

DEVELOPMENT OF GIRARDINIA DIVERSIFOLIO FABRIC

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INTRODUCTION

Textiles found a place in every society around the world has been a part of so many different cultures and lives. Textiles are central to our lives and are at the heart of the world's largest industries. Over the past few decades a new textile world has emerged where new fibres, new fabrics and new finishes make new demands for understanding and evaluation. The production of textiles is an ancient art, whose speed and scale of production has been altered almost beyond recognition by mass-production and the introduction of modern manufacturing techniques. Girardinia diversifolio fibers are finer than those of hemp, and can yield a fabric comparable to and even softer than cotton. Girardinia diversifolios are widely diffused throughout both tropical and temperate climates. Girardinia diversifolio is described as the only efficient cotton substitute. In Austria, also, Girardinia diversifolios were cultivated on a large scale. The length of the Girardinia diversifolio fibre varies from 3/4 inch to 2 1/2 inches: all above 1 3/8 inch is equal to the best Egyptian cotton. It can be dyed and bleached in the same way as cotton, and when mercerized is but slightly inferior to silk. It has been considered much superior to cotton for velvet and plush. Cotton is also ideal for blending with natural and manmade fibers.

PROPERTIES OF GIRARDINIA DIVERSIFOLIO FIBER

According to the opinion of Charlotte (1989) Girardinia diversifolio fibers have special characteristics in the fact that they are hollow which means they can accumulate air inside thus creating a natural insulation. To create cool fiber for summer the yarn lengths are twisted closing the hollow core and reducing insulation. In winter with a low twist the hollow fiber remains open maintaining a constant temperature.

METHODOLOGY

The sequential steps to create the Girardinia diversifolio cotton fabric

- Harvesting the Girardinia diversifolio plant
- Extraction of Girardinia diversifolio Fibre
- Blending, Opening and Cleaning
- Carding Process
- Drawing Process

- Spinning Process
- Warping and Sizing Process
- Reeling Process
- Weaving Process

HARVESTING THE GIRARDINIA DIVERSIFOLIO PLANT

Girardinia diversifolio is found in the tropical regions like Nilgiris and Anamalai Hills and Himalayas. Stinging Girardinia diversifolio (Girardinia Heterophylla) is a perennial plant found in temperate and tropical wasteland areas. The plant is characterized by pointed leaves and white to yellowish flowers. The plant for the study was collected from the forest of Kotagiri. The stem of the plants are cut 10 cm above the ground.

EXTRACTION OF GIRARDINIA DIVERSIFOLIO FIBRE

The leaves are removed from the stems. The barks of the stem is separated from the stem using the knives and peeled completely. The barks of the plant were laid in sunlight for three days to dry and then it was processed biologically. Fibre was extracted using water retting method. Water retting process employs the action of bacteria and moisture on plants to dissolve or rot away much of the cellular tissues and gummy substances surrounding the bast-fibre bundles. Thus facilitates separation of the fibre from the stem. The barks of the plant are placed in the slow stream. Stones are laid over the bark to restrict movement of the bark. This process was continued for about 15 days. The retted bark was taken out and beaten with wooden hammer and washed thoroughly to remove the impurities. The fiber is taken and boiled with ash for smoothening of the fibers after which the clean fiber is taken and dried thoroughly.

OPENING, BLENDING AND CLEANING

Opening was done in order to loose the hard lumps of fiber and disentangle them. The fibers were fed into opening machine which passes through rollers with metal hooks which opens the clusters of fibers and separates the fibers. Cleaning was done to remove the trash such as dirt and burrs. Since the natural fiber has a lot of impurities, it is necessary to clean them. After cleaning 50% of cotton and 50% of Girardinia diversifolio fiber was blended to obtain uniformity of fiber. This process was done manually.

CARDING PROCESS

The initial process of arranging the fibers in parallel is known as carding.

**Carding Web****Carding Sliver**

The remaining impurities were removed and the fibers were disentangled and straightened using the carding machine. Raw fibers were placed on the in-feed table or conveyor is moved to the nippers which restrain and meter the fibre onto the swift. As they are transferred to the swift, many of the fibers are straightened and is rotated into a drum to form a thin sheet. Then the sheet is cut in one end and removed which is called web. The web fed into the conveyor passes through an orifice which compacts them slightly and produces an even strip of fibers called carded sliver.

DRAWING PROCESS

The drawing machine makes slivers obtained from the carding engine by uniting or doubling a number of them and then drawing them to about a many times their original length as the number of doubled slivers amount to. The evenness would be perfect in each cross section of the entire length of the sliver.

**Drawing Machine**

The carding sliver fed to the drawing frame where the sliver passes through three set of rollers. It is then collected in a can kept underneath the machine. This process was repeated for three times to create evenness in the yarn.

