

***Blending Mesta
with Natural Colour
Cotton: A Novel
Approach***

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India is known for the production of a variety of textile fibers since ages. The textile industry is next to agriculture in terms of providing employment and earns significant returns to the country's foreign exchange earnings. There is a change observed in the trend of production and consumption of textiles and apparel during the last two decades that is the resultant of increasing awareness and general consciousness of preserving/conserving the ecology. Therefore there is need to review and revive the utilization of the underutilized natural resources to yield environmental friendly products and processes.

Agriculture is one of the major occupations of a majority of population in India. Vegetable fibers are known for their bio-degradability, non-carcinogenic and eco/health-friendly nature. Besides cotton a number of bast, fruit and leaf fibres are extracted to meet indigenous needs of the farmers. Jute, mesta, flax, sisal, ramie, pineapple leaf fibre, areca nut fibre and kapok are a few agro-based fibres used for household and farm requirements. Mesta fibre is basically grown by farmers as a vegetable crop. However, few plants also are used as hedge plants that grow tall and are later retted for fibre extraction. Fibre extracted is manually spun into ropes for home, cattle and farms. Two cultivated varieties of mesta varieties are *Hibiscus cannabinus* and *Hibiscus sabdariffa*. They are coarser but known to be stronger than jute. They possess very good luster that adds to its ultimate /overall appearance. Over a period of time, cordages made of synthetic polypropylene strands raveled out from seed/fertilizer bags and nylon cords are extensively used by the farmers. Thus mesta fibre extraction that is tedious requiring labourforce, is hardly done by any farmer. This inturn is declining the utility of mesta fibre. It is therefore felt necessary to identify new vista for the utility of mesta fibres that inturn would fetch better returns for the farmers. Hence, the present effort was made with and objective to know the possibility of spinning mesta fibre and to recommend the application of the mesta yarn for variegated end uses.

Material and Methods

Sourcing raw material

Natural Light brown cotton lint was procured from Agricultural Research Station, University of Agricultural Sciences, Dharwad and Mesta stalks from Main Research Station, UAS, Dharwad.

Mesta Fibre Extraction

Stalks from the physiologically matured mesta plant were cut and spread in the fields until dry. These stalks were later scotched, hackled and tied into bundles. These stalks were soaked in tank for degradation of the gum present in the stalks. The stage of harvesting mesta stalks, type and amount of water influence the time required for fibre extraction. On optimum rotting, the fibres get loosened that needs to be washed and cleaned. The fibres were finally washed thoroughly in plain water and dried.

Production of blended yarn

Mesta fibres were mechanically cut to an approximate length of 30mm & it is multicellular fibre we opened up the bundles of fibres to the individual stage by hand opening. It resulted into a fibre extraction percentage of only 10 per cent. Those opened fibres were mixed with Light brown natural color cotton fibres in the proportion of 20:80, respectively.

The fibre mixture was then processed on the conventional cotton carding machine to obtain sliver that was laterly converted to slub yarn with random slub effect with a yarn count set to 15s Ne. Spinning process was accomplished at the DKTE's Textile and Engineering Institute, Ichalkaranji.

Assessment of physical parameters

Natural Colour Cotton and mesta fibres were assessed for basic quality parameters viz., length, strength, elongation and fineness. The Unevenness percentage, 2.5 per cent span length were also recorded.

Natural Colour Cotton / Mesta blended slub yarns were assessed for the strength and elongation. The count strength product (CSP) was calculated to know the applicability of the yarn produced.

