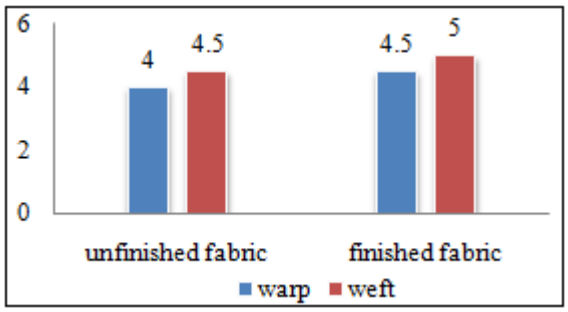



**Figure 5:** Pilling Test

From the above Table-V & Figure-V, it was observed that the Pilling of Finished fabric was greater than Unfinished fabric for both warp rating and weft rating.

**Spray Test**

**Table 6:** Spray Test Assessment

| S.No | Samples | Spray test |
|---|---|---|
| 1. | Unfinished fabric | 49 |
| 2. | Finished fabric | 48 |

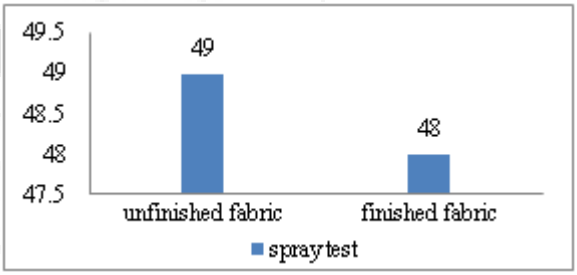



**Figure 6:** Spray Test

From the above Table-VI & Figure-VI, it was observed that the assessment of Spraying of water in Unfinished fabric was greater than Finished fabric.

**Colour Fastness to Washing**

The colour fastness to washing of the dyed sample was determined according to ISO 105-C06 in a Laundro-Meter.

**Table 7:** Colour Fastness To Washing At $40^0$C (ISO 105-C06 AIS: 1994)

| Samples | Colour staining of multi-fibers | | | | | |
|---|---|---|---|---|---|---|
| | Cotton | Acetate | Nylon | Polyester | Acrylic | Wool |
| 1 | 4.6 | 4.3 | 4.4 | 4.3 | 4.5 | 4.2 |

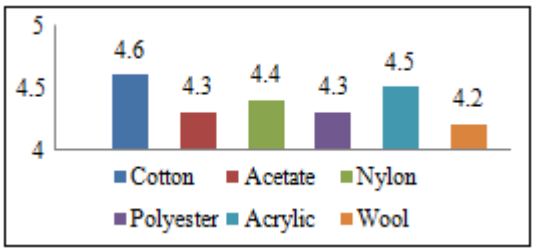



**Figure 7:** Colour Fastness to Washing

From the above Table-VII & Figure-VII, it was observed that the cotton fabric was greater than other fabrics namely acetate, nylon, polyester, acrylic and wool.

**Colour Fastness to Dry Crocking**

The colour fastness to rubbing (Dry & Wet) of the dyed samples are determined according to ISO 105-X12 by using crock meter and relevant grey scales.

**Table 8:** Colour Fastness To Dry Crocking (ISO 105-X12: 2001)

| S.No. | Dry Crocking |
|---|---|
| 1 | 4.5 |

From the Table-VIII, it was observed that the colour fastness to Dry Crocking was found as Very Good.

**Colour Fastness to Wet Crocking**

The colour fastness to rubbing (Dry & Wet) of the dyed samples are determined according to ISO 105-X12 by using crock meter and relevant grey scales.

**Table 9:** Colour Fastness to Wet Crocking (ISO 105-X12: 2001)

| S.No. | Wet Crocking |
|---|---|
| 1 | 4.3 |

From the Table-IX, it was observed that the colour fastness to Wet Crocking was found as Very Good.

**Colour Fastness to Sunlight**

The colour fastness to rubbing of the dyed sample was determined according to ISO 105-B02.

**Table 10:** Colour Fastness To Sunlight (ISO 105-B02)

| Samples | Sunlight (24 Hours) |
|---|---|
| 1 | 4.2 |

the Table-X, it was observed that the colour fastness to sunlight was found as Very Good.

**Ultraviolet Protection Factor**

The cotton fabric was dyed in Grape seed extract and their Ultraviolet Protection Factor was examined by UV/V Spectrometer.

**Table 11:** UPF Value And Protection Class Of Cotton Fabric Dyed With Grape Seed Extract

| S. No. | Fabric Sample | UPF Range | % UV Radiation Blocked | UV Protection Category |
|---|---|---|---|---|
| 1 | Grape seed extract Finished Cotton woven fabric | 32 | 96.2 | Very Good |

Table-XVI shows that the UPF value and protection class of the cotton fabric dyed with the grape seed extract. The dyed sample of cotton fabric showed the UPF rate of 32 (96.2%), exhibited as "Very Good & Considered the Ultimate in UV Sun Protection". It was observed that the cotton fabric dyed with the grape seed extract has Very Good UV Resistant in it.

## 4. Summary and Conclusion

The Natural dye was prepared from Grape Seed using Padding extraction method. The UV absorption property was examined by UV/V Spectrophotometer. The dyed sample was undergone colour strength, UV protection test and UPF rating. Natural dyes are better than the synthetic dyes since natural dyes are more useful for decreasing the environmental pollution. The Pine 203 was obtained along with this finishing as natural dye. Grape seeds exhibit both natural finishing & natural Dyeing. Thus the above finding indicates there is a good scope to produce UV protective cotton fabrics using natural dyes.

## 5. Findings of the Study

1) From the UV resistant activity assessment test method it was concluded that the exhibited protected category was Very Good.
2) From the Table I & Figure I, it was concluded that GSM of finished fabric was greater than unfinished fabric.
3) From the Table II & Figure II, it was concluded that Abrasion Resistance of unfinished fabric was greater than finished fabric.
4) From the Table III & Figure III, it was concluded that Tearing strength of finished fabric was greater than unfinished fabric.
5) From the Table IV & Figure IV, it was concluded that Tensile strength of unfinished fabric was greater than finished fabric.
6) From the Table V & Figure V, it was concluded that Pilling of finished fabric was greater than unfinished fabric
7) From the Table VI & Figure VI, it was concluded that the assessment of Spraying of water in unfinished fabric was greater than finished fabric.
8) From the Table VII & Figure VII, it was concluded that colour staining of finished fabric with Multifibre showed the greater towards cotton than other fabric samples.
9) From the Table VIII, it was concluded that the colourfastness to dry crocking of finished fabric was very good.

10) From the Table IX, it was concluded that the colourfastness to wet crocking of finished fabric was very good.
11) From the Table X, it was concluded that colour fastness to sunlight (24 Hours) of finished fabric was very good.

*Vitis Vinifera* family Vitaceae, commonly known as grapes & Grape Seed, is a species of vitis, is an important medicinal plant. Its native to the Mediterranean region, central Europe, and southwestern Asia, from Morocco and Portugal north to southern Germany and east to northern Iran. The fruit is a berry, known as a grape in the wild species it is 6 mm (0.24 in) diameter and ripens dark purple to blackish with a pale wax bloom; in cultivated plants it is usually much larger, up to 3 cm (1.2 in) long, and can be green, red, or purple (black). The species typically occurs in humid forests and stream sides. The plant contains Ultra Violet (UV) resistant activity in nature. UV Resistant Finishing on 100% Cotton fabric by using Padding Mangle method.

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