SPINNING PROCESS

The spinning process is an ancient textile art in which plant, animal or synthetic fibers are twisted together to form yarn briefs Toshinari (1994). Characteristics of spun yarn vary according to the material used, fiber length and alignment, quantity of fiber used, and degree of twist.



Spinning Machine

The carding sliver was converted into yarn by using computerized Open-End Rotor spinning machine. The drawing sliver was fed into the spinning machine. The twist, count and speed of rotation are fed into the computer and the machine was operated. Then the sliver was twisted and wound on the bobbin.

WARPING AND SIZING PROCESS

The large spools of yarn are wound into a beam which is used for weaving, a process known as warping. The warp yarns are wound onto the beam from packages mounted on creels. The warp yarns normally pass through sizing solution. Sizing protects the yarn against snagging that occurs during weaving.

REELING PROCESS

The spinning processes the thread is wound upon bobbins. The cone is fitted to the reeling machine and then the thread from the cone is transferred into small bobbin to be inserted in to the shuttle for weaving.

WEAVING

The yarns are converted into fabric by weaving process. The interlacing of two sets of threads crossing each other at right angles is called weaving. Girardinia diversifolio and cotton mixed fabric is manufactured in hand loom.

FABRIC TESTS

The fabric samples produced in this study is analysed for its characteristics with the following tests

1. Tensile strength
2. Fabric Count
3. Fabric Thickness
4. Fabric Weight
5. Abrasion
6. Drapability
7. Absorbency



4.3.1 TENSILE STRENGTH

The strength is a measure of the resistance of the fabric to a tensile load or stress in either warp or weft direction. The fabric sample is tested for its tensile strength in warp and weft direction. The tensile strength of fabric in warp strength is 18.65 kg, warp elongation is 20.18% and weft strength is 13.36 kg and 18.60%.

4.3.2 FABRIC THICKNESS

Thickness of the fabric is defined as the distance between the upper and lower surface of the fabric measured under specified pressure. The fabric sample is subjected to fabric thickness test. The thickness of the fabric is 0.8mm.

4.3.3 FABRIC WEIGHT

Fabric weight covers the measurement of fabric mass per unit area The weight of the fabric is 24.5 gms/m².

4.3.4 FABRIC COUNT

The fabric count of the fabric is denoted by the number of ends per inch and number of picks per inch. The Girardinia diversifolio fabric created has 30 ends per inch and 29 picks per inch.

4.3.5 ABRASION RESISTANCE

Abrasion resistance is the ability of a material to withstand mechanical action such as rubbing. The abrasion resistance of the fabric was found to be 98.5%.

4.3.6 DRAPABILITY

Drapability is the capacity of a fabric to fall attractively into folds. The drapability of the fabric is 43.33%.

4.3.7 ABSORBENCY

The time taken to absorb the water is called absorbency by droplet method. The absorbency of the fabric by Droplet method is 3 sec.

The time taken by the fabric to immerse completely in water is called absorbency by immersion method. The absorbency of the fabric by immersion method is 9 sec.

CONCLUSION

The properties of the fabrics are analyzed by fabric testing. It is found that the fabric has good abrasion resistance. Visual inspection by the experts success the acceptance level. The study states that Girardinia diversifolio cotton fabric is eco friendly and can be used as textile material for clothing.

BIBLIOGRAPHY

- ❖ A Shwini K. Agarwal - Introduction to natural fibers, Elsevier Publishers, 1959, Pg. 13.
- ❖ A.N.Galathi - The physical Properties of Cotton, Asia Publishing house Bombay, 1957 Pg.122.
- ❖ Albert Easton Lewis - Introduction To Textiles Sir I. Pitman, 1928, Pg. 6
- ❖ Barrett Hazeltine - Field Guide to Appropriate Technology, Academic press, 2003, Pg. 125.
- ❖ B. P.Saville - Physical testing of textiles, Woodhead Publishing Ltd. 1999 Pg. 145.
- ❖ Bhuvnesh Chandra Goswami - Textile sizing, Taylor & Francis Library, 2005, Pg. 69.
- ❖ Cheryl Mendelson Laundry, Published by Philadelphia printers.1848, Pg. 55.

WEBSITE ADDRESSES

- www.allfiberarts.com/library/.../aa052502.htm - United States
- www.selfsufficientish.com/forum/viewtopic.php
- [www.botanical.com/botanical/mgmh/n/Girardinia diversifolio03.html](http://www.botanical.com/botanical/mgmh/n/Girardinia%20diversifolio03.html)
- [www.rosenlake.net/er/Grieves_Girardinia diversifolio_Common.html](http://www.rosenlake.net/er/Grieves_Girardinia%20diversifolio_Common.html)
- [www.suite101.com/content/ethnobotany---useful-Girardinia diversifolios-a222495](http://www.suite101.com/content/ethnobotany---useful-Girardinia%20diversifolios-a222495)