Results and Discussion

Table 1: Physical properties of Natural light Brown and Mesta fibres

Sr.	Physical Parameters	Natural Color Cotton fibres	Mesta Fibres
1	Length	2.5% span length (mm): 26.70 50% span length (mm): 12.30	50-60 inches
2	Fineness	Micronaire value ($\mu\text{g}/\text{inch}$): 3.7	187.5 denier (20.831 tex)
3	Strength	19.8 grams/tex	450gf (21.60 grams/tex)

Primary parameters of the natural fibres are recorded in Table 1. Fibre length of Natural Light Brown cotton fibre was 26.70mm while that of mesta was 50-60 inches. Natural Colour Cottons are the traditional cotton varieties that are being re-researched for improved fibre parameters. They are known for their eco-friendly nature because of their natural colour obtained genetically without the use of chemical dyes. Natural light brown varieties exhibit better fibre parameters than the darker shade cottons. Mesta fibre that has poor fibre parameters needed good quality fibre as counterpart to yield better quality yarn. On the other hand, mesta being a bast fibre had an average length of 55 inches.

Fineness values showed 3.7 $\mu\text{g}/\text{inch}$ for cotton and 187.5 denier for mesta fibre. Cotton fibre fineness could be rated as 3-4 micronaire (fine-average) based on the SITRA norms for spinning. There was noticeable variation observed with regard to the diameter of mesta fibre. The fibres were coarser at the base and finer at the top. Hence the observation recorded at the base was 195 denier and 180 denier at the top that is because of the

hardening of the cellulosic content at the base over a period of time.

Strength of cotton exhibited a reading of 19.8 g/tex whereas 21.60 g/tex by mesta fibres. Mesta fibres being lingo cellulosic in nature have higher fibre strength than the cellulosic seed hair fine fibre -cotton.

Elongation percentage of the two fibres varied exceptionally with 6.20 per cent for cotton and only 0.50 per cent for mesta.

Table 2: NCC/Mesta yarn parameters

Sr.	Yarn Parameters	Readings
1	Count(s)	15s
2	Tenacity (gf/tex)	12.93
3	Elongation (%)	0.97
4	Turns Per Inch	13 tpi
5	CSP	1156

The uniformity ratio of cotton fibre was 46.1 per cent that is poorly rated according to the SITRA norms for spinning. Secondly there was noticeable difference in the fineness of both the fibres. The elongation percentage of mesta being very low makes it less suitable for producing yarn with good unevenness percentage at spinning. It was therefore suitable for producing slub yarns. The physical parameters of natural light brown colour cotton/mesta blended yarn are represented in table 2. The count of slub yarn was 15s Ne with random slub effects. The turns per inch maintained for the yarn was 13 tpi.

The tenacity of the yarn was 12.93 gf/tex with elongation of 0.97 percentages. The count strength product of the yarn was 1156 that indicates the suitability of the yarn as weft.

The yarn was also subjected for visual assessment by the spinning experts at DKTE's Textile and Engineering Institute and weavers at Ichalkaranji. Recommendations and suggestions given by the experts and weavers are compiled herewith:



- Yarn strength and the CSP values indicate the usage of the slub yarn as pick (weft) in fabric production.
- Mesta fibres protruding out in the yarn have a crispy feel and hence may be suitably utilized for winter wear especially as suiting material.
- Blending of mesta fibre with white cotton to produce slub shall also produce fancy effects in yarn with light brown striations.
- Dyeing of slub yarn produced by mixing of Cotton/& mesta fibre shall produce fancy shaded effects in the yarn.
- Such fancy yarns are also suitable for designing furnishings.
- Mesta fibre can be bleached, softened and used for blending to produce clothing.

There are varieties of agro-based/ natural fibres available in the environment that need to be expedited commercially for sufficing the needs of the health conscious consumers. Research and studies to utilize such fibres shall provide better opportunities for the farmer in terms of income.

The primary research done by the author is indicating the end use of Mesta fibres along with cotton in the furnishing types & in suiting material with crispy feel similar to tery wool type of costly suiting material Wool being a costliest component material in suiting & terylene (polyester) has limited availability being a petroleum product, mesta blended cotton fabric will be the rising sun. Only need to make farmers aware to grow mesta to increase the yield to suit demand - supply chain.

References

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